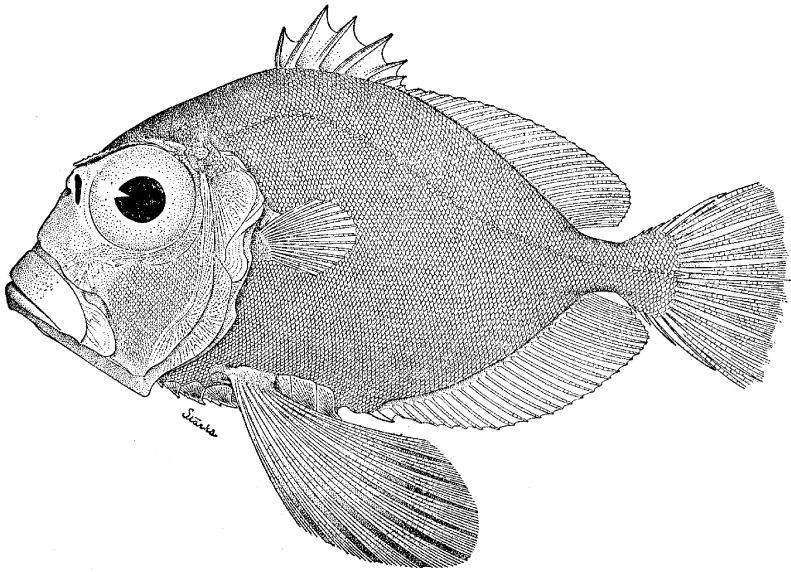


# BISHOP MUSEUM BULLETINS IN ZOOLOGY

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## Checklist of the Fishes of the Hawaiian Archipelago

Bruce C. Mundy



*Bishop Museum Bulletin in Zoology 6*

Bishop Museum Press  
Honolulu

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September 2005

**Checklist of the Fishes  
of the Hawaiian Archipelago**

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**Bishop Museum Press  
Honolulu, 2005**

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As with any project of this duration and this size, some contributors will likely be omitted from this list. My apologies and gratitude go to those whom I may have overlooked in these acknowledgments. Errors in this checklist are the fault of the author and not those of the reviewers who exerted considerable effort to correct the manuscript.

## SUMMARY

All fish species recorded from within the 200 nautical mile exclusive economic zones surrounding the State of Hawai'i and Johnston Atoll (200-nmi EEZ) are reviewed. These species are identified as endemic, indigenous, successfully introduced, unsuccessfully introduced, waifs, questionably occurring in the region, or falsely recorded from Hawai'i's waters. Fish species that have been taken near but not within the 200-nmi EEZ and whose general distributions indicate that they can be expected to occur in Hawai'i's waters are also listed. Hawaiian and English common names are given for species that have either. A regional synonymy is given of scientific names that have been used for records of each species from the Hawaiian Islands. For each species, information is given on its geographic distribution and depth range within the Hawaiian Archipelago, its entire geographic range, its entire depth range, and its general habitat. A bibliography on the taxonomy and biogeography of these species is included. The history of ichthyology in the Hawaiian Islands is reviewed.

There are 1250 fish species recorded within the 200-nmi Hawaiian Islands and Johnston Atoll EEZ, including 55 introduced species that have successfully established reproducing populations. Also included in this number are 26 species recorded from ephemeral occurrences that are considered to be "waifs" or "expatriates" and do not appear to have reproducing populations within the 200-nmi Hawaiian Islands and Johnston Atoll EEZ. Excluded from the total are 49 introduced species that failed to become established. There are 79 demonstrably false records of fish species from the region and 38 species with questionable records. Twenty-five of the 1250 confirmed species (and an additional three unconfirmed species) have not been found in the Hawaiian Islands but are recorded from Johnston Atoll, which is clearly part of the Hawaiian biogeographic region. The only indigenous freshwater species are five species of amphidromous gobioids. Fish species continue to be newly recorded from the region at a slow but steady pace. An additional 104 wide-ranging, oceanic species not recorded from the 200-nmi EEZ will likely be found in Hawai'i's waters, bringing the probable number of Hawaiian fish species to 1354. An extrapolation of new fish discoveries in the region between the first published record in 1782 and 1999 suggested that about 1357 species may eventually be found in the region.

The 10 families with the most species recorded from Hawai'i's waters are the Stomiidae (76 species), Myctophidae (67), Muraenidae (49), Labridae (46), Gobiidae (36), Macrouridae (29), Scorpaenidae and Acanthuridae (28), Carangidae (26), and Chaetodontidae (24). Many fish families common in continental regions are absent in the Hawaiian Islands. Most fish species found in the Hawaiian region occur throughout the region, but there are distinct subsets of species found only at the extreme ends of the archipelago. There is marked faunal variation along the archipelago caused by changes in the relative abundance of dominant taxa, however. The majority (52.4%) of Hawai'i's fish species live in close association with substrates but only 25.8% are truly benthic. Entirely pelagic species comprise 35.5% of the fauna. Most (81.3%) of the species live in the upper 200 m of the water column, 17.6% dwell below 200 m, and just 1.1% live only below 1000 m. There has been almost no sampling of fishes below 2000 m in the Hawaiian Islands and only 3 species (0.2%) live exclusively below 2000 m. Cosmopolitan species are only 1.8% of Hawai'i's fish fauna but circumtemperate species are 10.4%. There are 155 circum-subtropical species (12.4%) and 364 Indo-Pacific species (29.3%). Seventeen of the undescribed or unidentified species have unknown ranges. The largest biogeographic category of Hawai'i's fish species is that of Pacific Ocean endemic species, which are 36.9% of the fauna (462 species). This includes 195 species that are found only in the Hawaiian Islands and Johnston Atoll. The percent of endemism in the islands is 15.6% overall or 22.3% if entirely pelagic species are excluded.

The origins of Hawai'i's fish fauna are reviewed, using phylogenetic relationships and present-day distribution patterns to argue that the same processes influenced the evolution and biogeography of both the shore ichthyofauna and the oceanic ichthyofauna. Vicariant speciation and larval dispersal are discussed as the two processes that most influenced the evolution of Hawai'i's fish fauna. The discussion develops the hypothesis that changing ocean-circulation through geologic time was the major driving force for vicariance and dispersal of central Pacific fish taxa in all habitats. A scenario of prehistoric changes in the geology and oceanography of the Pacific Ocean, the formation of the Hawaiian Islands, and the fossil record of fishes is given to place the origins of Hawai'i's fish fauna in context with knowledge of the earth's evolutionary history. The marine biota of Pacific Islands was shaped through dispersive colonizations, local extinctions, and the evolution of endemic species via peripheral isolation. The extant Hawaiian Islands shore fish fauna may not have formed until after ocean currents intensified in the Oligocene (ca. 34 ma), but the oceanic fauna probably evolved in situ as the archipelago formed beginning in the Cretaceous. Several biogeographic sources are indicated for the fauna: 1) an ancient Tethyan connection to the eastern Pacific and Caribbean; 2) an ongoing but minor connection to the eastern Pacific; 3) a weak connection to islands of the southeast Pacific; 4) a strong connection to islands to the south and west of the archipelago that probably was more pronounced in the Pleistocene; and 5) a strong present-day connection from the northwestern Pacific to the Emperor Seamounts and Northwestern Hawaiian Islands.

The fish fauna of the Hawaiian Archipelago is being altered by human activities but is healthier than either the terrestrial biota of the islands or the fish faunas of many other parts of the world. No species are considered endangered. Only one, the stream-dwelling 'o'opu alamo'o (*Lentipes concolor*, a goby), has been proposed for listing under the U.S. Endangered Species Act, but its numbers are greater than once thought. The major threats to the region's fish populations are habitat degradation, pollution, overfishing, and introduced species. Freshwater stream, estuarine, and coral-reef fishes are most susceptible to habitat degradation and pollution. In general, fishing pressures are primarily of concern in the main islands rather than threats to fish species throughout the region. Four snappers and one grouper are considered locally depleted in the main Hawaiian Islands, and one armorhead is considered overfished at seamounts at the northern end of the 200-nmi EEZ. There is little evidence that introduced species have directly damaged fish populations although fishermen claim that the bluestripe snapper *Lutjanus kasmira* competes with and preys upon indigenous species. The increasing number of introductions is of concern for resource managers, however. Fish populations in the Hawaiian Archipelago are protected by the region's refuges, especially the vast expanse of the Northwestern Hawaiian Islands. The prognosis for the continued health of Hawai'i's fish biodiversity away from centers of human population is therefore good.

## INTRODUCTION

“Research that depends on exact counting of species either across space or through time is probably misconceived, because the historical nature of the evolutionary process imparts an inescapable indeterminateness to the notion of ‘species’.” (O’Hara, 1994).

“So I have decided to issue this volume regardless of its errors and completeness and to allow the next generation to make additions and corrections in their books and publications.” (Tinker, 1982).

The fish fauna of the Hawaiian Archipelago is the best known of any region on the Pacific tectonic plate (Fig. 1). Hawai‘i is the only oceanic Pacific island archipelago in which the midwater and deep-benthic fish faunas from >200 m have been extensively sampled. Despite this, there is no adequate, comprehensive checklist available for the entire Hawaiian Archipelago fish fauna. Neither is there a compilation of bibliographic sources on the distribution or taxonomy of Hawai‘i’s fishes. This checklist is intended to fill this gap.

The checklist builds upon the earlier efforts of Gosline & Brock (1960) and Tinker (1982). It is intended to be used as a guide to changes in Hawai‘i’s fish taxonomy and systematics that have occurred since those efforts, as an initial source for the primary literature for Hawaiian Islands records of fishes prior to 2005, and as a source for future summaries of Hawai‘i’s fish fauna.

The first attempt at a complete listing of the fishes of the Hawaiian Islands came at the turn of the 20th century, sponsored by the U.S. Bureau of Commercial Fisheries and done by ichthyologists of Stanford University and the Bureau (Jordan & Evermann, 1905; Gilbert, 1905). More than 50 years passed before the next listing from the University of Hawai‘i by Gosline & Brock (1960). At the time of that publication Vernon Brock was director of the Bureau of Commercial Fisheries’ Pacific Ocean Fishery Investigation laboratory, is now the Pacific Islands Fisheries Science Center (PIFSC) of the National Marine Fisheries Service (NMFS). It thus seems appropriate that the next listing of the island’s fishes be offered following another 50-year interval after the turn of another century. I am pleased to present this effort as a product of the same agency that sponsored the 1905 lists (renamed NMFS from Bureau of Commercial Fisheries when the agency was transferred from the U.S. Department of Interior’s Fish and Wildlife Service to the U.S. Department of Commerce’s National Atmospheric and Oceanic Administration in 1970). It is also satisfying that the current list is presented after the 50-year anniversary of the founding of the NMFS PIFSC, from which many of the region’s ichthyological discoveries were made during the past 50 years and where the author was employed during the preparation of this list.

“Fish” and “fishes” are vernacular terms without precise scientific meaning. For the purpose of this list these terms include animals possessing a notochord (i.e., in the Phylum Chordata), well-developed muscle segments (myotomes) in the trunk and tail at all life stages after hatching, and fins or fin-folds as adults. Almost all are capable of swimming as juveniles and adults; perhaps the sole exceptions to this are the parasitic males of certain species of deep-sea anglerfish. The taxonomic groups included are the lancelets (Subphylum Cephalochordata); hagfishes (Subphylum Myxini); cartilaginous fishes such as sharks, rays, and ratfishes (Class Chondrichthyes); and ray-finned bony fishes (Class Actinopterygii). Extinct fish taxa are excluded because fish fossils from the Hawaiian Islands are unknown. The lancelets (Cephalochordata) are included even though they are not called “fish” because they superficially resemble actinopterygian larvae and because larval lancelets are often collected in plankton samples with pelagic, marine actinopterygian larvae.

The discussion is included before the checklist even though the checklist is equivalent to the “results” section of most scientific papers. This departs from the usual convention in scientific publication, but it seems useful because it will allow readers access to the conclusions of this survey without having to go through hundreds of pages of species-listings to reach them. Details and citations that support the claims and conclusions of the discussion are found in the checklist that follows.

## METHODS

This list was compiled almost entirely from the literature. Unpublished records based on specimens were added for a few species in NMFS collections; these are cited as “NMFS PIFSC, unpubl. data”. Other unpublished records obtained from researchers elsewhere are cited as personal communications. The list was initially compiled by consulting major reviews of Hawai‘i’s fish fauna: Jordan & Evermann (1905), Gilbert (1905), Gosline & Brock (1960), Struhsaker (1973a), Randall (1976a, 1981a), Tinker (1982), Springer (1982), and Humphreys *et al.* (1984). Information was subsequently incorporated from other major summaries of the fauna published as the list was compiled (i.e., Uchida & Uchiyama, 1986; Borets, 1986; Hoover, 1993; Randall *et al.*, 1993a,b; Hoover, 1993, 1994, 2003; Chave & Mundy, 1994; Randall, 1996a). The primary literature was

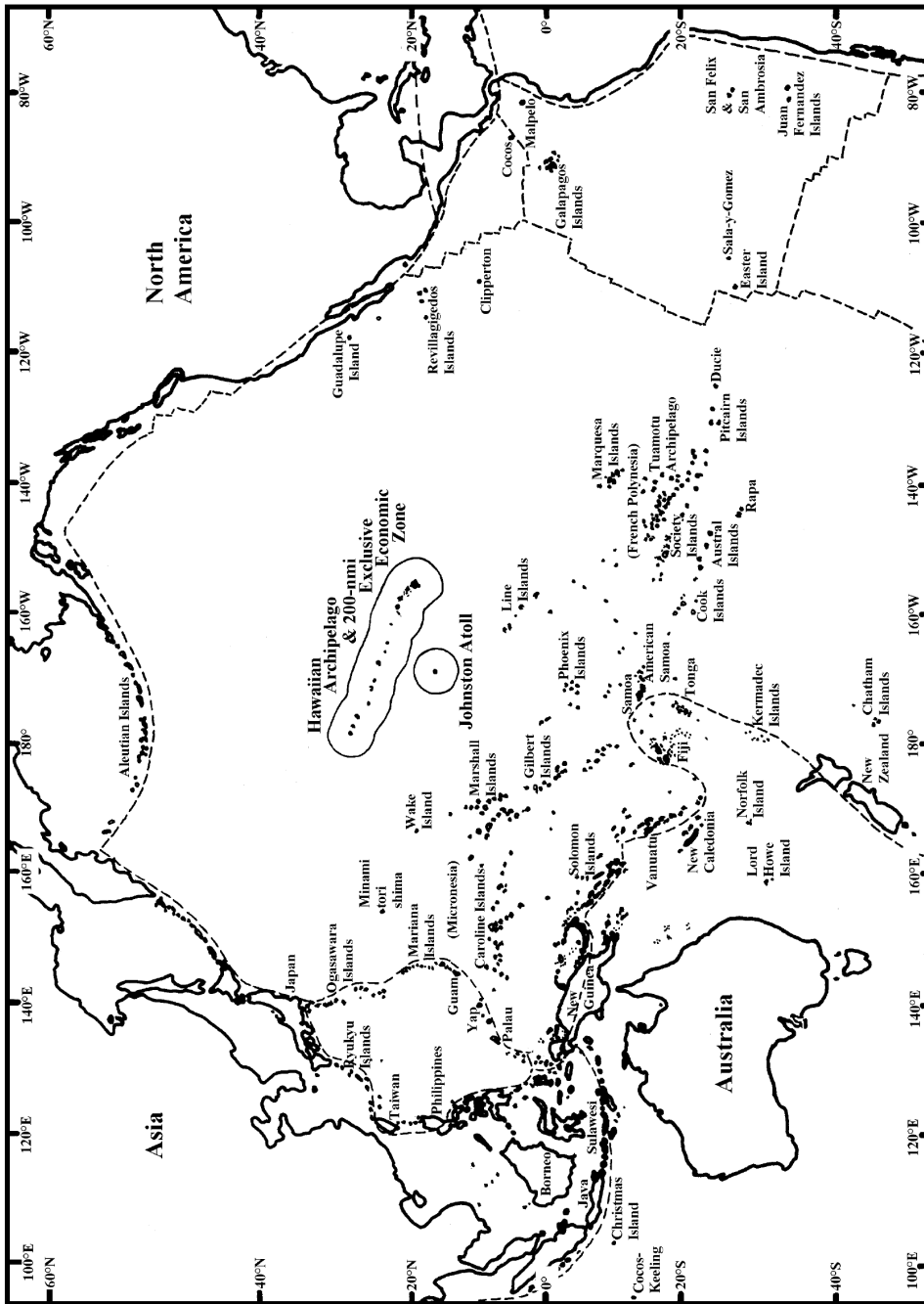
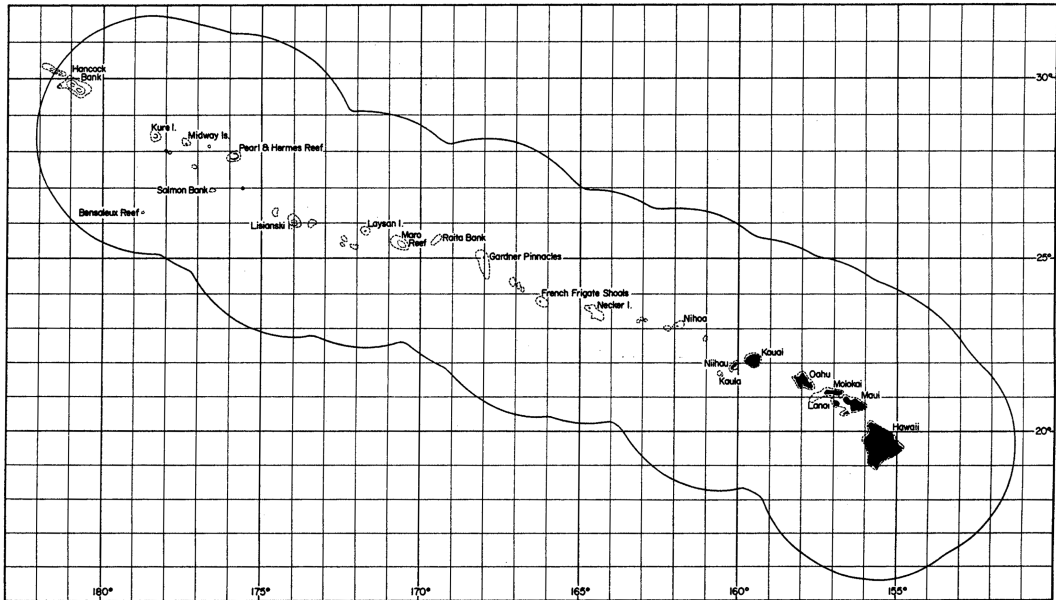


Figure 1. A map of the Pacific Ocean basin showing the location of the Hawaiian Archipelago and Johnston Atoll, within their respective 200-nmi Exclusive Economic Zones, in relation to other Pacific island groups and continents. The dashed lines indicate the boundaries of tectonic plates (modified from Springer, 1982).



**Figure 2.** A map of the major Hawaiian Islands, including the Northwestern Hawaiian Islands (Nihoa to Kure). The curved lines indicate the boundaries of the 200 nautical mile Hawaiian exclusive economic zone.

consulted for fish families included in those summaries to obtain records of other species and to confirm the occurrence and taxonomic status of species in the reviews. The checklist includes records and taxonomic changes published before March 1, 2005.

The region of coverage for the list is the 200-nmi Exclusive Economic Zone (EEZ) of the Hawaiian Islands (Fig. 2). It includes all fish species taken within a 200-nmi radius of the emergent landmasses of the State of Hawai‘i. Thus, it includes records from all waters within this radius from the “Big Island” of Hawai‘i north past Kure Atoll. Several seamounts north of Kure Atoll, including the extensively sampled Hancock Seamounts, are included within this radius. The undersea volcano Lō‘ihi, south of the island of Hawai‘i, is also included. The geological feature extending from Lō‘ihi Seamount through the Hancock Seamounts is the “Hawaiian Ridge”. Colahan Seamount is the northernmost feature of the Hawaiian Ridge, but it is outside of the 200-nmi EEZ. The nomenclature and locations of the Emperor Seamounts were taken from Clague *et al.* (1980). The nomenclature and locations of the Northwestern Hawaiian Islands and adjacent undersea features of the Hawaiian Ridge were taken from Uchida & Uchiyama (1986).

Records of fishes from Johnston Atoll (Fig. 1) are also included in this list. Johnston Atoll is geologically part of the Line Island Ridge and is outside of the Hawaiian 200-nmi EEZ. It is included here because, as discussed later, it is the only other island within the Hawaiian zoogeographic province (Randall *et al.*, 1985b; Ralston *et al.*, 1986; Kosaki *et al.*, 1989; Boehlert *et al.*, 1992). A few records of widespread, deep-living pelagic or abyssal species from other sites in the central North Pacific Ocean are also included because it is likely that these species will be found in Hawai‘i’s waters when the deeper (>2000 m) fauna is sampled.

Higher taxa in this list, through the subfamily or tribe level, are arranged following the format of Nelson (1994) except where noted. Spellings of these taxa may differ from Nelson (1994) as suggested by other studies. Taxa at the ordinal level and lower are identified by their conventional suffixes in ichthyology: “-iformes” for order, “-oidei” for suborder, “-idae” for family, “-inae” for subfamily, and “-ini” for tribe. Genera and species are arranged alphabetically within their families, subfamilies, or tribes.

Species headings in bold type flush left are those for which taxonomy and Hawaiian Islands records have been confirmed in the primary literature. Species headings in square brackets flush left are those for which taxonomic validity and occurrence have not been confirmed or that have had disputed information on ranges or taxonomy for which authoritative resolution could not be found.

Eric Knight Jordan (1925), son of the famous and prolific ichthyologist David Starr Jordan, described several new taxa and first recorded other nominal species from the Hawaiian Islands. To avoid confusion and in departure from usual textual citation convention, the initials of E.K. Jordan are included in citations of this work to distinguish it from papers by his better known father.

Several printings of Hoover (1993, 1994, 2003, among others) had revisions and additions to the text that would normally justify recognition of those printings as different editions, but they have not been so identified by the publisher. This checklist includes information only from the first, second, and ninth printings. The first printing is cited because it included several first records and other useful information for fish species from the Hawaiian Islands. The second printing is cited because it included most of the changes and additions to the first. The ninth is cited as the most recent summary of cumulative changes in other printings prior to publication of this checklist.

Abbreviations for ichthyology collections and institutions are from Leviton *et al.* (1985) and Leviton & Gibbs (1988).

The format for each species includes:

**SCIENTIFIC NAME** = the species name considered valid in recent taxonomic literature. Publication dates and authorship of species names are from Eschmeyer (1998) except for the Amphioxiformes from Poss & Boschung (1996) and a few other species as noted in the text. Valid scientific names and common names are followed by information on the original taxonomic description of the species, including the name by which the species was first taxonomically described, the author, date of publication, page, and location from where the type material was collected. This information is cited from Eschmeyer (1998) for species described prior to that work's completion and from original descriptions for species described thereafter. A regional synonymy follows the information on each species' first description giving scientific names used in major works on Hawai'i's fish fauna and primary papers that discuss the taxonomic status of the species. A question mark (?) following a citation in the regional synonymy indicates uncertainty about the correct identification of the specimens mentioned in the cited reference. The regional synonymies are not intended to be a complete taxonomic review, but only a guide to the names used in the regional literature to validate central Pacific occurrences and nomenclature. The authorship of pre-1998 names in the synonymies follows from Poss & Boschung (1996) and Bigelow & Perez Farfante (1948) for the Amphioxiformes, and Eschmeyer (1998) for other species.

**TAXONOMY** = references accepted as authoritative for taxonomy for the species.

**COMMON NAMES** = these are listed with Hawaiian names first, followed by names considered official by the American Fisheries Society (AFS) (Robins *et al.*, 1991a,b) or United Nations Food and Agriculture Organization (FAO) (from the various FAO species catalogues and identification guides), and lastly other common names used frequently in Hawai'i. Two widely available and authoritative popular guides to Hawai'i's fishes, Hoover (1993, 1994, 2003) and Randall (1996a), were used as the primary sources for common names, with augmentation from two similar sources for Pacific fishes in general: Myers (1999) and Randall *et al.* (1997a). Many common names used in the local fishing community were taken from an unpublished working list by the State of Hawai'i's Department of Land and Natural Resources (DLNR). These include certain names of Asian derivation (such as "menpachi", "gindai", and "onaga") that have become the most frequently used names for their species by local fishermen and are often misunderstood as being of Hawaiian origin. Citations are sometimes not given for other common names used within Hawai'i's fishing community or in the local aquarium-hobby community. Common names are not listed when none was found in the literature or when only unwieldy "coined" names were found. Many of the common names created by Tinker (1982) are the prime examples of the latter.

**HAWAIIAN RECORDS AND RANGE** = the southeastern-northwestern extent of the species' distribution along the Hawaiian Ridge and the source of the Hawaiian records for the species, including the first record of the species in the archipelago. Locations are given as islands or seamounts, on the assumption that for most species too little sampling has been done to define the ranges on a finer scale. In many instances, O'ahu is given as a limit or only location of occurrence. It should be recognized that this is an artifact of sampling. Most collecting in Hawai'i has taken place around O'ahu, including the sampling by Jordan & Evermann (1905) much of which was at the Honolulu fish market. Records from fish market sampling by Jordan & Evermann (1905) are recorded as from O'ahu even though many of the fish there may have been taken elsewhere. Many readers will know that numerous species have broader ranges in the Hawaiian Islands than are given here, but without published records this information could not be incorporated into this list. It is hoped that future publications will better document the ranges of the common fishes of the Hawaiian Islands. Depths of occurrence are taken from the literature without critical review. Depths are rounded to the nearest meter and records from the upper few centimeters of the ocean or shoreline are



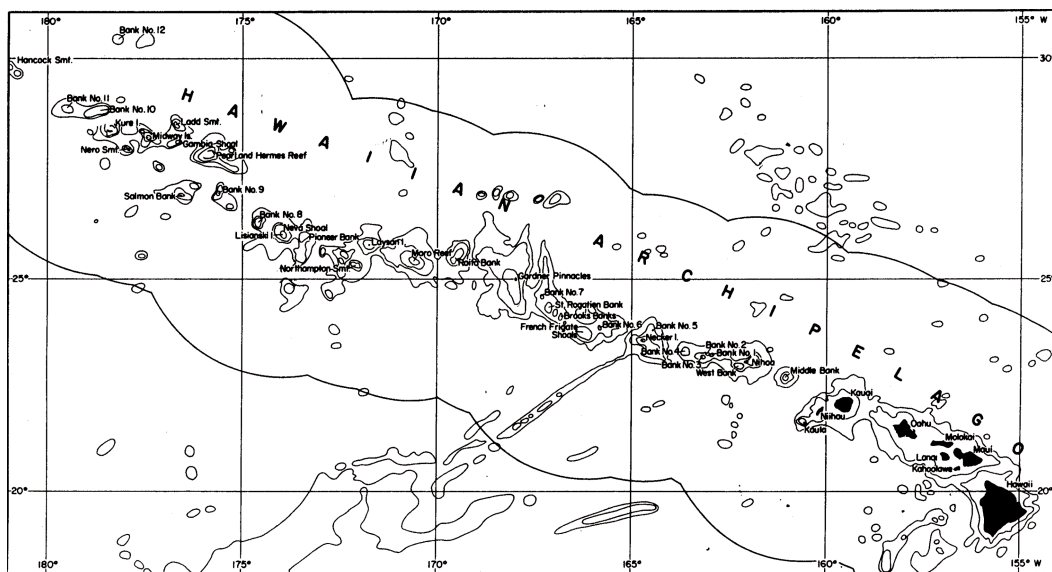


Figure 3. Detailed map of the Hawaiian Islands showing emergent islands and submerged seamounts within the 200-nmi Hawaiian Exclusive Economic Zone (from Uchida & Uchiyama, 1986).

given as “1 m”. For oceanic taxa, “fishing depths” are sometimes given to indicate collections taken with non-opening/closing gear. “Fishing depths” indicate that a species was taken within the range given; the actual depth ranges of these species may prove to be much more restricted once samples have been collected with opening/closing nets. Locations and depths of occurrence of shallow dwelling species sometimes include the author’s unpublished diving observations;

GENERAL RANGE = the entire range of the species outside of the Hawaiian Islands. The general habitat and depth range of the species are given. These ranges are given as coarse indications of the species’ geographic and vertical distributions.

No other life history or ecological information is included, but this information can often be obtained by consulting the references cited for each taxon or from their bibliographies. The compilation of keys, illustrations, guides to identification, and synopses of biological data on Hawai‘i’s fishes was a larger task than could be finished by the author. It is hoped that this checklist will facilitate completion of such compilations.

#### KEY TO ABBREVIATIONS AND HAWAIIAN GEOGRAPHIC LOCATIONS (Fig. 3)

**Bank 8** = an unnamed bank northwest of Lisianski, Northwestern Hawaiian Islands (26°17'N, 174°34'W)

**Bank 10** = an unnamed bank northwest of Kure Atoll, Northwestern Hawaiian Islands (28°58'N, 178°42'W)

**Bank 11** = an unnamed bank northwest of Kure Atoll, Northwestern Hawaiian Islands (28°53'N, 179°38'W)

**Brooks** = Brooks Bank northwest of French Frigate Shoals, Northwestern Hawaiian Islands (23°07'N, 166°42'W)

**Colahan** = Colahan Seamount, the most northwestern feature of the Hawaiian Ridge (31°0'N, 176°15'E)

**Cross** = Cross Seamount, southwest of Hawai‘i Island (18°44'N, 158°15'W)

**EEZ** = Exclusive Economic Zone. Legally defined as federally controlled waters between 3 and 200 nautical miles from shore but for brevity used in this manuscript to include all waters within 200-nmi from shore, including waters from 0–3 nmi from shore that are legally under state control.

**French Frigate** = French Frigate Shoals, Northwestern Hawaiian Islands (23°45'N, 166°10'W) including Shark, Tern, Trig, Whale-Skate, Round, Mullet, Near, Bare, East, Gin, Little Gin, and Disappearing Islands, as well as La Pouse Pinnacles

**Gardner** = Gardner Pinnacles, Northwestern Hawaiian Islands (25°00'N, 167°55'W)

**Hawai‘i Island** (18°45'–20°20'N, 154°45'–156°05'W) = the largest and most southeastern of the main Hawaiian Islands, correctly called only “Hawai‘i” but often called “the Big Island” in local parlance. “Hawai‘i Island” is used in this checklist to avoid confusion with the use of the name Hawai‘i for the state or island archipelago as a whole.

- Hancock** = Hancock Seamounts (28°48'N, 179°04'E and 30°16'N, 178°43'E)  
**HURL** = Hawai'i Undersea Research Laboratory, University of Hawai'i at Mānoa  
**Johnston** = Johnston Island (16°45'N, 169°30'W)  
**Kaho'olawe** (20°30'–20°40'N, 156°32'–156°45'W)  
**Kaua'i** (21°53'–22°14'N, 159°17'–159°48'W)  
**Koko** = Koko Seamount, also called Kinmey or Kimmei Seamount (35°30'N, 171°30'E)  
**Kure** = Kure Atoll, Northwestern Hawaiian Islands (28°25'N, 178°10'W) including Starck, Green, Shark, and Sand Islands; Kure is the most northwestern emergent island in the Hawaiian Archipelago  
**Ladd** = Ladd Seamount northeast of Midway Atoll, Northwestern Hawaiian Islands (28°32'N, 176°40'W)  
**Lāna'i** (20°45'–20°57'N, 156°47'–157°05'W)  
**Laysan** = Laysan Island, Northwestern Hawaiian Islands (25°42'N, 171°44'W)  
**Lisianski** = Lisianski Island, Northwestern Hawaiian Islands (26°02'N, 174°00'W)  
**Lō'ihi** = Lō'ihi undersea volcano, the most southeastern feature of the Hawaiian Ridge to have been sampled for fishes (18°55'N, 155°16'W)  
**Main Hawaiian Islands** = Hawai'i, Maui, Kaho'olawe, Lāna'i, Moloka'i, O'ahu, Kaua'i, and Ni'ihau (18°45'–22°45'N, 154°45'–160°18'W)  
**Maro** = Maro Reef, Northwestern Hawaiian Islands (25°25'N, 170°35'W)  
**Middle Bank** = northwest of Ni'ihau (22°58'N, 161°02'N)  
**Milwaukee** = Milwaukee Seamounts, composed of the Yuryaku, Dikakuji, and Kammu Seamounts; Kammu Seamount is the most southeastern of the Emperor Seamounts (32°28'N, 171°55'E)  
**Maui** (20°35'–21°05'N, 155°48'–156°45'W)  
**Midway** = Midway Atoll, Northwestern Hawaiian Islands (28°12'N, 177°23'W) including Sand and Eastern Islands  
**Moloka'i** (21°05'–21°15'N, 156°45'–157°20'W)  
**MS** = Milwaukee Seamounts (see above) (32°28'N, 171°55'E)  
**Necker** = Necker Island, Northwestern Hawaiian Islands (23°34'N, 164°42'W)  
**Nero** = Nero Seamount southwest of Midway Atoll, Northwestern Hawaiian Islands (27°57'N, 177°58'W)  
**Nihoa** = Nihoa Island, Northwestern Hawaiian Islands (23°06'N, 161°58'W), the southernmost of the uninhabited Northwestern Hawaiian Islands  
**Ni'ihau, including Lehua Rock** = (21°46'–22°02'N, 160°02'–160°18'W)  
**Northampton** = Northampton Seamounts southwest of Laysan, Northwestern Hawaiian Islands (25°18'N, 172°04'W)  
**NMFS** = generally used as the abbreviation for the National Marine Fisheries Service (NOAA Fisheries) but in this manuscript used (unless otherwise specified) to abbreviate the National Marine Fisheries Service, Pacific Islands Fisheries Science Center.  
**NWHI** = the emergent Northwestern Hawaiian Islands, Nihoa Island (23°06'N, 161°58'W) to Kure Island (28°25'N, 178°10'W) inclusive  
**O'ahu** (21°15'–21°35'N, 157°38'–158°40'W)  
**Pearl and Hermes** = Pearl and Hermes Reef, Northwestern Hawaiian Islands (27°55'N, 175°45'W) including North, Southeast, Bird, Sand, Grass, Kittery, and Seal Islands  
**PIFSC** = Pacific Islands Fisheries Science Center of NMFS (formerly called the "Honolulu Laboratory")  
**Pioneer** = Pioneer Tablemount east of Lisianski, Northwestern Hawaiian Islands (26°00'N, 173°25'W)  
**Raita** = Raita Bank northeast of Maro, Northwestern Hawaiian Islands (25°35'N, 169°35'W)  
**Salmon** = Salmon Bank southwest of Pearl and Hermes, Northwestern Hawaiian Islands (26°56'N, 176°28'W)  
**St. Rogatien** = St. Rogatien Bank between French Frigate and Gardner, Northwestern Hawaiian Islands (24°25'N, 167°15'W)  
**Twin Banks** = two banks between Nihoa and Necker, Northwestern Hawaiian Islands (23°13'–15'N, 162°55'–163°09'W)  
**West Bank Nihoa** = an extension of Nihoa Island, Northwestern Hawaiian Islands (22°58'N, 162°14'W)

## DISCUSSION

### How many fish species are there in the Hawaiian Islands?

There are verified records of 1224 fish species with reproducing populations in marine or freshwaters within the 200 nautical mile Exclusive Economic Zone around the Hawaiian Islands and Johnston Atoll (200-nmi Hawaiian EEZ), and an additional 26 species that do not appear to have reproducing populations (waifs).

**Table 1. Fish species known from within the 200-nmi EEZ surrounding Johnston Atoll but not from within the 200-nmi EEZ surrounding the Hawaiian Islands.** Taxa followed by question marks need to have their identities verified to confirm their occurrence at Johnston Atoll as taxa distinct from those found in the Hawaiian Islands. Three species' names from a similar table in Randall *et al.* (1985b, their table 1) do not appear here because *Myrichthys bleekeri* is a junior synonym of *M. colubrinus* and because *Chromis acares* and *Plectroglyphidodon phoenixensis* were recently discovered in the Hawaiian Islands (Randall *et al.* 1993a).

Muraenidae	Holocentridae
<i>Anarchias allardicei</i>	<i>Sargocentron microstoma</i>
<i>Anarchias cantonensis</i>	Scorpaenidae
<i>Echidna leucotaenia</i>	<i>Scorpaenodes</i> sp.?
<i>Echidna unicolor</i>	Serranidae
<i>Gymnothorax kontodontos</i>	<i>Pseudanthias randalli</i>
<i>Gymnothorax margaritophorus</i>	Pomacanthidae
<i>Gymnothorax zonipectis</i>	<i>Centropyge nigriocellus</i>
<i>Uropterygius xenodontus</i>	<i>Genicanthus</i> sp.?
Ophichthidae	Labridae
<i>Brachysomophis crocodilinus</i>	<i>Cirrhilabrus luteovittatus</i>
<i>Muraenichthys schultzei</i>	<i>Pseudocheilinus ocellatus</i>
<i>Myrichthys colubrinus</i>	Blenniidae
<i>Schismorhynchus labialis</i>	<i>Cirripectes polyzona</i>
<i>Scolecenchelys gymnota</i>	<i>Cirripectes variolosus</i>
Myctophidae	Gobiidae
<i>Diaphus pacificus</i> ?	<i>Priolepis semidoliatus</i>
<i>Myctophum asperum</i>	Acanthuridae
Exocoetidae	<i>Ctenochaetus marginatus</i>
<i>Cypselurus poecilopterus</i>	<i>Naso</i> sp.?

Unsuccessful introductions are not included in this number. Fifty-five introduced species that have established non-captive breeding populations in the state are included. The number 1250 is almost double the number often cited for Hawai'i's fish species because it includes fishes from all depths and habitats, whereas more frequently seen numbers refer primarily to inshore fishes from the upper 200 m [440 by Hourigan & Reese (1987); 536 by Randall (1992b); 531 by Randall *et al.* (1997b); and 680 by Randall (1982), Randall *et al.* (1985b), and Hoover (1993)]. The current estimate of 1250 fish species recorded from the Hawaiian Islands differs from estimates of 1150+ marine species by Eldredge & Miller (1995), 1197 marine and freshwater species by Eldredge & Miller (1997), and 1216 marine and freshwater species by Eldredge & Evenhuis (2003) in part because several doubtful records from the region have been verified and several new species have been described in the intervening years.

There are 28 fish species known from Johnston Atoll that are not found in the 200-nmi Hawaiian EEZ (Table 1). Three of these need to have their identities clarified to confirm that they do not occur in the Hawaiian Islands.

There are good reasons for including the fishes of Johnston Atoll in consideration of the Hawaiian Islands ichthyofauna. The strongest evidence is that there are 55 species known only from the atoll and the Hawaiian Islands (Randall *et al.*, 1985b; Kosaki *et al.*, 1991; Table 2). These include some of the most abundant endemic fishes of the region. Many of these, such as the milletseed butterflyfish (*Chaetodon miliaris*) and the saddle wrasse (*Thalassoma duperrey*), are so distinctive that there is no question that they have been recorded only from these islands (Table 2).

Johnston Atoll is ca. 800 km from its nearest island neighbor, French Frigate Shoals in the Northwestern Hawaiian Islands, and ca. 1500 km from the next nearest island, Kingman Reef, on the Line Island Ridge of which Johnston Atoll is geologically a part (Kosaki *et al.*, 1991). At its origin about 85 million years ago (ma), Johnston Atoll was much to the southeast of the Hawaiian hot-spot. The atoll most likely had a tropical, central Pacific biota through much of its existence because of its early location. Johnston Atoll is older than the Emperor Seamounts or Hawaiian Islands and was carried to its present position first by the northward and later north-westward motion of the Pacific tectonic plate (Schlanger *et al.*, 1984). Extinction of much of the atoll's earlier fish fauna is supported by the absence of many common, tropical-Pacific species (Randall *et al.*, 1985b). Kosaki *et al.* (1991) proposed that lowered sea levels caused these extinctions by several mechanisms.

**Table 2. Endemic Hawaiian fishes also found within the 200-nmi EEZ of Johnston Atoll.** Most of these species and sub-species indisputably have not been recorded from outside of the Hawaiian Islands and Johnston Atoll. Species marked with an asterisk (\*) are among the most abundant or distinct of characteristically Hawaiian fishes known from well-sampled, shallow-water habitats, validating the recognition of these taxa as Hawaiian endemics even though they are also found at Johnston Atoll. The occurrence of these species and subspecies at these islands and nowhere else demonstrates that Johnston Atoll is part of the Hawaiian biogeographic region. Several species' names from a similar table in Randall *et al.* (1985b, their table 2) do not appear here because: the Johnston Atoll specimen previously identified as *Uropterygius inornatus* was redescribed as the western/central Pacific species *U. xenodontus*; *U. superforatus*, *Plectranthias helena*, *Grammatonotus laysanus*, *Erythrocles scintillans*, *Polylepion russelli*, *Chironema chryseres*, *Parapercis roseoviridis*, *Centropyge fisheri*, *Eviota epiphanes*, *Priolepis aureoviridis*, *Trimma unisquamis*, and *Canthigaster inframacula* were discovered at other localities; *Parupeneus multifasciatus* is no longer considered to be an endemic species distinct from *P. moana* elsewhere in the Pacific; the Hawaiian and Johnston Atoll populations previously recognized as the endemic *Apogon menesemus* are now considered to be populations of the Indo-Pacific *A. taeniopterus* (Randall 1998b); and the *Epigonus* sp. of Randall *et al.* (1985b) was described as *E. glossodontus* Gon (1985). Reports of *Pseudamiops gracilicauda* from the Hawaiian Islands and Johnston Atoll refer to the endemic *P. diaphanes* (Randall 1998b). *Oplegnathus punctatus* has long been known from the western Pacific, from which it was originally described. *Priacanthus meeki* may belong in this table (Kosaki *et al.* 1991) but is not included here because it may also occur in the Galapagos Islands (Starnes 1988).

Muraenidae	Pomacanthidae (continued)
<i>Gymnothorax nuttingi</i>	<i>Apolemichthys arcuatus</i> *
Ophichthidae	Pomacentridae
<i>Myrichthys magnificus</i>	<i>Abudefduf abdominalis</i> *
<i>Scolecenchelys cookei</i>	<i>Chromis verater</i> *
Congridae	<i>Dascyllus albisella</i> *
<i>Ariosoma marginatum</i>	Labridae
<i>Conger cinereus marginatus</i>	<i>Anampses cuvier</i> *
<i>Conger oligoporus</i>	<i>Bodianus bilunulatus alboataeniatus</i>
Moridae	<i>Cirrhilabrus jordani</i> *
<i>Physiculus grinnelli</i>	<i>Coris ballieui</i> *
Antennariidae	<i>Labroides phithiophagus</i> *
<i>Antennarius drombus</i>	<i>Macropharyngodon geoffroy</i> *
Hemiramphidae	<i>Stethojulis balteata</i> *
<i>Hyporhamphus acutus pacificus</i>	<i>Thalassoma ballieui</i> *
Holocentridae	<i>Thalassoma duperrey</i> *
<i>Sargocentron xantherythrum</i> *	Scaridae
Scorpaenidae	<i>Chlorurus perspicillatus</i> *
<i>Dendrochirus barberi</i> *	<i>Scarus dubius</i>
<i>Neomerinthe rufescens</i>	Percophidae
<i>Scorpaena colorata</i>	<i>Chironema squamiceps</i>
<i>Sebastapistes ballieui</i> *	Blenniidae
Serranidae	<i>Cirripectes vanderbilti</i> *
<i>Epinephelus quernus</i>	Callionymidae
<i>Holanthias elizabethae</i>	<i>Synchiropus rosulentus</i>
<i>Holanthias fuscipinnis</i>	Gobiidae
<i>Pseudanthias fuscinus</i>	<i>Priolepis eugenius</i>
<i>Pseudanthias hawaiiensis</i>	<i>Priolepis farcimen</i>
<i>Pseudogramma polyacanthum hawaiiensis</i>	<i>Priolepis limbatosquamis</i>
Apogonidae	Acanthuridae
<i>Apogon erythrinus</i>	<i>Acanthurus triostegus sandvicensis</i>
<i>Pseudamiops diaphanes</i>	<i>Ctenochaetus strigosus</i>
Epigonidae	Triacanthodidae
<i>Epigonus fragilis</i>	<i>Hollardia goslinei</i>
Mullidae	Monacanthidae
<i>Parupeneus chrysonemus</i>	<i>Cantherhines sandwichiensis</i>
Chaetodontidae	<i>Pervagor spilosoma</i> *
<i>Chaetodon miliaris</i> *	Ostraciidae
<i>Chaetodon multicinctus</i> *	<i>Ostracion meleagris camurum</i>
Pomacanthidae	Tetraodontidae
<i>Centropyge nahackyi</i>	<i>Canthigaster jactator</i>
<i>Centropyge potteri</i> *	

Recolonization of the atoll by dispersal of fishes from the Hawaiian islands and to a lesser degree from other islands to the west and south is suggested by the atoll's present fish fauna (Randall *et al.*, 1985b; Kosaki *et al.*, 1991). Less frequent dispersal of species from Johnston Atoll to the Hawaiian Islands is indicated by a few atoll species which occur in Hawaiian waters primarily around French Frigate Shoals, the island nearest to the atoll. Examples include the chevron butterflyfish (*Chaetodon trifascialis*) and the slingjaw wrasse (*Epibulus*

**Table 3. Deep-dwelling bottom-associated fish species that have been collected in the central north Pacific but not yet collected within the 200-nmi Hawaiian EEZ.** These are wide-ranging species or poorly known species that are expected to occur within Hawaiian waters. The absence of records of such species from Hawaiian waters is attributed to the limited numbers of samples from deep-waters of the archipelago, particularly below 2000 m. Benthopelagic and enygbenthic species are included in this table, even though individuals may be collected in pelagic samples.

Mitsukurinidae	Ophidiidae
<i>Mitsukurina owstoni</i>	<i>Acanthonus armatus</i>
Chlamydoselachidae	<i>Bassozetus galathea</i>
<i>Chlamydoselachus anguineus</i>	<i>Dicrolene hubrechtii</i>
Synphobranchidae	<i>Holocomycteronus profundissimus</i>
<i>Dysomma anguillare</i>	<i>Lamprogrammus niger</i>
<i>Dysomma muciparus</i>	Moridae
<i>Histiobranchus bathybius</i>	<i>Halargyreus johnsonii</i>
Monognathidae	<i>Lepidion schmidtii</i>
<i>Monognathus rosenblatti</i>	Macrouridae
Alepocephalidae	<i>Coryphaenoides armatus</i>
<i>Alepocephalus tenebrosus</i>	<i>Coryphaenoides leptolepis</i>
<i>Bajacalifornia megalops</i>	<i>Coryphaenoides rudis</i>
<i>Conocara krefftii</i>	<i>Coryphaenoides yaquinae</i>
<i>Rouleina atrita</i>	Ogcocephalidae
<i>Talismania antillarum</i>	<i>Halieutopsis bathyoreos</i>
Ipnopidae	Epigonidae
<i>Bathypterois longipes</i>	<i>Epigonus denticulatus</i>
<i>Ipnopis agassizi</i>	<i>Epigonus pectinifer</i>
<i>Ipnopis meadi</i>	Pleuronectidae
Neoscopelidae	<i>Microstomus shuntovi</i>
<i>Neoscopelus microchir</i>	
Carapidae	
<i>Echiodon</i> sp.	

*insidiator*) (see Hobson, 1980), as well as corals in the genus *Acropora* (Grigg, 1981). The biogeography of Johnston Atoll has been discussed in detail by Gosline (1955), Randall *et al.* (1985b), Maragos & Jokiel (1986), and Kosaki *et al.* (1991).

Fish species recorded from the Hawaiian Islands from ephemeral occurrences, thought not to have reproducing populations here, are discussed later. Decisions about the reproductive status of fish species in the region are admittedly subjective in many cases because there is little or no information about the basic biology of most noncommercial, nonreef fish species (Randall, 1998c). Thus, 1224 is merely the best estimate of resident fish species in Hawaiian waters now. This number will change as more knowledge is accumulated.

Most (1177 or 96.2%) of the 1224 resident fish species in the Hawaiian Islands are marine. There are only five indigenous freshwater species: the 'o'opu nākea (*Awaous guamensis*), the 'o'opu akupa (*Eleotris sandwicensis*), the 'o'opu alamo'o (*Lentipes concolor*), the 'o'opu nōpili (*Sicyopterus stimpsoni*), and the 'o'opu naniha (*Stenogobius hawaiiensis*). All but *A. guamensis* are considered to be endemic Hawaiian Islands species. All are gobioids that live in streams as adults and reproduce there, but have larvae that drift downstream into the sea and eventually migrate back to their adult habitats as they transform into juveniles. There are currently 42 introduced freshwater species in the state, nearly an order of magnitude more than the small number of indigenous freshwater species. The number of introduced species is expected to increase with time.

The poor sampling of central Pacific waters deeper than 2000 m makes it certain that more species will be added to those presently known from Hawaiian Archipelago and Johnston Atoll abyssal and hadal waters. There are 28 species of deep-dwelling, bottom-associated species known from two or more oceans that have been collected in the central Pacific not far from the Hawaiian Islands (Table 3). These probably occur in Hawaiian waters below 2000 m but samples have not been collected within the 200-nmi Hawaiian EEZ to investigate this. An additional 35 species of widely distributed, pelagic fishes have ranges suggesting that they also occur in Hawaiian waters (Table 4). Many of these species are apparently rare even though they are known from widespread localities and most are in taxonomically difficult groups, a number in need of taxonomic revision, making their identification problematic. These 35 pelagic species have circumglobal, Indo-Pacific, or trans-Pacific distributions suggesting that the absence of records from Hawaiian waters is primarily due to undersampling with gear effective for their capture or to incorrect identifications of specimens collected here. Included among the widespread deep-water and open-ocean species recorded from areas near the Hawaiian Islands are two deep-water, central North Pacific fish species (a batfish, *Halieutopsis bathyoreos*, and a deepsea anglerfish, *Linophryne andersoni*) known only from single collections. These probably also occur in Hawaiian waters. Inclusion of these various deep-water and open-ocean species in the Hawaiian Islands and

**Table 4. Pelagic fishes that have been collected in the central North Pacific near, but not yet within the 200-nmi Hawaiian EEZ.** These are expected to occur within Hawaiian waters. The absence of records of these species from within the 200-nmi Hawaiian EEZ is attributed to undersampling of the open ocean with gear effective for the capture of these fishes and to taxonomic problems that have prevented reports of their occurrences within Hawaiian waters.

Derichthyidae	Radiicephalidae
<i>Nessorhamphus danae</i>	<i>Radiicephalus elongatus</i>
Microstomatidae	Trachipteridae
<i>Xenophthalmichthys danae</i>	<i>Desmodema lorum</i>
Opisthoproctidae	<i>Trachipterus ishikawae</i>
<i>Dolichopteryx longipes</i>	<i>Trachipterus trachipterus</i>
Alepocephalidae	Ophidiidae
<i>Mirorictus tanningi</i>	<i>Brotulataenia nielsenii</i>
Stomiidae	Caulophryniidae
<i>Astronesthes indopacificus</i>	<i>Caulophryne jordani</i>
<i>Eustomias woolardi</i>	<i>Caulophryne pelagica</i>
<i>Eustomias uniramis</i>	Himantolophidae
<i>Melanostomias macrophotus</i>	<i>Himantolophus nigricornis</i>
<i>Melanostomias valdiviae</i>	Gigantactinidae
Paralepididae	<i>Gigantactis vanhoeffeni</i>
<i>Lestidiops jayakari pacifica</i>	Linophryniidae
<i>Lestrolepis luetkeni</i>	<i>Haplophryne mollis</i>
Anotopteridae	<i>Linophryne andersoni</i>
<i>Anopterus pharao</i>	<i>Linophryne coronata</i>
Evermannellidae	Melamphaidae
<i>Coccorella atrata</i>	<i>Scopeloberyx malayanus malayanus</i>
Myctophidae	Diretmidae
<i>Diaphus malayanus</i>	<i>Diretmus argenteus</i>
<i>Diaphus parri</i>	Bramidae
<i>Lampanyctus alatus</i>	<i>Brama pauciradiata</i>
<i>Lampanyctus festivus</i>	Caristiidae
<i>Symbolophorus rufinus</i>	<i>Caristius maderensis</i>
Lophotidae	Chiasmodontidae
<i>Eumicichthys fiskii</i>	<i>Dysalotus oligoscolus</i>
	<i>Kali indica</i>

Johnston Atoll fish fauna would bring the total number of resident fish species in the region to 1287.

There is an additional group of North Pacific endemic species reported from seamounts or the open ocean just north of the 200-nmi Hawaiian EEZ (Table 5). These are also species that could be expected within the region, although probably only at seamounts or in deep waters at the northwestern part of the Hawaiian Ridge. Of these, 14 are species found in the western and central North Pacific from Japan and sometimes Taiwan to the Emperor Seamounts. As will be discussed later, this distribution is shared by a number of species found in Hawaiian waters, including shore fishes, pelagic species, and deep-sea, bottom-associated species. There are an additional nine bottom-associated species known only from the Emperor Seamounts. Another species, a scorpionfish (*Adelosebastes latens*), is known primarily from the Emperor Seamounts but also has been found at the Aleutian Islands and is included with the seamount endemics. All 24 of these North Pacific species have been recorded from the most southeastern Emperor Seamounts: Koko or Milwaukee. It is highly probable that these will occur at the Colahan or Hancock Seamounts, the most northwestern features of the Hawaiian Ridge, given that many other western and central North Pacific endemic fishes found at the southeastern Emperor Seamounts have also been collected there. Five of the 24 species have not yet been identified and may prove not to be taxonomically distinct from species already reported from the Hawaiian region. If these are excluded, the remaining 19 species can be added to those likely to occur in the Hawaiian Islands and Johnston Atoll to yield 1306 expected resident species.

This number (1306) is a reasonable approximation of the number of fish species in the region from the records currently available. It is almost certain that not all of the species listed in Tables 3–5 will be found within the 200-nmi Hawaiian EEZ, but it is also almost certain that others yet unknown will be discovered here. New species will be described, some currently recognized species will be synonymized, and unexpected species will be found here. Factors that could cause the estimate of 1306 fishes in the region to be grossly wrong will likely be the discovery of numerous small species in high-relief habitats below 60 m, the discovery of species by sampling of abyssal and hadal waters, and the increased frequency of introductions of non-

**Table 5. Endemic North Pacific fish species that have been collected at seamounts just to the north of the 200-nmi Hawaiian EEZ but that have not yet been collected within the Hawaiian region.** These have a high probability of being found at seamounts or in deep water at the extreme northwestern end of the Hawaiian Ridge within the 200-nmi EEZ.

**A. Species endemic to the western and central North Pacific, or transition zone,  
from at least Japan to the Emperor Seamounts**

Chimaeridae	<i>Diaphus</i> “ <i>rafinesquii</i> type 1”
<i>Chimaera owstoni</i>	<i>Diaphus</i> “ <i>rafinesquii</i> type 2”
Dasyatidae	<i>Diaphus</i> “ <i>rafinesquii</i> type 3”
<i>Dasyatis matsubarai</i>	Macrouridae
Congridae	<i>Caelorinchus matsubarai</i>
<i>Ariosoma anagoides</i>	Moridae
Serrivomeridae	<i>Laemonema longipes</i>
<i>Thalassenchelys coheni</i>	Scorpaenidae
Chlorophthalmidae	<i>Helicolenus federovi</i>
<i>Chlorophthalmus filamentosus</i>	Callanthiidae
Notosudidae	<i>Callanthias japonicus</i>
<i>Scopelosaurus harryi</i>	Centrolophidae
Myctophidae	<i>Psenopsis anomala</i>

**B. Species endemic to the Emperor Seamount chain and vicinity**

Monognathidae	<i>Antigonia xenolepis</i>
<i>Monognathus smithi</i>	Scorpaenidae
Alepocephalidae	<i>Helicolenus avius</i>
<i>Alepocephalus</i> sp.	<i>Helicolenus</i> sp.
Macrouridae	Ereuniidae
<i>Caelorinchus anisacanthus</i>	<i>Marukawaichthys pacificus</i>
<i>Nezumia tinro</i>	Trichiuridae
Caproidae	<i>Lepidopus calcar</i>

**C. Species endemic to the subarctic North Pacific known primarily from the Emperor Seamounts**

Scorpaenidae	<i>Adelosebastes latens</i>
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indigenous species.

Many species recorded from the Hawaiian Islands or in nearby waters have been excluded from the 1224 species verified from within the 200-nmi Hawaiian and Johnston EEZ and the additional 82 species thought to likely occur here. The excluded species fall into four categories. The first category includes 26 well-identified species with undisputable but isolated and ephemeral records from the Hawaiian Islands (Table 6). These species are not thought to have reproducing populations in the Hawaiian Islands but rather are thought to have been transported here as larvae, juveniles, or adults originating from reproductive populations elsewhere. The terms “waifs”, “vagrants”, or “expatriates” have been variously applied to these and similar species in other parts of the world. “Waif” will be used in this publication. One species only recently observed in the Hawaiian Islands, the Indo-Pacific sergeant (*Abudefduf vaigiensis*), was first recorded as a waif but has been seen spawning and guarding eggs at Molokini Islet (Severns & Fiene-Severns, 1993) and O‘ahu (B. Mundy, pers. observ., 1989–2005). Increased sightings of juveniles at new locations, along with continued observations of spawning, suggest that *A. vaigiensis* is becoming established in the Hawaiian Islands (B. Mundy, pers. observ., 1989–2005).

The second category of species excluded from the fishes of the Hawaiian region are 49 nonindigenous species that were introduced to open waters of the state but which failed to establish reproducing populations (Table 7). The third category of excluded species includes 38 species with questionable Hawaiian records because of suspect collection data, uncertain identifications, or taxonomic uncertainties (Table 8). It is likely that most of these questionable species do not occur in the region or that they have been misidentified. The few that probably do occur within the 200-nmi Hawaiian EEZ need verification. The final category includes 79 species that have been mentioned in the published ichthyological literature as occurring in “Hawai‘i” or “the Hawaiian Islands” but whose occurrence here is demonstrably false or whose identities as valid species cannot be established (Table 9).

A number of species that are not expected to be found in the region except perhaps as waifs (Table 10)

**Table 6. Well-identified species with verified records from within the 200-nmi Hawaiian EEZ that are known only from isolated, ephemeral occurrences in the region.** These species are thought not to have reproducing populations in the Hawaiian Islands, Johnston Atoll, or seamounts. These are species that have variously been called waifs, vagrants, or expatriates.

Carcharhinidae	Kyphosidae (continued)
<i>Carcharhinus albimarginatus</i>	<i>Sectator ocyurus</i>
<i>Sphyrna mokarran</i>	Labridae
Cetorhinidae	<i>Cheilinus undulatus</i>
<i>Cetorhinus maximus</i>	<i>Halichoeres marginatus</i>
Myctophidae	Ephippidae
<i>Diaphus theta</i>	<i>Platax boersii</i>
<i>Diogenichthys lateratus</i>	Acanthuridae
Triglidae	<i>Acanthurus lineatus</i>
<i>Chelidonichthys kumu</i>	<i>Acanthurus maculiceps</i>
Carangidae	<i>Paracanthurus hepatus?</i>
<i>Caranx caballus</i>	<i>Zebrasoma rostratum</i>
<i>Seriola lalandi</i>	Sphyraenidae
Lobotidae	<i>Sphyraena genie</i>
<i>Lobotes surinamensis</i>	Scombridae
Chaetodontidae	<i>Euthynnus lineatus</i>
<i>Chaetodon ulietensis</i>	Ostraciidae
Pomacanthidae	<i>Ostracion cubicus</i>
<i>Centropyge multicolor</i>	Tetraodontidae
<i>Pomacanthus imperator</i>	<i>Arothron manilensis</i>
Kyphosidae	<i>Canthigaster solandri</i>
<i>Girella leonina</i>	

have been included in the checklist. These are species that were collected near but not within the 200-nmi Hawaiian EEZ in sampling efforts that collected species characteristic of Hawaiian waters. They have been included to alert researchers of the possibility of their occurrence at the periphery of the region although the probability of their being found here is low. These species fall into four biogeographic categories. First, there are four oceanic species that are eastern North or tropical Pacific endemics. Most records of these species are near the American continents, but their westernmost records are from the central North Pacific near the Hawaiian Archipelago. Second, there are 12 species with subarctic distributions that have been collected at southern seamounts of the Emperor Seamount chain. These are endemic North Pacific species with the exception of the Pacific sleeper shark (*Somniosus pacificus*), which has an antitropical distribution in subpolar waters of both the northern and southern hemispheres. Sea temperatures will probably exclude these 12 subarctic species from Hawaiian waters but it is possible that they could be seasonal waifs at Colahan and the SE Hancock Seamounts during the winter. This is suggested by the regular, wintertime occurrence at these seamounts of several subarctic and North Pacific transition-zone species such as the Pacific pomfret (*Brama japonica*), the Pacific saury (*Cololabis saira*), a pearleye (*Scopelarchus stephensi*), a scaleless black dragonfish (*Opostomias mitsuii*), and a lanternfish (*Symbolophorus californiensis*). A third category contains only a single equatorial species, a swallower eel (*Saccopharynx berteli*). It is included here because the family is wide-ranging in deep pelagic waters and may likely be found within the Hawaiian region with more sampling of bathyal or abyssal waters. The last category of waifs includes only one species. This is the remarkable capture in waters to the north of the Hawaiian Islands of two specimens of butterfly mackerel (*Gasterochisma melampus*), a southern-hemisphere, subtropical convergence-zone species, (Ito *et al.*, 1994; D. Hawn, pers. comm., Sept. 2003). These are mentioned here even though the species has not been found within the 200-nmi EEZ because the records are so unusual. The records of *Gasterochisma* demonstrate that truly amazing dispersals of pelagic fishes can occur and that we can, on very rare occasions, expect thoroughly implausible appearances of fishes within the 200-nmi Hawaiian EEZ.

### What kinds of fishes are these?

There are 216 families of fishes in the Hawaiian Islands, representing most of the major orders and perciform suborders of fishes. The species diversity of Hawai'i's fishes is summarized by family in Table 11. When Hawai'i's fishes from all depths and habitats are considered, dominant families are found that differ from those



**Table 7. Nonindigenous fish species that were (or likely were) released into open waters of the 200-nmi Hawaiian EEZ but that failed to establish reproducing populations here.** (FW) = freshwater.

Anguillidae	Serranidae (continued)
<i>Anguilla marmorata</i> (FW adults)	<i>Cromileptes altivelis</i>
Osteoglossidae	<i>Epinephelus fasciatus</i>
<i>Osteoglossum bicirrhosum</i> (FW)	<i>Epinephelus hexagonatus</i>
Engraulidae	<i>Epinephelus irroratus</i>
<i>Anchoa compressa</i>	<i>Epinephelus merra</i>
Cyprinidae	Pseudochromidae
<i>Ctenopharyngodon idella</i> (FW)	<i>Pseudochromis tapeinosoma?</i>
<i>Puntius filamentosus</i> (FW)	Lutjanidae
<i>Puntius semifasciolatus</i> (FW)	<i>Lutjanus guttatus</i>
Anostomidae	<i>Lutjanus sebae</i>
<i>Leporinus fasciatus</i> (FW)	Lethrinidae
Characidae	<i>Lethrinus</i> sp.
<i>Colossoma macropomum</i> (FW)	Pomacanthidae
<i>Pygocentrus nattereri</i> (FW)	<i>Apolemichthys xanthopunctatus</i>
Ictaluridae	<i>Chaetodontoplus mesoleucus</i>
<i>Ameiurus nebulosus</i> (FW)	<i>Pomacanthus semicirculatus</i>
Clariidae	<i>Pygoplites diacanthus</i>
<i>Clarias</i> sp.? (FW)	Kuhliidae
Mochokidae	<i>Kuhlia rupestris</i>
<i>Synodontis</i> sp. (FW)	Cirrhitidae
Loricariidae	<i>Cirrhitichthys falco</i>
<i>Peckoltia</i> sp. (FW)	<i>Cirrhitichthys oxycephalus</i>
Osmeridae	Cichlidae
<i>Plecoglossus altivelis</i> (FW)	“ <i>Cichlasoma</i> ” sp. (FW)
Salmonidae	<i>Pelvicachromis pulcher</i> (FW)
<i>Oncorhynchus tshawytscha</i> (FW)	<i>Pterophyllum scalare</i> (FW)
<i>Salmo trutta</i> (FW)	Pomacentridae
<i>Salvelinus fontinalis</i> (FW)	<i>Amphiprion</i> sp.
Adrianiichthyidae	<i>Chrysiptera taupou</i>
<i>Oryzias latipes</i> (FW)	Ehippiidae
Aplocheilidae	<i>Platax tiera</i>
<i>Aplocheilus lineatus</i> (FW)	Tripterygiidae
<i>Nothobranchius guentheri</i> (FW)	<i>Enneapterygius bahasa</i> or <i>nigricauda</i>
Fundulidae	Blenniidae
<i>Fundulus grandis</i> (FW)	<i>Ecsenius bicolor</i>
Moronidae	Belontiidae
<i>Morone saxatilis</i>	<i>Trichogaster leeri</i> (FW)
Serranidae	Osphronemidae
<i>Cephalopholis urodeta</i>	<i>Osphronemus goramy</i> (FW)

in the shallow-water fish fauna (Randall, 1992b, 1996a). The family with the greatest number of species in the region is the Stomiidae (dragonfishes) with 76 species, if the classification of Fink (1984, 1985) is accepted. The second most diverse family in the region is the Myctophidae (lanternfishes) with 67 species. The families cited as having the most species in discussions of Hawaii’s shallow-water fauna are the Muraenidae (morays) with 49 species and the Labridae (wrasses) with 46 species. Thus, the two most diverse families in Hawaiian waters are composed primarily of mesopelagic species, and both families have over 30% more species than the most species-rich shore fish families. Even if a more traditional classification is used for the stomiiform fishes, the “Melanostomiidae” (scaleless black dragonfishes) with 50 species exceeds the Muraenidae in diversity. The fifth most diverse family is the Gobiidae (gobies), with 36 species, followed by the deep-water Macrouridae (grenadiers) with 29 species. The Acanthuridae (surgeonfishes) and the Scorpaenidae (scorpionfishes) with both shallow and deep-dwelling species both have 28 species in the region. Shore fish families usually mentioned as having large numbers of species are next in abundance, but oceanic families not usually mentioned also rank highly. These include the Sternoptychidae (lightfishes and hatchetfishes) with 18 species, Exocoetidae (flyingfishes) with 17 species, and Gonostomatidae (bristlemouths) with 14 species. The 16 species of Cichlidae (cichlids) rank this family among the 20 fish families with the most species in Hawaiian

**Table 8. Fish species recorded from within the 200-nmi Hawaiian EEZ whose Hawaiian records are questionable because of suspect collection data, because of uncertain identifications, or because they are species that are disputed in the taxonomic literature as being identical to species well known from Hawaiian waters.** It is likely that most of these questionable species do not actually occur in the region or that they are the same as species already well known here. A few may occur within the region, but their Hawaiian records need verification.

Squalidae	Regalecidae
<i>Cirrhigaleus asper</i>	<i>Regalecus glesne</i>
Myliobatididae	Polymixiidae
<i>Manta alfredi</i>	<i>Polymixia</i> sp.
Congridae	Ophidiidae
<i>Ariosoma anago</i>	<i>Pycnocraspedum</i> sp.
Argentinidae	Moridae
<i>Argentina</i> sp.	<i>Physiculus japonica</i>
Microstomatidae	<i>Physiculus nigripinnis</i>
<i>Nansenia ardesiaca</i>	Bregmacerotidae
Sternoptychidae	<i>Bregmaceros</i> sp.
<i>Argyripnus atlanticus</i>	Ogcocephalidae
Phosichthyidae	<i>Malthopsis tiarelle</i>
<i>Pollichthys maui</i>	Oneirodidae
Stomiidae	<i>Oneirodes acanthias</i>
<i>Astronesthes chrysophekadion</i>	Poeciliidae
<i>Stomias nebulosus</i>	<i>Poecilia</i> sp.
Chlorophthalmidae	Melamphaidae
<i>Chlorophthalmus agassizi</i>	<i>Melamphaes suborbitalis</i>
<i>Chlorophthalmus albatrossis</i>	Diretmidae
<i>Paraulopus japonicus</i>	<i>Diretmoides pauciradiatus</i>
<i>Paraulopus oblongus</i>	Scorpaenidae
Paralepididae	<i>Sebastes flammeus</i>
<i>Lestidiops jayakari jayakari</i>	Hoplichthyidae
<i>Lestidium atlanticum</i>	<i>Hoplichthys platophrys</i>
<i>Lestrolepis japonica</i>	Serranidae
Myctophidae	<i>Tosanoides filamentosus</i>
<i>Diaphus agassizii</i>	Carangidae
<i>Diaphus coeruleus</i>	<i>Seriola quinqueradiata</i>
<i>Diaphus dumerili</i>	Labridae
<i>Diaphus problematicus</i>	<i>Choerodon anchorago</i>
<i>Diaphus regani</i>	<i>Hologymnosus doliatus</i>
Lophotidae	Balistidae
<i>Lophotus lacepede</i>	<i>Canthidermis rotundatus</i>
Trachipteridae	
<i>Trachipterus fukuzakii</i>	

waters, a disturbing note because all of these species were introduced here by people during the past century.

It has long been recognized that the biota of the Hawaiian Islands, like that of other oceanic islands, is “disharmonic” by lacking many higher taxa that are dominant components of continental biotas (Simon, 1987). The primary explanations for this may be the failure of the absent taxa to disperse to the islands for a variety of reasons.

Freshwater fishes failed to colonize the Hawaiian Islands because of the vast barrier of salt water between the islands and continents. There were no indigenous primary freshwater fishes (*sensu* Myers, 1938) in the islands, and the only freshwater fishes were the five gobioid species with marine dispersive larvae. The vicariant evolution in the Hawaiian Islands of a diverse freshwater fish fauna composed of secondary or peripheral families, such as the fauna found in Australia or New Guinea, was prohibited by the small size of the islands, their isolation, the small size and limited variability of natural freshwater habitats, and the dynamic history of high island formation and destruction in the archipelago. Freshwater Cypriniformes, Characiformes, Siluriformes, Salmoniformes, Cyprinodontiformes, Synbranchiformes, Cichlidae, Anabantoidei, and Channoidei now present in the islands were all introduced by man. The Petromyzontiformes, Ceratodontiformes, Polypteriformes, Acipenseriformes, Semionotiformes, Amiiiformes, Esociformes, Percopsiformes, and Elasmomatoidei are absent. Most species in these groups live in cool-water habitats. In the Hawaiian Islands cool-water habitats are restricted to remote, high-elevation areas where nonindigenous fishes are unlikely to be released. The Lepidosireniformes, Osteoglossiformes, and Gymnotiformes are also absent but occur naturally in tropical environments.

Three marine perciform suborders absent from the Hawaiian Islands, the Zoarcoidei, Notothenioidei, and Icosteioidei, are composed of cool-water species. These suborders have their greatest diversity in the two bio-

**Table 9. Fish species that have falsely been stated to occur in waters of the Hawaiian Archipelago.** Junior synonyms and incorrect identifications of species with valid records from within the 200-nmi Hawaiian EEZ are not included in this table. The species included here are valid species for which no corroborated records exist within the area, or are not valid taxonomic species at all, but have been mentioned in the published literature as occurring here. Species that are not taxonomically valid are marked with an asterisk (\*). The publications giving the records of these species in the region and the reasons for considering the records to be false are given in the accounts for the individual species within the body of this checklist.

Triakidae	<i>Galeorhinus galeus</i>	Malacanthidae	<i>Malacanthus latovittatus</i>
Carcharhinidae	<i>Carcharhinus munising*</i>	Echeneididae	<i>Remora australis</i>
	<i>Carcharhinus obscurus</i>	Carangidae	<i>Alectis indica</i>
Odontaspidae	<i>Carcharias taurus</i>		<i>Carangoides gymnostethus</i>
Echinorhinidae	<i>Echinorhinus brucus</i>		<i>Megalaspis cordyla</i>
Muraenidae	<i>Channomuraena vittata</i>		<i>Parastromateus niger</i>
Congridae	<i>Atopeichthys</i> sp.*	Menidae	<i>Mene maculata</i>
Engraulidae	<i>Anchoviella mauii*</i>	Lutjanidae	<i>Lutjanus bohar</i>
Clupeidae	<i>Dussumieria</i> sp.		<i>Pristipomoides argyrogrammicus</i>
Ariidae	<i>Arius dasycephalus</i>	Nemipteridae	<i>Scolopsis</i> sp.
Stomiidae	<i>Astronesthes tchuvasovi</i>	Polynemidae	<i>Polydactylus plebeius</i>
Paralepididae	<i>Lestidium prolixum</i>	Mullidae	<i>Mulloidichthys bilineatus</i>
Myctophidae	<i>Bolinichthys pyrsobolus</i>		<i>Parupeneus barberinus</i>
	<i>Gonichthys</i> sp.		<i>Parupeneus macronemus</i>
	<i>Hygophum macrochir</i>	Chaetodontidae	<i>Chaetodon humeralis</i>
	<i>Lampanyctus reinhardtii*</i>		<i>Chaetodon semeion</i>
	<i>Myctophum orientale</i>		<i>Chaetodon vagabundus</i>
	<i>Myctophum punctatum</i>	Pomacanthidae	<i>Centropyge bicolor</i>
Mugilidae	<i>Crenimugil crenilabrus</i>		<i>Centropyge bispinosa</i>
	<i>Liza vaigiensis</i>	Pomacentridae	<i>Chrysiptera cyanea</i>
	<i>Valamugil seheli</i>		<i>Dascyllus aruanus</i>
Exocoetidae	<i>Cheilopogon arcticeps</i>	Labridae	<i>Cheilinus trilobatus</i>
	<i>Cheilopogon katoptron</i>		<i>Coris aygula</i>
	<i>Cheilopogon spilopterus</i>		<i>Labroides dimidiatus</i>
	<i>Fodiator acutus rostratus</i>		<i>Macropharyngodon meleagris</i>
	<i>Hirundichthys oxycephalus</i>		<i>Thalassoma amblycephalum</i>
Melamphaidae	<i>Melamphaes laeiviceps</i>		<i>Thalassoma lunare</i>
	<i>Sio nordenskjoldii</i>		<i>Xyrichtys copei</i>
Holocentridae	<i>Myripristis leiognathus</i>	Scaridae	<i>Calotomus japonicus</i>
	<i>Sargocentron caudimaculatum</i>		<i>Scarus radians</i>
	<i>Sargocentron tieerooides</i>	Blenniidae	<i>Hypsoblennius brevipinnis</i>
Solenostomidae	<i>Solenostomus cyanopterus</i>		<i>Hypsoblennius sordidus</i>
Syngnathidae	<i>Syngathoides biaculeatus</i>	Callionymidae	<i>Callionymus enneactis</i>
Centriscidae	<i>Aeoliscus strigatus</i>	Acanthuridae	<i>Acanthurus nigricauda</i>
Scorpaenidae	<i>Scorpaena asperella*</i>		<i>Acanthurus rackliffei*</i>
Cottidae	<i>Cottus filamentosus</i>		<i>Naso vlamingii</i>
Serranidae	<i>Epinephelus fuscoguttatus</i>	Sphyraenidae	<i>Sphyraena forsteri</i>
	<i>Epinephelus miliaris</i>		<i>Sphyraena novaehollandiae</i>
	<i>Epinephelus spilotoceps</i>	Trichiuridae	<i>Trichiurus lepturus</i>
	<i>Gracilia albomarginata</i>	Stromateidae	<i>Pampus argenteus</i>
		Balistidae	<i>Balistapus undulatus</i>

**Table 10. Species that have been found near, but not within, the 200-nmi Hawaiian EEZ and not expected to be found in the region except perhaps as waifs.** These are species that were collected near the 200-nmi Hawaiian EEZ in sampling efforts that collected species characteristic of Hawaiian waters. They have been included to alert researchers of the possibility of their occurrence at the margins of the region.

**A. Eastern North and tropical Pacific endemic species**

Nemichthyidae	Microstomatidae
<i>Avocettina bowersi</i>	<i>Nansenia ahlstromi</i>
Nettastomatidae	Myctophidae
<i>Venefica tentaculata</i>	<i>Lampanyctus parvicauda</i>

**B. North Pacific endemic species (and one anti-tropical, boreal species\*)**

Dalatiidae	Myctophidae
<i>Somniosus pacificus*</i>	<i>Lampanyctus acanthurus</i>
Bathylagidae	<i>Lampanyctus simulator</i>
<i>Bathylagus ochotensis</i>	<i>Nannobranchium regale</i>
<i>Bathylagus pacificus</i>	Oreosomatidae
Notosudidae	<i>Alloctytus folletti</i>
<i>Scopelosaurus adleri</i>	Anoplopomatidae
Paralepididae	<i>Erilepsis zonifer</i>
<i>Lestidiops ringens</i>	Trichiuridae
<i>Lestidiops sphyraenopsis</i>	<i>Benthodesmus pacificus</i>

**C. Equatorial species**

Saccopharyngidae
<i>Saccopharynx berteli</i>

**D. Southern Hemisphere species (waif)**

Scombridae
<i>Gasterochisma melampus</i>

geographic areas with the most unique fish faunas of the world, the north Pacific and Antarctic oceans (Nelson, 1994, Gon & Heemstra, 1990). All are absent from the subtropical and tropical Indo-Pacific except for several zoarcid species that live in deep water below the thermocline (Nelson, 1994; Anderson, 1994). It is possible although unlikely that zoarcids (eelpouts) will be found in deep waters of the Hawaiian Islands when regions below 1000 m are more extensively sampled. The presence of a family with a distribution very similar to that of the Zoarcidae, the Liparidae (snailfish), was also thought unlikely until *Paraliparis meridionalis* was discovered at O'ahu.

The Heterodontiformes, Pristiodei, Rajoidei, Coelacanthiformes, and Batrachoidiformes are marine groups, with warm-water species, that are absent from the Hawaiian Islands. These taxa are found in tropical and subtropical waters but are absent from the non-marginal portions of the Pacific tectonic plate. Their biogeographic distributions may be determined largely by their lack of dispersive, planktonic egg and larval stages. But numerous other Indo-Pacific fish families and genera also absent from the Pacific tectonic plate do have dispersive larvae, indicating that this is not the only determinant of this biogeographic pattern. Examples include the Sillaginidae, Terapontidae, *Rachycentron*, *Pomatomus*, Sciaenidae, Clinidae, and *Scomberomorus*. This phenomenon was discussed in detail by Springer (1982) and the reader is referred to his paper for more information.

The fishes that occur in the Hawaiian Islands epitomize a wide range of evolutionary divergence from fish populations in other parts of the Pacific. Some endemic Hawaiian Archipelago fishes have no close resemblance to any other species. Others are almost indistinguishable from populations elsewhere in the Pacific. Populations with intermediate degrees of morphological divergence are identifiable in species whose taxonomic identities are disputed among researchers or even species whose identities have been reevaluated by a single researcher (see Randall, 1998b, for a different perspective on this). The Hawaiian Archipelago provides from its fish fauna, as it does from its famous terrestrial biota, numerous examples for testing evolutionary hypotheses as well as numerous examples for confounding clearly delimited definitions of what a "species" is.

Endemic Hawaiian Archipelago species that have little resemblance to other species include the bluestripe butterflyfish (*Chaetodon fremblii*) and the bandit angelfish (*Apolemichthys arcuatus*). These have color patterns that are very unlike their congeners, hampering the identification of their closest relatives. Randall

Table 11. Numbers of species in families of fishes found in Hawaiian waters.

Species	Families
76	1 = Stomiidae ( 15 “Astronesthinae”, 3 “Stomiini”, 1 “Chauliodontini”, 50 “Melanostominae”, 1 “Idiacanthinae”, 5 “Malacosteinae”)
67	1 = Myctophidae
49	1 = Muraenidae
46	1 = Labridae
36	1 = Gobiidae
29	1 = Macrouridae
28	2 = Scorpaenidae, Acanthuridae
26	1 = Carangidae
24	1 = Chaetodontidae
23	2 = Ophichthidae, Serranidae
21	1 = Holocentridae
18	2 = Sternoptychidae, Synodontidae
17	2 = Exocoetidae, Pomacentridae
16	2 = Cichlidae, Blenniidae
14	3 = Carcharhinidae, Gonostomatidae, Tetraodontidae
13	6 = Congridae, Paralepididae, Melamphaidae, Lutjanidae, Scombridae, Bothidae
12	1 = Ophidiidae
11	4 = Antennariidae, Mullidae, Pomacanthidae, Balistidae
10	5 = Dalatiidae, Oneirodidae, Apogonidae, Bramidae, Gempylidae
9	4 = Moridae, Syngnathidae, Callionymidae, Nomeidae
8	2 = Poeciliidae, Monacanthidae
7	6 = Synphobranchidae, Carapidae, Bythitidae, Gigantactinidae, Kyphosidae, Scaridae
6	7 = Phosichthyidae, Scopelarchidae, Howellidae, Echeneidae, Cirrhitidae, Xiphiidae, Ostraciidae
5	7 = Nettastomatidae, Clupeidae, Platyroctidae, Ogcocephalidae, Belonidae, Trachichthyidae, Chiasmodontidae
4	11 = Nemichthyidae, Cyematidae, Opisthoproctidae, Ipnopidae, Linophryinae, Cetomimidae, Centrarchidae, Priacanthidae, Epigonidae, Percophidae, Diodontidae
3	28 = Alopeiidae, Lamnidae, Dasyatidae, Myliobatidae, Chlopsidae, Loricariidae, Microstomatidae, Alepocephalidae, Notosudidae, Evermannellidae, Lophiidae, Thaumatchthyidae, Ceratiidae, Mugilidae, Hemiramphidae, Zeidae, Caproidae, Triglidae, Callanthiidae, Emmelichthyidae, Pentacerotidae, Ammodytidae, Microdesmidae, Sphyraenidae, Trichiuridae, Tetragonuridae, Soleidae, Molidae
2	35 = Epigonichthyidae, Odontaspidae, Centrophoridae, Elopidae, Albulidae, Halosauridae, Notacanthidae, Serrivomeridae, Engraulidae, Cyprinidae, Bathylagidae, Neoscopelidae, Trachipteridae, Polymixiidae, Bregmacerotidae, Chaunacidae, Melanocetidae, Scomberesocidae, Mirapinnidae, Berycidae, Grammicolepidae, Fistulariidae, Centriscidae, Acropomatidae, Symphysanodontidae, Coryphaenidae, Kuhliidae, Oplegnathidae, Pinguipedidae, Creediidae, Draconettidae, Schindleriidae, Ariommatidae, Samaridae, Cynoglossidae
1	76 = Myxinae, Chimaeridae, Rhinochimaeridae, Rhincodontidae, Scyliorhinidae, Pseudotriakidae, Pseudocarchariidae, Megachasmidae, Cetorhinidae, Hexanchidae, Echinorhinidae, Squalidae, Torpedinidae, Plesiobatidae, Hexatrygonidae, Moringuidae, Derichthyidae, Eurypharyngidae, Chanidae, Gonorynchidae, Cobitidae, Ictaluridae, Clariidae, Callichthyidae, Argentinidae, Salmonidae, Ateleopodidae, Giganturidae, Aulopodidae, Chlorophthalmidae, Omosudidae, Alepisauridae, Veliferidae, Lampridae, Stylephoridae, Lophotidae, Melanonidae, Caulophryinae, Neoceratiidae, Himantolophidae, Diceratiidae, Atherinidae, Notocheiridae, Stephanoberycidae, Rondeletidae, Barbourisiidae, Anoplogastridae, Diretmidae, Pegasidae, Aulostomidae, Synbranchidae, Dactylopteridae, Caracanthidae, Bembridae, Hoplichthyidae, Liparidae, Malacanthidae, Caristiidae, Lobotidae, Lethrinidae, Polynemidae, Cheilodactylidae, Cepolidae, Champsodontidae, Tripterygiidae, Eleotridae, Kraemeriidae, Ephippidae, Luvaridae, Zancidae, Scombrlabracidae, Amarsipidae, Centrolophidae, Channidae, Pleuronectidae, Triacanthidae

(1992b, 1998c) has referred to these as “relic” species. Although their distinctiveness from their congeners is less trenchant than *C. fremblii* or *A. arcuatus*, other Hawaiian Islands species mentioned as examples of relics are the Hawaiian lionfish (*Dendrochirus barberi*), the Hawaiian turkeyfish (*Pterois sphex*), the spotted cardinalfish (*Apogon maculiferus*), the masked angelfish (*Genicanthus personatus*), the yellowstripe coris (*Coris flavovittata*), and the spectacled parrotfish (*Chlorurus perspicillatus*). The fantail filefish (*Pervagor spiloso-**ma*) might also be added to this list. The Hawaiian grouper (*Epinephelus quernus*) has been discussed as another relic species but it resembles the eastern Pacific star-studded grouper (*E. niphobles*) and the Caribbean snowy grouper (*E. niveatus*), making it a relic only in its status as a member of an ancient, Tethyan clade. Some Hawaiian Islands species once thought to have no similar congeners have more recently been found to be synonyms of other species (e.g., a goby, *Vitraria clarescens*, was found to be the juvenile stage of the ‘o‘opu nōpili, *Sicyopterus stimpsoni*, by Greenfield et al., 1998) or to have recently discovered sister species elsewhere (e.g., the ‘o‘opu alamo‘o, *Lentipes concolor*, was the only species known from its genus prior to 1979 but several species have been described since, reviewed by Allen, 1997). Nevertheless, it is clear that a few

**Table 12. Biogeographic data for fish distributions within the 200-nmi Hawaiian EEZ including: the numbers of species with their most southeastern collection locality at each bank or island, the number of species with their most northwestern collection locality at the same features, the numbers of species known only from the location, and the total number of fish species recorded from the bank or island.**

Island or bank	Southeastern records at island or bank	Northwestern record at island or bank	Species only at location	Total species at island or bank
Johnston Atoll	355	27	27	355
Cross Seamount	23	0	0	351
Lō'ihī Seamount	2	0	0	353
Hawai'i Island	321	33	30	674
Kaho'olawe	2	0	0	643
Maui	62	15	5	705
Lāna'i	5	2	0	695
Moloka'i	23	7	1	716
O'ahu	324	355	222	1033
Kaua'i	7	60	4	685
Ni'ihau	2	11	2	627
Nihoa	2	3	1	618
Necker	3	8	0	618
French Frigate Shoals	1	30	0	611
Gardner Pinnacles, Brooks Bank, & St. Rogatien Bank	0	8	0	581
Maro Reef	3	18	2	576
Laysan	4	34	1	562
Lisianski	0	14	0	528
Pearl and Hermes Reef	7	19	1	521
Midway Atoll	5	139	3	507
Kure Atoll	0	147	0	368
Banks 10 and 11	4	9	1	225
Hancock Seamounts	49	145	30	265
Colahan to Koko Seamounts	2	122	2	122

endemic Hawaiian Islands fishes exhibit great morphological divergence from related species. Randall (1992b, 1998c) explained his use of the term relic for these to indicate a long history of isolation and perhaps the extinction of their nearest relatives elsewhere. He cited the masked angelfish (*Genicanthus personatus*) as an example, stating (without a phylogenetic analysis) that it is the most primitive species of its genus. Whether the observed divergences of these species are due to ancient cladogenesis or to rapid anagenesis following more recent speciation remains to be demonstrated by rigorous phylogenetic studies of the genera involved. In the only phylogenetic analysis of a Hawaiian Islands relic species to date, the bluestripe butterflyfish (*Chaetodon fremblii*) was not found to be either a very early or very recently diverged species within its genus. *Chaetodon fremblii* is a relic in the sense that it is geographically isolated from its nearest relative but not in the sense that it is a phylogenetically basal species (Blum, 1988, 1989).

Most endemic Hawaiian Archipelago fishes are obviously related to one or several similar Indo-Pacific species while being clearly distinctive in morphology as full species. These are too numerous to list completely, but they include some of the most abundant and conspicuous fishes of the archipelago. A few examples are the Hawaiian anchovy (*Engrasichthys purpuræa*), which closely resembles the Buccaneer anchovy (*E. punctifer*) (see Whitehead, 1988); the whitesaddle goatfish (*Parupeneus porphyreus*), which shares a derived color pattern with the white-lined goatfish (*P. ciliatus*) (see Myers, 1999); the milletseed butterflyfish (*Chaetodon miliaris*), the sister species of the Günther's butterflyfish (*C. guentheri*) (see Blum, 1988, 1989); the Hawaiian sergeant (*Abudefduf abdominalis*), a sister species of the Indo-Pacific sergeant (*A. vaigiensis*) (see Randall, 1998); the Hawaiian dascyllus (*Dascyllus albisella*), a sister species of the threespot dascyllus (*D. trimaculatus*) (see Randall & Allen, 1977); the pearl wrasse (*Anampses cuvier*), the sister species of the blue-spotted wrasse (*A. caeruleopunctatus*) (see Randall, 1998); the Hawaiian cleaner wrasse (*Labroides phthirophagous*), a sister species of the bluestreak cleaner wrasse (*L. dimidiatus*) (see Randall, 1958); the Ewa fangblenny (*Plagiotremus ewaensis*) and Gosline's fangblenny (*P. goslinei*), sister species to the bluestriped fangblenny

**Table 13. Fish species known within the Hawaiian Archipelago only from the Northwestern Hawaiian Islands and not from seamounts north of Kure Atoll or the main Hawaiian Islands.**

Species	Locations	Habitat and comments
Scyliorhinidae		
<i>Apristurus spongiceps</i>	Nihoa	Deep-water, poorly known, undoubtedly has wider range in the archipelago
Muraenidae		
<i>Gymnothorax atollii</i>	Pearl & Hermes to Midway	Cryptic species living within reefs
Alepocephalidae		
<i>Mentodus mesalarius</i>	Pearl & Hermes to Midway	Deep-water, poorly known, undoubtedly has wider range
Stomiidae		
<i>Astronesthes nigroides</i>	Pearl & Hermes	Mesopelagic, undoubtedly has wider range
<i>Eustomias cancriensis</i>	Midway	Mesopelagic, poorly known, undoubtedly has wider range
Ophidiidae		
<i>Bassozetus zenkevitchi</i>	Midway to Kure	Deep-water, poorly known
<i>Spectrunculus grandis</i>	Maro Reef	Deep-water, undoubtedly has wider range
Macrouridae		
<i>Cetomurus crassiceps</i>	Pearl & Hermes	Deep-water, undoubtedly has wider range
Holocentridae		
<i>Myripristis murdjan</i>	Midway to Kure	Shallow reefs, restricted range in the Hawaiian Islands
Fistulariidae		
<i>Fistularia petimba</i>	Nihoa to Kure	Moderately deep-water, undoubtedly has wider range
Scorpaenidae		
<i>Scorpaenopsis pluralis</i>	Laysan	Deep-water, undoubtedly has wider range
Callanthiidae		
<i>Grammatonotus macrophthalmus</i>	French Frigate Shoals	Deep-water, poorly known
Epigonidae		
<i>Epigonus devanyi</i>	Necker to Maro	Deep-water, may have wider range
Carangidae		
<i>Caranx lugubris</i>	Necker to Midway (& Johnston)	Shallow and deep-water, absent from the main Hawaiian Islands
<i>Decapterus macrosoma</i>	Maro	Pelagic, poorly known in region, needs more study
Pomacanthidae		
<i>Centropyge interrupta</i>	Kure & Midway	Shallow reefs, restricted range in Hawaiian Islands
Kyphosidae		
<i>Girella leonina</i>	Midway	Waif
Labridae		
<i>Epibulus insidiator</i>	French Frigate Shoals to Kure	Shallow reefs, restricted range in Hawaiian Islands (waifs in main Hawaiian Islands)
Ammodytidae		
<i>Lepidamodytes macrophthalmus</i>	Maro	Poorly known, undoubtedly has wider range
Ephippidae		
<i>Platax boersii</i>	Midway	Waif
Luvaridae		
<i>Luvarus imperialis</i>	Laysan	Epipelagic but rarely seen in region, undoubtedly has wider range

(*P. rhinorhynchos*), and the scale-eating fangblenny (*P. tapeinosoma*), respectively (see Smith-Vaniz, 1976); and the Hawaiian whitespotted toby (*Canthigaster jactator*), a sister species to the honeycomb toby (*C. janthinoptera*) (see Allen & Randall, 1977).

More controversial are species whose status has changed as they have been reexamined by different investigators or even the same ichthyologist over time. Disputes or contradictions about these often reflect the incomplete evolutionary differentiation of Hawaiian Islands populations from those elsewhere in the Pacific as much as the varying taxonomic practices of the ichthyologists who must decide on the specific status of

**Table 14. "Cosmopolitan" fish species found in Hawaiian waters.** These are fishes that occur throughout almost all marine areas except for the Arctic and Antarctic oceans. Those species that are absent from the eastern North or eastern tropical Pacific near the American continents are marked with an asterisk (\*).

Notacanthidae	Alepisauridae
<i>Notacanthus chemnitzii</i>	<i>Alepisaurus ferox</i>
Nemichthyidae	Myctophidae
<i>Avocettian infans</i> *	<i>Ceratoscopelus townsendii</i>
<i>Nemichthys scolopaceus</i>	Lampridae
Alepocephalidae	<i>Lampris guttatus</i>
<i>Photostylus pycnopterus</i>	Melanocetidae
Gonostomatidae	<i>Melanocetus johnsonii</i>
<i>Cyclothone pallida</i>	Oneirodidae
<i>Cyclothone pseudopallida</i>	<i>Chaenophryne longiceps</i>
Sternoptychidae	Ceratiidae
<i>Argyropelecus hemigymnus</i> *	<i>Cryptosaras couesii</i>
<i>Sternoptyx diaphana</i> *	Diretmidae
Stomiidae	<i>Diretmichthys parini</i> *
<i>Chauliodus sloani</i> *	Anoplogastridae
<i>Malacosteus niger</i>	<i>Anoplogaster cornuta</i>
Scopelarchidae	Xiphiidae
<i>Benthalbella infans</i> *	<i>Xiphias gladius</i>
Paralepididae	
<i>Arctozenus rissoi</i>	
<i>Magnisudis atlantica</i> *	

those populations. Examples of endemic Hawaiian species recognized as valid by some workers but not others include the Emperor Seamount lightfish (*Maurollicus imperatorius*), the Fisher's angelfish (*Centropyge fisheri*), a dragonet (*Synchiropus kanmuensis*), and the 'o'opu akupa (*Eleotris sandwicensis*) (see checklist for references). These cases are certainly not equivalent because there is a wide variety of factual or interpretive reasons for the taxonomic disputes in which they are involved. An example of a Hawaiian endemic species that was recognized first from inadequate sample sizes and later from a simple misinterpretation of fact was the bandfin cardinalfish, *Apogon menesemus* (= *A. taeniopterus* as discussed by Randall, 1998b). But in at least some cases these disputes are due to the low level of morphological differentiation of the Hawaiian Islands populations from their sister populations, suggesting recent isolation, slow rate of anagenesis, or incomplete genetic isolation. Other cases exist where a taxonomist considered a Hawaiian fish population to be conspecific with populations elsewhere but later decided that the Hawaiian Islands population was distinct enough to be considered an endemic species. Examples are the magnificent snake eel (*Myrichthys magnificus*), the Hawaiian softheaded grenadier (*Malacocephalus hawaiiensis*), the shortnose scorpionfish (*Scorpaenopsis brevifrons*), the Hawaiian longfin anthias (*Pseudanthias hawaiiensis*), the Hawaiian ruby cardinalfish (*Apogon erythrinus*), the transparent cardinalfish (*Pseudamiops diaphanes*), and the goldring surgeonfish (*Ctenochaetus strigosus*) (see checklist for references).

There are also many cases where Hawai'i's fishes are distinctive from the same species elsewhere in the Indo-Pacific at the subspecies level (Gosline & Brock, 1960; Randall, 1998c). The classic example of this is the manini or convict tang, whose Hawaiian Islands populations were described as an endemic species, *Acanthurus sandwicensis*, based on higher modal fin-ray counts and a streak of dark pigment below the pectoral fin that was thought not to be present in related *A. triostegus* populations elsewhere in the Pacific (Gosline, 1955). Randall (1956a) analyzed the distribution of fin-ray counts and size of the subpectoral pigment streak throughout the range of manini and relegated the Hawaiian and Johnston Atoll populations to subspecific status, *A. triostegus sandwicensis*. This conclusion has since been supported by genetic analysis (Planes & Fauvelot, 2002). In a case with opposite results, Smith-Vaniz (1976) commented that the nominal Hawaiian blennies *Plagiotremus ewaensis* (the Ewa fangblenny) and *P. goslinei* (the Gosline's fangblenny) differed from Indo-Pacific *P. rhinorhynchos* (the bluestriped fangblenny) and *P. tapeinosoma* (the scale-eating fangblenny) only by such minor pigment patterns and counts that he would have considered them to be subspecies had they not been previously named as separate species. The two Hawaiian Islands populations were retained as species in this case. In a third case with yet another outcome, Randall (1979) originally described the Hawaiian longfin anthias as *Anthias ventralis hawaiiensis* but later elevated the Hawaiian subspecies to a species (Randall, 1996a) in the genus *Pseudanthias*. Examples of other endemic Hawaiian Island fish sub-



**Table 15. Fish species found in Hawaiian waters that are only known from the Atlantic and Pacific oceans, with no recorded collections in the Indian Ocean.**

Synbranchiidae	Moridae
<i>Dysomma brevirostre</i>	<i>Laemonema robustum</i>
Cyematidae (known only from larvae)	Melanocetidae
Cyematidae sp. 1	<i>Melanocetus murrayi</i>
Cyematidae sp. 2	Diceratiidae
Cyematidae sp. 3	<i>Diceratias pileatus</i>
Microstomatidae	Oneirodidae
<i>Nansenia longicauda</i>	<i>Leptacanthichthys gracilispinus</i>
<i>N. pelagica</i>	<i>Oneirodes macronema</i>
Alepocephalidae	Thaumatichthyidae
<i>Holtbyrnia innesi</i>	<i>Lasiognathus beebei</i>
<i>Maulisia argipella</i>	<i>L. saccostoma</i>
Stomiidae	Gigantactinidae
<i>Bathophilus altipinnis</i>	<i>Gigantactis golovani?</i>
<i>Photonectes achirus</i>	<i>G. macronema</i>
Paralepididae	<i>Rhynchactis leptonema</i>
<i>Sudis atrox</i>	Linophryidae
<i>Uncisudis advena</i>	<i>Linophryne densiramis</i>
<i>U. quadrimaculata</i>	<i>Linophryne pennibarbata</i>
Myctophidae	Melamphaidae
<i>Bolinichthys distofax?</i>	<i>Melamphaes longivelis</i>
<i>Diaphus adenomus</i>	Stephanoberycidae
<i>Diaphus andersonii</i>	<i>Malacosarcus macrostoma</i>
<i>D. bertelseni</i>	Carangidae
<i>Hygophum reinhardti</i>	<i>Decapterus muroadsi</i>
<i>Lampadena urophaos</i> [but with different subspecies in Atlantic and Pacific]	Bramidae
Lophotidae	<i>Taractes rubescens</i>
<i>Lophotus capellei</i>	Caristiidae
Macrouridae	<i>Caristius macropus</i>
<i>Cetonus crassiceps</i>	Ariommatidae
	<i>Ariomma lurida</i>

species are *Conger cinereus marginatus* (the mustache conger), *Hyporhamphus acutus pacificus* (the acute halfbeak), *Plectranthias kelloggi kelloggi* (a deep-water basslet), *Pseudogramma polyacantha hawaiiensis* (the palespotted podge), *Bodianus bilunulatus albotaeniatus* (the Hawaiian hogfish), *Crystallodytes cookei cookei* (a sandburrower), *Gnatholepis cauerensis hawaiiensis* (the shoulderspot goby), and *Ostracion meleagris camurum* (the spotted boxfish).

A more subtle differentiation of Hawai'i's fish populations from their sister populations is seen in species that have common color variants in the Hawaiian Islands which are rare elsewhere. The differences between the Hawaiian Islands population and those elsewhere are not so consistent as to warrant the recognition of separate species or subspecies. An example is the Thompson's surgeonfish (*Acanthurus thompsoni*), which often has a white caudal fin throughout most of its range but consistently has a dark caudal fin in its Hawaiian Islands population (Randall, 1996a). Another good example is the Hawaiian Islands population of the Pacific gregory *Stegastes fasciolatus* which differs from populations elsewhere by the consistent presence of a black spot between the first and third dorsal-fin spines (Allen & Emery, 1985). Yet another is the flame angelfish (*Centropyge loricula*), with indigenous individuals from the Hawaiian Islands having brighter red between the black lateral bars than individuals from elsewhere (Hoover, 1994). (A population of *C. loricula* in Kāne'ohe Bay, O'ahu, with the color pattern of populations from elsewhere in the Pacific may have been established from releases of aquarium fishes imported to the state.) A weaker example of partial differentiation of a Hawaiian fish population from populations elsewhere is found in the longnose butterflyfish (*Forcipiger longirostris*). At Hawai'i Island dark brown individuals are common but the dark brown morph of *F. longirostris* is rare at other islands.

### How did ichthyologists learn what fish species live in Hawaiian waters?

The earliest taxonomy for Hawai'i's fishes was that of the Polynesians who arrived in the archipelago at ca. 300–750 A.D. (Juvik & Juvik, 1998). There was a rich *kanaka maoli* (native Hawaiian) nomenclature for Hawai'i's fishes (Randall, 1985a) that was diminished by both neglect and prejudice against the language and

culture by later immigrants. During the 20th century, science became a dominant mode of understanding in the Hawaiian Islands as elsewhere. Scientific culture relies on written history for its development, transmission, and validation. Because the knowledge and culture of the *kanaka maoli* were transmitted and validated verbally, that learning was not readily incorporated into scientific culture. As a consequence, the detailed *kanaka maoli* knowledge of natural history was often neglected by ichthyologists studying the fauna of the archipelago (Taylor, 1993). Gosline & Brock (1960, p. 1) stated that “it is probable that the Hawaiians of Captain James Cook’s time knew more about the fishes of their islands than is known today. Most of this information has now been lost.”

The history of ichthyology in the Hawaiian Islands is therefore usually thought of as beginning with Captain Cook’s third voyage with the *Resolution* and *Discovery* in 1778, when Europeans first became aware of the archipelago. Two fish species from the Sandwich [Hawaiian] Islands were mentioned in the report on fishes collected during that voyage (Broussonet, 1782). One, the convict tang (*Chaetodon* [= *Acanthurus*] *trioestegus*) had been previously named by Linnaeus (1758). The other was the longnose butterflyfish, named by Broussonet (1782) as *Forcipiger longirostris* from a Hawaiian Islands specimen in the Joseph Banks Museum along with a specimen from Tahiti. This was the first fish from the Hawaiian Islands described in the western, scientific literature (Jordan & Evermann, 1905).

No fishes were recorded again from the islands until 1824, when Quoy and Gaimard listed 17 fish species from Hawaiian Island collections of the French vessel *Uranie*’s 1819 expedition (Kay, 1972). The first notice of the archipelago’s unique fish fauna came with this publication because it included the earliest descriptions of Hawai’i’s endemic fish species. Quoy & Gaimard’s (1824) descriptions also had special importance for subsequent recognition of Hawai’i’s fish fauna as among the most unique in the world because some of their endemic species (the milletseed butterflyfish, *Chaetodon miliaris*, the Hawaiian sergeant, *Abudefduf abdominalis*, and the saddle wrasse, *Thalassoma duperrey*) are among some of the most abundant fishes of the islands.

In describing the chronology of natural history in the Hawaiian Islands, Kay (1972) characterized the period of 1820–1850 as that of the explorer-naturalists and the period of 1850–1900 as that of resident-naturalists, missionaries, physicians, and others. Euro-American connections to the Hawaiian Islands increased after 1819 with the arrival of missionaries, the rise and fall of the sandalwood trade with China, and the subsequent development of the islands as a major whaling center (Daws, 1968). Surprisingly, no investigations of Hawai’i’s marine natural history resulted from the increased maritime activity of sandalwood commerce or whaling. From 1819 to 1897, knowledge of Hawai’i’s fish fauna increased sporadically as collections were reported from a few expeditions and individual travelers (Kay, 1972, see also Figs. 4 & 5). The expeditions of the explorer-naturalist phase that resulted in the greatest numbers of fish species newly reported from the islands were those of the *Blonde* (Bennett, 1828), *Blossom* (Lay & Bennett, 1839), and *Bonite* (Eydoux & Souleyet, 1850). Residents of the islands were more interested in the astonishing endemic terrestrial biota than in fishes, with the notable exceptions of Garrett (1863, 1864), Ballieu (whose collections were described in Vaillant & Sauvage, 1875), and Wetmore (1890). Most of Wetmore’s (1890) records were only given as Hawaiian names and/or genus names, and cannot be assigned to species. Garrett, a professional naturalist who collected specimens for mercantile museums as well as for his own use, sold many of his fish specimens to the Museum Godeffroy, the collection of a major Hamburg trading company (Kay, 1972; Tinker, 1982). These were reported by Günther (1873–1910). At the end of the explorer-naturalist phase, attempts were made at cataloging the fish species of the entire globe by Cuvier and Valenciennes of the Paris Museum during 1828–1850 and by Albert Günther of the British Museum during 1859–1870 (Bauchot *et al.*, 1997; Pietsch & Grobecker, 1987). These cataloging efforts added many species to those known from the Indo-Pacific, including new records from the Hawaiian Islands.

The HMS *Challenger* expedition of 1872–1876 was the first around-the-world expedition specifically dedicated to marine science and is considered by many to mark the beginning of the science of oceanography (Hedgepeth, 1974; Mills, 1983). The crew and scientists on the *Challenger* sampled at the Hawaiian Islands in 1875, and several shallow-water fish species were described as new or first reported from the region in the expedition’s reports (Günther, 1878, 1880, 1887, 1889). In addition, many deep-sea species subsequently found in Hawaiian waters by later investigators were first described from *Challenger* collections in other areas. The *Challenger* expedition was the first concerted effort at sampling oceanic deep-sea fishes, a remarkable feat considering that the *Challenger* was a sailing vessel with only augmented steam-power, without steam-powered winches, and only hemp rope for deep-sea sampling (Hedgepeth, 1974; Mills, 1983).

The final two major reports of fishes new to the region during the early phases of Hawai’i’s ichthyology were published by American scientists. Streets (1877a) reported on 38 fish species collected primarily in Honolulu Harbor by the USS *Portsmouth* during its North Pacific Ocean island surveys. Smith & Swain (1882) gave the first report of Johnston Atoll fishes from collections of the North Pacific Guano Company.

**Table 16. Fish species that occur in the Hawaiian Archipelago that have ranges restricted to the central Pacific Ocean.** Species in brackets are those that also occur in restricted areas of the easternmost Indian Ocean such as northwestern Australia or Indonesia, most likely as a result of dispersal from otherwise Pacific Ocean populations. Species followed by a question mark are those with taxonomic or distributional problems mentioned in their individual species accounts.

### I. Trans-Pacific Basin

#### A. AUSTRALIAN, PHILIPPINE, EURASIAN, PACIFIC, AND ONE OR MORE EASTERN PACIFIC PLATES

Rhinochimaeridae	Exocoetidae
[ <i>Rhinochimaera pacifica</i> ]	<i>Cheilopogon dorsomacula</i>
Echinorhinidae	Nomeidae
<i>Echinorhinus cookei</i>	<i>Cubiceps baxteri</i>

#### B. AUSTRALIAN, EURASIAN, PACIFIC, AND ONE OR MORE EASTERN PACIFIC PLATES

Gigantactinidae	Zeidae
[ <i>Gigantactis gargantua</i> ]	<i>Zenopsis nebulosa</i>

#### C. AUSTRALIAN, PACIFIC, AND ONE OR MORE EASTERN PACIFIC PLATES

Mirapinnidae	Serranidae
[ <i>Parataeniophorus brevis</i> ]	<i>Caprodon longimanus?</i>

#### D. EURASIAN, PHILIPPINE, PACIFIC, AND ONE OR MORE EASTERN PACIFIC PLATES

Myctophidae	Scombridae
<i>Nannobranchium bristori</i>	<i>Scomber japonicus</i>
<i>Nannobranchium hawaiiensis</i>	<i>Thunnus orientalis</i>

#### E. EURASIAN, PACIFIC, AND ONE OR MORE EASTERN PACIFIC PLATES

Platyroctidae	Himantolophidae
<i>Sagamichthys abei</i>	<i>Himantolophus sagamius</i>

#### F. PHILIPPINE, PACIFIC, AND ONE OR MORE EASTERN PACIFIC PLATES (= TRANS-PACIFIC EXCEPT TO WESTERN MARGIN OF PACIFIC OCEAN)

Gonostomatidae	Priacanthidae
<i>Sigmops ebelingi</i>	<i>Priacanthus alalaua</i>

#### G. PACIFIC AND CONTINENTAL CENTRAL AMERICA

Myctophidae	Acanthuridae
<i>Diaphus wisneri</i>	<i>Tenchochaetus marginatus</i>

### II. Australian and Pacific

Albulidae	Macrouridae
[ <i>Albula forsteri</i> ]	<i>Trachonurus sentipellis</i>
Muraenidae	Macrouridae (continued)
<i>Uropterygius xenodontus</i>	<i>Ventrifossa atherodon</i>
Sternopychidae	Pomacanthidae
<i>Argyripnus ephippiatus</i>	<i>Centropyge loriculus</i> (primarily on Pacific plate)
Phosichthyidae	<i>Centropyge multicolor</i> (primarily on Pacific plate)
<i>Ichthyococcus intermedius</i>	Gobiidae
Stomiidae	[ <i>Trimma unisquamis</i> ]
<i>Eustomias similis</i>	Acanthuridae
Synodontidae	<i>Acanthurus achilles</i> (primarily on Pacific plate)
<i>Synodus amaranthus</i>	<i>Naso caesius</i> (primarily on Pacific plate)

### III. Southwestern Eurasian and Pacific

Scyliorhinidae	Scorpaenidae
<i>Apristurus spongiceps</i>	[ <i>Phenacoscorpius megalops</i> ]
Synodontidae	Draconettidae
<i>Synodus usitatus</i>	<i>Centrodraco rubellus</i>
Lophiidae	Bothidae
<i>Sladenia remiger</i>	<i>Arnoglossus debilis</i>

(continued ...)

Table 16 (continued)

	<b>IV. Australian, Eurasian, and Pacific</b>	
Stomiidae		Bythitidae
<i>Eustomias vulgaris</i>		<i>Saccogaster tuberculata</i>
Paralepididae		Moridae
<i>Lestidium nudum</i>		<i>Lepidion inosimae</i>
Myctophidae		Labridae
[ <i>Nannobranchium nigrum</i> ]		<i>Bodianus cylindriatus</i>
		<i>Suezichthys notatus</i>
	<b>V. Australian, Eurasian, Philippine, and Pacific</b>	
Elopidae		Chaetodontidae
<i>Elops hawaiiensis</i>		[ <i>Chaetodon ephippium</i> ]
Muraenidae		[ <i>Chaetodon lunulatus</i> ]
<i>Gymnothorax gracilicauda</i>		[ <i>Chaetodon reticulatus</i> ]
Stomiidae		[ <i>Chaetodon ulietensis</i> ]
<i>Astronesthes lucifer</i>		[ <i>Chaetodon unimaculatus</i> ]
Aulopodidae		[ <i>Hemitaurichthys polylepis</i> ]
<i>Hime japonica</i>		Pentacerotidae
Synodontidae		<i>Eviustus acutirostris</i>
<i>Synodus kaianus</i>		Kyphosidae
<i>Synodus rubromarmoratus</i>		<i>Microcanthus strigatus</i>
Myctophidae		Pomacentridae
<i>Diaphus chrysohynchus</i>		<i>Chromis vanderbilti</i>
Ophidiidae		Labridae
[ <i>Ophidion muraenolepis</i> ]		[ <i>Coris gaimard</i> ]
Antennariidae		[ <i>Gomphosus varius</i> ]
<i>Antennarius randalli</i> (also to Easter Island on the		[ <i>Oxycheilinus unifasciatus</i> ]
Nazca Plate).		<i>Pseudocheilinus ocellatus</i>
Chaunacidae		[ <i>Iniistius aneitensis</i> ]
[ <i>Chaunax fimbriatus</i> ]		Callionymidae
Exocoetidae		<i>Synchiropus corallinus</i>
<i>Cheilopogon unicolor</i>		Acanthuridae
Caproidae		<i>Acanthurus leucopareius</i>
[ <i>Antigonia rubescens</i> ]		[ <i>Acanthurus olivaceus</i> ]
Serranidae		<i>Zebrasoma veliferum</i>
<i>Caprodon schlegelii</i>		Bothidae
[ <i>Pseudanthias randalli</i> ]		<i>Parabothus coarctatus</i>
Emmelichthyidae		Tetraodontidae
<i>Emmelichthys struhsakeri</i>		<i>Arothron manilensis</i>
Mullidae		[ <i>Canthigaster epilampra</i> ]
[ <i>Parupeneus multifasciatus</i> ]		
	<b>VI. Australian, Philippine, and Pacific</b>	
Stomiidae		Symphysanodontidae (continued)
<i>Eustomias parini</i>		[ <i>Symphysanodon typus</i> ]
Antennariidae		Serranidae
[ <i>Antennarius analis</i> ]		[ <i>Suttonia lineata</i> ]
Holocentridae		Pomacentridae
[ <i>Sargocentron iota</i> ]		<i>Chromis acares</i>
Syngnathidae		Labridae
[ <i>Minyichthys brachyrhinus</i> ]		[ <i>Halichoeres ornatissimus</i> ]
Symphysanodontidae		Gobiidae
[ <i>Symphysanodon maunaloae</i> ]		<i>Awaous guamensis</i>
		(continued ...)

Table 16 (continued)

	<b>VII. Eurasian, Philippine, and Pacific</b>	
Squalidae		Liparidae
<i>Squalus mitsukurii</i>		<i>Paraliparis meridionalis</i>
Notacanthidae		Serranidae
<i>Notacanthus abbotti</i>		<i>Plectranthias kelloggi</i> (except endemic subspecies in Hawaiian Islands)
Muraenidae		Lutjanidae
<i>Gymnothorax albimarginatus</i>		<i>Randallichthys filamentosus</i>
<i>Gymnothorax kidako</i>		Chaetodontidae
Myctophidae		<i>Chaetodon quadrimaculatus</i>
<i>Diaphus fulgens</i> “form C”		Labridae
<i>Diaphus schmidti</i>		<i>Polylepion russelli</i>
Exocoetidae		<i>Iniistius baldwini</i>
<i>Hirundichthys albimaculatus</i>		<i>Iniistius celebicus</i>
Holocentridae		Gobiidae
<i>Myripristis amaena</i>		<i>Eviota epiphanes</i>
<i>Sargocentron ensiferum</i>		Acanthuridae
Scorpaenidae		<i>Naso maculatus</i>
<i>Pontinus macrocephalus</i>		<i>Zebrasoma flavescens</i>
	<b>VIII. Non-marginally on Philippine Plate and Pacific Plate</b>	
Serranidae		Cynoglossidae
<i>Liopropoma collettei</i>		<i>Symphurus undatus</i>
	<b>IX. Australian, Pacific, and Nazca</b>	
Macrouridae		Hoplichthyidae
<i>Mataeocephalus acipenserinus</i>		<i>Hoplichthys citrinus</i>
	<b>X. Eurasian, Philippine, Pacific, and Nazca</b>	
Bembridae		Emmelichthyidae
<i>Bembradium roseum</i>		<i>Erythrocles scintillans</i>
Bramidae		Percophidae
<i>Pteraclis aesticola</i>		<i>Chironema chryseres</i>
	<b>XI. Philippines, Pacific, and Nazca</b>	
Stomiidae		Epigonidae
<i>Eustomias gibbsi</i>		<i>Epigonus atherinoides</i>
Moridae		
<i>Laemonema rodochir</i>		
	<b>XII. Pacific and Nazca</b>	
Stomiidae		<i>Hymenocephalus striatulus</i>
<i>Astronesthes nigroides</i>		<i>Pseudocetonurus septifer</i>
<i>Bathophilus kingi</i>		Zeidae
<i>Eustomias bibulboides</i>		<i>Cyttomimus stelgis</i>
<i>Eustomias bituberoides</i>		<i>Stethopristis eos</i>
Synodontidae		Callanthiidae
<i>Synodus capricornis</i>		<i>Grammatonotus laysanus</i>
Bathygadidae		Gobiidae
<i>Gadomus melanopterus</i>		<i>Kellogella oligolepis</i>
Macrouridae		Bothidae
<i>Caelorinchus spilonotus</i>		<i>Engyprosopon arenicola</i>

(continued ...)

Table 16 (continued)

<b>XIII. Eastern margin of the Philippine Plate and Pacific</b>	
Stomiidae	Chaetodontidae (continued)
<i>Eustomias medusa</i>	<i>Roa excelsa</i>
<i>Eustomias pacificus</i>	Pomacanthidae
Mugilidae	<i>Centropyge nigroocella</i>
<i>Chaenomugil leuciscus</i>	Labridae
Scorpaenidae	<i>Pseudocheilinus tetrataenia</i>
<i>Sebastapistes galactaema</i>	Blenniidae
Emmelichthyidae	<i>Cirripectes variolosus</i>
<i>Emmelichthys karnellai</i>	Acanthuridae
Chaetodontidae	<i>Ctenochaetus hawaiiensis</i>
<i>Hemitaurichthys thompsoni</i>	
<b>XIV. Pacific Plate endemics (* = known only from the Hawaiian Islands and French Polynesia)</b>	
Myxinidae	Hemiramphidae
<i>Eptatretus carlhubbsi</i>	<i>Hemiramphus depauperatus</i>
Muraenidae	<i>Hyporamphus acutus</i> (except endemic subspecies in Hawaiian Islands)
<i>Anarchias cantonensis</i>	Holocentridae
<i>Anarchias leucurus</i> *	<i>Ostichthys sandix</i> *
<i>Gymnothorax prismodon</i>	Scorpaenidae
Ophichthidae	<i>Sebastapistes coniorta</i>
<i>Apterichthys flavicaudus</i> ?	Howellidae
Nettastomatidae	<i>Pseudohowella intermedia</i>
<i>Nettachelys</i> sp. C	Apogonidae
Stomiidae	<i>Apogon deetsie</i> *
<i>Eustomias bimargaritoides</i> *	Chaetodontidae
<i>Eustomias longiramis</i>	<i>Chaetodon tinkeri</i>
Synodontidae	Kuhliidae
<i>Saurida flamma</i> *	<i>Kuhlia sandvicensis</i>
Myctophidae	Labridae
<i>Protomyctophum beckeri</i>	<i>Cirrhilabrus luteovittatus</i>
Ophidiidae	Creediidae
<i>Brotula townsendi</i>	<i>Crystallodytes cookei</i> (except endemic subspecies in Hawaiian Islands)
Macrouridae	Gobiidae
<i>Coryphaenoides longicirrus</i>	<i>Hazeus nephodes</i>
Antennariidae	<i>Priolepis aureoviridis</i>
<i>Antennarius duescus</i>	Kraemeriidae
Isonidae	<i>Kraemeria bryani</i>
<i>Iso hawaiiensis</i>	Ostraciidae
Exocoetidae	<i>Ostracion whitleyi</i> *
<i>Cypselurus simus</i>	

The next phase of Hawai'i's natural history was characterized by intensive research by professional scientists (Kay, 1972). Between 1896 and 1906, 330 fishes were added to the 134 species previously known from the islands. These 330 species are almost one-third of the total fauna. This "golden era" of taxonomy (Collette, 1967) was the result of efforts by the extraordinarily influential ichthyologist David Starr Jordan, his students, and associates (see Jordan & Evermann, 1905; Hubbs, 1964; Brittan, 1997). Efforts in Hawaiian waters were prompted by political upheaval in the Hawaiian Islands that led to its annexation by the United States and by technological advances in oceanographic sampling. The turn of the last century was a time of energetic taxonomic investigation of U.S. aquatic resources as a result of laws passed in the late 1880s and early 1890s by the U.S. Congress requiring that fisheries surveys be done in the new western states and territories (Jennings, 1997). The surveys were done under the authority of the U.S. Fish Commission (renamed the U.S. Bureau of Fisheries in 1903, part of this agency became the Bureau of Commercial Fisheries in 1956, which in turn was renamed the National Marine Fisheries Service in 1970) but were completed mostly by Jordan, his students, and his colleagues at universities. Surveys began in the Hawaiian Islands soon after annexation. At the time of Hawai'i's fisheries surveys, Jordan was president of Stanford University (Brittan, 1997). The U.S. Fish

**Table 17. North Pacific endemic fish species that have been recorded within the 200-nmi Hawaiian EEZ.**

**A. Subarctic Pacific endemic fish species.** Most of these species have only been found at the extreme northwestern portion of the Hawaiian region.

Gonostomatidae	<i>Cyclothone atraria</i>	Scomberesocidae	<i>Cololabis saira</i>
	<i>Sigmops gracile</i>	Melamphaidae	<i>Melamphaes lugubris</i>
Myctophidae	<i>Diaphus theta</i>	Bramidae	<i>Brama japonica</i>
	<i>Lampanyctus jordani</i>	Trichiuridae	<i>Aphanopus arigato</i>
Moridae	<i>Antimora microlepis</i>		

**B. North Pacific transition zone species.** These are species that are known only from the region within the influence of the Kuroshio Current from Japan or Taiwan to the Hawaiian Islands.

Chimaeridae	<i>Hydrolagus purpurescens</i>	Trachichthyidae (continued)	<i>Gephyroberyx japonicus</i>
Etmopteridae	<i>Trigognathus kabeyai</i>	Trachichthyidae (continued)	<i>Hoplostethus crassispinus</i>
Dasyatidae	<i>Dasyatis lata</i>	Holocentridae	<i>Sargocentron spinosissimum</i>
Muraenidae	<i>Gymnothorax ypsilon</i>	Scorpaenidae	<i>Rhinopias xenops</i>
Congridae	<i>Gnathophis nystromi nystromi</i>	Triglidae	<i>Satyrichthys engyceros</i>
Gonostomatidae	<i>Diplophos orientalis</i>		<i>S. hians</i>
Sternoptychidae	<i>Maurolucus japonicus</i>	Howellidae	<i>Howella parini</i>
	<i>Polyipnus matsubarai</i>		<i>H. zina</i>
Phosichthyidae	<i>Ichthyococcus elongatus</i>	Serranidae	<i>Liopropoma maculatum</i>
Stomiidae	<i>Astronesthes fedorovi</i>		<i>Plectranthias helenae</i>
	<i>Borostomias pacificus</i>		<i>Pseudanthias thompsoni</i>
	<i>Eustomias cancriensis</i>	Callanthiidae	<i>Grammatonotus macrophthalmus</i>
	<i>Eustomias elongatus</i>	Pomacanthidae	<i>Centropyge interrupta</i>
	<i>Eustomias ioani</i>	Pentacerotidae	<i>Pentaceros japonicus</i>
	<i>Opostomias mitsuui</i>		<i>Pseudopentaceros wheeleri</i>
	<i>Stomias pacificus</i>	Kyphosidae	<i>Girella leonina</i>
Scopelarchidae	<i>Scopelarchus stephensi</i>	Oplegnathidae	<i>Oplegnathus fasciatus</i>
Synodontidae	<i>Synodus lobeli</i>		<i>Oplegnathus punctatus</i>
	<i>Synodus ulae</i>	Labridae	<i>Xyrichtys woodi</i>
Myctophidae	<i>Diaphus kuroshio</i>	Pinguipedidae	<i>Parapercis roseoviridis</i>
	<i>Loweina terminata</i>	Percophidae	<i>Bembrops filifera</i>
	<i>Notoscopelus japonicus</i>	Ammodytidae	<i>Protammodytes brachistos</i>
	<i>Symbolophorus californiensis</i>	Callionymidae	<i>Synchiropus rubrovinctus</i>
Polymixiidae	<i>Polymixia japonica</i>	Centrolophidae	<i>Hyperoglyphe japonica</i>
Ophiidiidae	<i>Bassozetus zenkevitchi</i>	Ostraciidae	<i>Kentrocapros aculeatus</i>
Macrouridae	<i>Nezumia burragei</i>	Tetraodontidae	<i>Canthigaster inframacula</i>
Lophiidae	<i>Lophiodes miacanthus</i>		<i>Torquigener florealis</i>
Ogcocephalidae	<i>Malthopsis jordani</i>		
Trachichthyidae	<i>Aulotrachichthys prosthemiis</i>		

**Table 18. Eastern Pacific endemic species that occur in Hawaiian waters at the westernmost fringes of their ranges.** Some of these are only known as waifs (indicated by asterisks) but others are thought to reproduce in Hawaiian waters.

Dalatiidae	Carapidae
<i>Centroscyllium nigrum</i>	<i>Encheliophis dubius</i>
Dasyatidae	Oneirodidae
<i>Dasyatis dipterura?</i>	<i>Oneirodes acanthias?</i>
Nemichthyidae	Gigantactinidae
<i>Nemichthys larseni</i>	<i>Gigantactus microdontis</i>
Monognathidae	<i>Gigantactus savagei</i>
<i>Monognathus rosenblatti</i>	Scomberesocidae
Alepocephalidae	<i>Cololabis adocetus</i>
<i>Mentodus eubranchus</i>	Carangidae
Gonostomatidae	<i>Caranx caballus*</i>
<i>Cyclothone signata*</i>	Kyphosidae
Sternoptychidae	<i>Sectator ocyurus*</i>
<i>Danaphos oculus</i>	Scombridae
Neoscopelidae	<i>Euthynnus lineatus*</i>
<i>Scopelengys clarkei</i>	Nomeidae
Myctophidae	<i>Cubiceps paradoxus</i>
<i>Diaphus pacificus</i>	Balistidae
<i>Diaphus trachops</i>	<i>Balistes polylepis</i>
<i>Diogenichthys laternatus*</i>	
<i>Symbolophorus reversus</i>	

Commission scientist who worked most closely with Jordan in managing these surveys was Barton Warren Evermann (Jennings, 1997). The third key investigator was Charles Henry Gilbert, who had been an early student of Jordan's and who later became the Chairman of Stanford's Zoology Department (Dunn, 1996, 1997). The history of Jordan and Gilbert's professional relationship is an interesting story of different personalities and scientific styles (Hubbs, 1964; Dunn, 1996, 1997). Jordan eventually wrote that Gilbert was "the keenest and ablest critic of natural history I have ever known" (cited from Dunn, 1997).

The political stage for these events was set at the end of the 1800s when immigrants to the Hawaiian Kingdom from the United States had acquired economic and political power that enabled them to depose the ruling monarchy (Daws, 1968). In 1887 the *haole* (foreign, but usually understood to mean of Euro-American ancestry) oligarchy pressured King Kalākaua into transforming the Hawaiian government to a constitutional monarchy. Shortly thereafter the sole use of Pearl Harbor was ceded to the United States for a naval base. As a result of the consequent demand for improved communications between the Hawaiian Islands and the United States, the U.S. fisheries research vessel *Albatross* was sent in 1891 to survey a deep-sea telegraph-cable route from the mainland to the islands. In 1882 the *Albatross* was the first ship to be constructed specifically for scientific work, with innovative technologies for the time that included steam-powered winches, wire cable for deep-sea sampling, the first electric lighting system aboard a research vessel, and a two-engine, twin-screw propulsion system (Allard, 1999). While in the Hawaiian Islands, the *Albatross* collected 26 fish species at depths of 295–375 fathoms, the first deep-sea fishes to be described from the archipelago, of which 21 were new to science and known only from the Hawaiian Islands (Gilbert & Cramer, 1897).

The overthrow of the Hawaiian monarchy in 1893 and the annexation of the islands as a territory by the United States in 1898 led to the U.S. fisheries surveys from which Jordan and his colleagues reported many new species from the Hawaiian Islands. The procedures of these surveys of Hawai'i's aquatic resources were reviewed in three resultant Bulletins of the U.S. Fish Commission (volume 23, parts 1, 2, and 3), as well as by Tinker (1982), Dunn (1996, 1997), Brittan (1997), and Jennings (1997). Additions to Hawai'i's fish fauna from the surveys began in 1899 with market and shore fish sampling by Dr. Oliver Jenkins. Jenkins was Jordan's student at Indiana University who became a professor at DePauw University and later at Stanford. Jenkins' publications were major contributions to the numbers of new Hawaiian Islands fish records of 1901 and 1903 (Fig. 4). Jordan and Evermann themselves published preliminary papers in 1903 from their fish-market surveys. John O. Snyder added a paper in 1904 that described 27 new species. Snyder had also been Jordan's student, later becoming a Stanford professor of ichthyology and fisheries biology.

The culmination of these post-annexation Hawaiian Islands fisheries surveys came in 1901 and 1902 with expeditions first by Jordan and his coworkers to survey the islands' shore fishes and then by Gilbert, Snyder, and others aboard the *Albatross* to survey the deep-sea fishes. Dunn (1996) has given a fascinating account of



**Table 19. Endemic Hawaiian Archipelago fish species.** Non-endemic species that have their Hawaiian population recognized as an endemic subspecies are enclosed in brackets. Species for which there is insufficient information to verify ranges, but which are suspected to be endemic species, are noted with a question mark. Species usually thought to be valid endemic taxa but for which there are questions about their taxonomic distinction from species elsewhere are noted with an asterisk.

Dalatiidae	Macrouridae	Scorpaenidae (continued)
<i>Etmopterus villosus</i>	<i>Caelorinchus aratrum</i>	<i>Scorpaenopsis pluralis</i>
Muraenidae	<i>Caelorinchus doryssus</i>	<i>Sebastipistes ballieui</i>
<i>Gymnothorax nuttingi</i>	<i>Caelorinchus gladius</i>	Caracanthidae
<i>Gymnothorax polyspondylus</i>	<i>Hymenocephalus antraeus</i>	<i>Caracanthus typicus</i>
<i>G. steindachneri</i>	<i>Hymenocephalus tenuis</i>	Acropomatidae
Ophichthidae	<i>Kumba hebetata</i>	<i>Synagrops argyrea</i>
<i>Callechelys luteus</i>	<i>Malacocephalus boretzi</i>	Serranidae
<i>Myrichthys magnificus</i>	<i>Malacocephalus hawaiiensis</i>	<i>Epinephelus quernus</i>
<i>Ophichthus kunaloa</i>	<i>Nezumia ectenes</i>	<i>Holanthias elizabethae</i>
<i>Scolecenchelys cookei</i>	<i>Nezumia holocentra</i>	<i>Holanthias fuscipinnis</i>
<i>Scolecenchelys puhiolo</i>	<i>Nezumia obliquata</i>	<i>Liopropoma aurora</i>
Congridae	<i>Sphagemacrurus gibber</i>	[ <i>Plectranthias kelloggi kelloggi</i> ]
<i>Acromycter alcocki</i>	<i>Ventrifossa ctenomelas</i>	<i>Pseudanthias fucinus</i>
<i>Ariosoma marginatum</i>	Moridae	<i>Pseudanthias hawaiiensis</i>
<i>Bathycongrus aequoria</i>	<i>Gadella molokaiensis</i>	[ <i>Pseudogramma polyacanthum</i>
[ <i>Conger cinereus marginatus</i> ]	<i>Physiculus cynodon</i>	<i>hawaiiensis</i> ]
<i>Conger oligoporus</i>	<i>Physiculus grinnelli</i>	Priacanthidae
<i>Gorgasia hawaiiensis</i>	<i>Physiculus sterops</i>	<i>Priacanthus meeki?</i>
Engraulididae	Lophiidae	Apogonidae
<i>Encrasicholina purpurea</i>	<i>Lophiodes bruchius</i>	<i>Apogon erythrinus</i>
Gonorynchidae	Antennariidae	<i>Apogon maculiferus</i>
<i>Gonorynchus moseleyi</i>	<i>Antennarius drombus*</i>	<i>Pseudamiops diaphanes</i>
Argentiniidae	Chaunacidae	Epigonidae
<i>Glossanodon struhsakeri</i>	<i>Chaunax umbrinus</i>	<i>Epigonus devaneyi</i>
Sternoptychidae	Ogcocephalidae	<i>Epigonus fragilis</i>
<i>Araiophos gracilis</i>	<i>Halieutaea retifera</i>	<i>Epigonus glossodontus</i>
<i>Maurolucus imperatorius</i>	<i>Scolicisquama erythrinus</i>	Mullidae
<i>Polyipnus nuttingi</i>	Thaumatchthyidae	<i>Parupeneus chrysonemus</i>
Stomiidae	<i>Lasiognathus waltoni?</i>	<i>Parupeneus porphyreus</i>
<i>Eustomias albulbis?</i>	Linophryniidae	Chaetodontidae
<i>Eustomias bulbiramis?</i>	<i>Linophryne escaramosa?</i>	<i>Chaetodon fremblii</i>
<i>Eustomias curtatus?</i>	Atherinidae	<i>Chaetodon miliaris</i>
<i>Eustomias deofamiliaris?</i>	<i>Atherinomorus insularum</i>	<i>Chaetodon multicinctus</i>
<i>Eustomias dinema?</i>	Hemiramphidae	<i>Prognathodes</i> sp.?
<i>Eustomias inconstans?</i>	[ <i>Hemiramphus acutus pacificus</i> ]	Pomacanthidae
<i>Eustomias magnificus?</i>	Trachichthyidae	<i>Centropyge fisheri*</i>
<i>Eustomias melanostigmoides?</i>	<i>Aulotrachichthys heptalepis</i>	<i>Centropyge nahackyi</i>
<i>Eustomias problematicus?</i>	<i>Hoplostethus federovi</i>	<i>Centropyge potteri</i>
<i>Eustomias tomentosus</i>	Holocentridae	<i>Apolemichthys arcuatus</i>
<i>Leptostomias macronema?</i>	<i>Sargocentron xantherythrum</i>	<i>Genicanthus personatus</i>
Ateleopodidae	Caproidae	Kuhliidae
<i>Ijimaia plicatellus</i>	<i>Antigonia eos</i>	<i>Kuhlia xenura</i>
Chlorophthalmidae	Pegasidae	Cheilodactylidae
<i>Chlorophthalmus proridens</i>	<i>Eurypegasus papilio</i>	<i>Cheilodactylus vittatus?</i>
Synodontidae	Syngnathidae	Pomacentridae
<i>Synodus falcatus</i>	<i>Cosmocampus balli</i>	<i>Abudefduf abdominalis</i>
<i>Synodus janus</i>	<i>Doryrhamphus baldwini</i>	<i>Chromis hanui</i>
Myctophidae	<i>Halicampus edmondsoni</i>	<i>Chromis ovalis</i>
<i>Diaphus fulgens</i> “form B”?*	<i>Hippocampus fisheri?</i>	<i>Chromis struhsakeri</i>
Ophidiidae	Scorpaenidae	<i>Chromis verater</i>
<i>Luciobrotula lineata</i>	<i>Dendrochirus barberi</i>	<i>Dascyllus albisella</i>
<i>Pycnocraspedum armatum</i>	<i>Hozukius guyotensis</i>	<i>Plectroglyphidodon sindonis</i>
<i>Cataetx hawaiiensis</i>	<i>Neomerinthe rufescens</i>	Labridae
Bythitidae	<i>Pterois sphex</i>	<i>Ammolabrus dicrus?</i>
<i>Grammonus waikiki</i>	<i>Scorpaena colorata</i>	<i>Anampses chrysocephalus</i>
<i>Microbrotula rubra</i>	<i>Scorpaena pele</i>	<i>Anampses cuvier</i>
<i>Saccogaster hawaii</i>	<i>Scorpaenopsis altirostris</i>	[ <i>Bodianus bilunulatus albotaeniatus</i> ]
Bathygadidae	<i>Scorpaenopsis brevifrons</i>	<i>Bodianus sanguineus</i>
<i>Bathygadus bowersi</i>	<i>Scorpaenopsis cacopsis</i>	<i>Bodianus</i> cf. <i>vulpinus</i> ?*
		<i>Cirrhilabrus jordani</i>
		<i>Coris ballieui</i> (continued ...)

Table 19 (continued)

Labridae (continued)	Blenniidae (continued)	Acanthuridae (continued)
<i>Coris flavovittata</i>	<i>Entomacrodus strasburgi</i>	<i>Ctenochaetus strigosus</i>
<i>Coris venusta</i>	<i>Istiblennius zebra</i>	Bothidae
<i>Cymolutes lecluse</i>	<i>Plagiotremus ewaensis</i> *	<i>Bothus thompsoni</i>
<i>Labroides phthirophagus</i>	<i>P. goslinei</i> *	<i>Chascanopsetta crumenalis</i>
<i>Macropharyngodon geoffroy</i>	Callionymidae	<i>Chascanopsetta prorigera</i>
<i>Stethojulis balteata</i>	<i>Callionymus coeruleonotatus</i>	<i>Engyprosopon hawaiiensis</i>
<i>Thalassoma ballieui</i>	<i>Callionymus comptus</i>	<i>Engyprosopon xenandrus</i>
<i>Thalassoma duperrey</i>	<i>Callionymus decoratus</i>	<i>Parabothis chlorospilus</i>
<i>Iniistius umbrilatus</i>	<i>Draculo pogognathus</i>	<i>Taeniopsetta radula</i>
Scaridae	<i>Synchiropus hawaiiensis</i> *	Pleuronectidae
<i>Calotomus zonarchus</i>	<i>Synchiropus kinmeiensis</i> *	<i>Microstomus shuntovi</i>
<i>Chlorurus perspicillatus</i>	<i>Synchiropus rosulentus</i> .	<i>Poecilopsetta hawaiiensis</i>
<i>Scarus dubius</i>	Eleotrididae	Samaridae
Champsodontidae	<i>Eleotris sandwicensis</i> *	<i>Samariscus corallinus</i>
<i>Champsodon fimbriatus</i>	Gobiidae	Soleidae
Creediidae	<i>Cabillus caudimacula</i>	<i>Aseraggodes borehami</i>
[ <i>Crystallodytes cookei cookei</i> ]	<i>Eviota rubra</i>	<i>Aseraggodes holcomi</i>
Percophidae	<i>Eviota susanae</i>	<i>Aseraggodes therese</i>
<i>Chironema squamiceps</i>	[ <i>Gnatholepis cauerensis hawaiiensis</i> ]	Triacanthodidae
<i>Osopsaron incisum</i>	<i>Lentipes concolor</i>	<i>Hollardia goslinei</i>
Ammodytidae	<i>Oxyurichthys heisei</i>	Monacanthidae
<i>Ammodytoides pylei</i>	<i>Oxyurichthys lonchotus</i>	<i>Cantherhines sandwichiensis</i>
<i>Lepidammodytes macrophthalmus</i>	<i>Priolepis eugenius</i>	<i>Cantherhines verecundus</i>
Tripterygiidae	<i>Priolepis farcimen</i>	<i>Pervagor pilosoma</i>
<i>Enneapterygius atriceps</i>	<i>Priolepis limbatoaquamus</i>	<i>Thamnaconus garretti</i>
Blenniidae	<i>Psilogobius mainlandi</i>	Ostraciidae
<i>Cirripectes obscurus</i>	<i>Sicyopterus stimpsoni</i>	[ <i>Ostracion meleagris camurum</i> ]
<i>Cirripectes vanderbilti</i>	<i>Stenogobius hawaiiensis</i>	Tetraodontidae
<i>Encheilurus brunneolus</i>	Acanthuridae	<i>Canthigaster jactator</i>
<i>Entomacrodus marmoratus</i>	[ <i>Acanthurus triostegus sandwicensis</i> ]	<i>Torquigener randalli</i>

the events and personality conflicts aboard the *Albatross* during the 1902 Hawaiian Islands expedition.

The dominant event in the history of Hawai'i's ichthyology was the publication of two Bulletins of the U.S. Fish Commission resulting from these surveys (Jordan & Evermann, 1905; Gilbert, 1905). These summarized the fish fauna and ichthyological history of the Hawaiian Islands until 1905 and included the description of 148 new species. The bulletins remained the primary sources of information about Hawai'i's fishes for over 50 years.

Investigations of Hawai'i's fish fauna during the 50 years following the U.S. Fish Commission surveys reverted to a low level, like the taxonomic "doldrums" described by Collette (1967) for North American freshwater ichthyology in 1893–1931. The low level of activity in Hawai'i during 1906–1949 is quite understandable considering that a global economic depression and two world wars occupied many of these years. Another cause of the decrease in the numbers of fish species reported as new to the islands was that Jordan and his colleagues, the dominant U.S. researchers in ichthyology until Jordan's death in 1931, had then turned their attention away from the islands. Ichthyological research in the islands by others may have been inhibited by the false sense that the fish fauna of the Hawaiian Islands had been fully described in the monographs of 1905.

During the doldrums of 1906–1949 most of the new contributions to Hawai'i's ichthyology came from three institutions. The first was the Naturhistorisches Museum Wien (Vienna), where Franz Steindachner and his assistant, Victor Pietschmann, began publishing on Hawaiian Islands fish collections in the 1870s. They continued in the 1890s with reports on the collections by Dr. Schauinsland of the Berlin Museum and ended with papers by Pietschmann in the 1930s (see Kay, 1972; Herzig-Straschil, 1997). The effects of war and economic depression during this time are exemplified by the death of Steindachner from pneumonia in 1919, aggravated by lack of heat in his museum apartment during the impoverished post-World War I years in Germany (Tiedemann & Grillitsch, 1997). The second institution was Stanford University, where Jordan and his coworkers occasionally made additions to the 1905 reviews (Jordan & Snyder, 1907, 1923; Jordan & Dickerson, 1908; Gilbert & Hubbs, 1917; Jordan, 1921a; Jordan & Jordan, 1922; Jordan *et al.*, 1927). The third institution was the Academy of Natural Sciences of Philadelphia, where the highly prolific ichthyologist Henry W. Fowler worked from 1893 to 1962 with only one hiatus during 1901–1902 when he studied at Stanford under Jordan (Smith-Vaniz & Peck, 1991). Fowler's first contributions to Hawai'i's ichthyology came in 1900.

**Table 20. Undescribed or unidentified fish species recorded from the Hawaiian Islands or Johnston Atoll with ranges that are unknown at this time.**

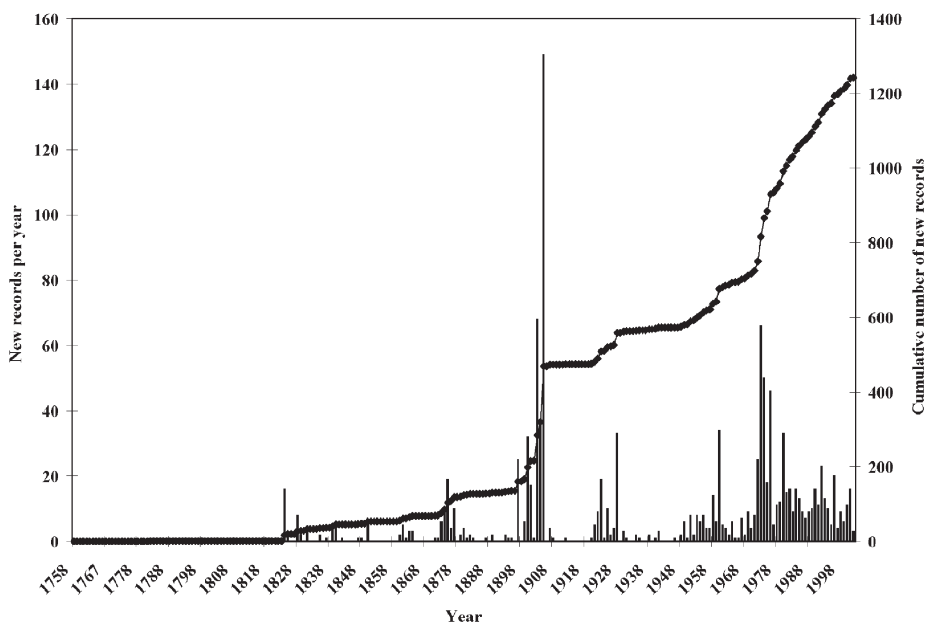
Torpedinidae	
<i>Torpedo</i> sp.	Cetomimidae
Muraenidae	<i>Cetomimus</i> sp.
<i>Anarchias</i> sp. 1	<i>Gyrinomimus</i> sp.
<i>Anarchias</i> sp. 2	Macrurocyttidae
Congridae	<i>Zenion</i> sp.
<i>Gnathophis</i> sp.	Callanthiidae
Congridae sp. B	<i>Callanthias</i> sp.
Stomiidae	Cepolidae
<i>Photostomias</i> sp. 2	<i>Sphenanthias</i> sp.
Bythitidae	Chiasmodontidae
<i>Diplacanthopoma</i> sp.	<i>Pseudoscopelus</i> sp. 1
Macrouridae	<i>Pseudoscopelus</i> sp. 2
<i>Caelorinchus</i> sp.	Acanthuridae
	<i>Naso</i> sp.

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In 1922 Fowler published a list of Hawai‘i’s fishes, augmented by papers in 1923 and 1925. He became an associate of the Bernice P. Bishop Museum in Honolulu in 1922, visiting the museum in 1922–1923 and again in 1929. It was his ambition to describe and illustrate all of the fishes of the world in a series of monographs. His work with Bishop Museum and other collections resulted in *The Fishes of Oceania* (Fowler, 1928). This monograph and its supplements (Fowler, 1931, 1934a, 1949) were the primary summaries of Indo-Pacific fish taxonomy until after World War II and inspired (or provoked) much of the taxonomic work on this fish fauna in the post-war years.

Following World War II, discoveries of new fish species in the central Pacific began a phase of geometric growth that continues to this day. There were many contributing factors to this taxonomic “reawakening” (Collette, 1967). Highly dedicated scientists returned from their wartime military service newly focused by their war experiences. Under the G.I. Bill there was an influx of experienced and determined new students to universities from the military. Unusually robust economic conditions developed in the United States that persisted for two decades, allowing for ample research and educational funding. Universities grew in anticipation of a large number of “baby boom” students. There was an increased emphasis on science as a result of the cold-war competition between the United States and the Soviet Union, especially after the Soviet Union’s launch of the first successful space satellite. And numerous technological innovations from both World War II and cold-war military efforts became available to scientists. In Hawai‘i, the reawakening began with the employment of William A. Gosline as professor of ichthyology at the University of Hawai‘i, the work of Vernon E. Brock as a fishery biologist for the Territory of Hawai‘i and the Federal Government, and the establishment of the U.S. Bureau of Fisheries Pacific Ocean Fisheries Investigation (POFI) Honolulu Laboratory in 1949. Gosline began publishing taxonomic papers on Hawai‘i’s fishes in 1949 with his number of contributions increasing annually. His graduate students became prominent ichthyologists and one, John E. Randall, would contribute much to the explosion of Hawai‘i’s ichthyology from the 1970s through the present. In 1960, a year after the Territory of Hawai‘i became a state, Gosline and Brock published their *Handbook of Hawaiian Fishes*, the first comprehensive review of the fauna in over 50 years.

Two technological innovations incorporated into ichthyology during this time were the use of scuba diving and rotenone, a natural fish poison, for collecting fishes. Brock (1954) used scuba in 1952 to assess fishes in the Hawaiian Islands but this technology had been used by ichthyologists in California several years earlier. The modern Cousteau/Gagnan scuba regulator was invented in 1943. The second or third “aqualung”, as scuba gear was then called, newly sold in the United States was purchased in 1949 by UCLA ichthyologist Boyd Walker for his students, Conrad Limbaugh and Andreas Rechnitzer (Hanauer, 1992, 1996). At that time, John E. Randall was an undergraduate at UCLA, in the first ichthyology class taught by Walker with Rechnitzer as the teaching assistant. Walker influenced Randall to pursue a career in systematic ichthyology (J.E. Randall, pers. comm., 14 Oct. 1998). Randall had purchased a pre-Cousteau/Gagnan version of scuba gear at a navy surplus store at about the same time that Limbaugh and Rechnitzer began using the technology (Greenfield, 2001b). Randall later became the Bishop Museum’s senior ichthyologist and used scuba extensively to collect and describe dozens of new Hawaiian Islands fish species (B.A. Carlson, from cover of Randall, 1996a). Specimens collected with scuba and rotenone were used for the next great review of Indo-Pacific fishes, *Fishes of the Marshall and Marianas Islands* (Schultz *et al.*, 1953, 1960, 1966). In the Hawaiian



**Figure 4.** Annual increase in the numbers of fish species first recorded from the Hawaiian Islands from 1782 to 1998. The histograms show the numbers of species first recorded from the region in each year, noted on the left vertical axis. The line with the diamond symbols shows the cumulative number of fish species recorded from the region through each year, noted on the right vertical axis.

Islands, Gosline & Brock (1960) used rotenone and scuba to discover many small or cryptic fishes. Their *Handbook of Hawaiian Fishes* reported 39 species new to the islands and remains significant as the only publication to provide comprehensive identification keys to Hawai'i's fishes.

The renewed interest in Indo-Pacific fish taxonomy continued to provide new records of Hawai'i's fish species at moderate levels through the 1960s. But in the early 1970s, the pace of discovery accelerated in a second "golden era" (in the sense of Collette, 1967) that has continued through today. During this time the growing aquarium, recreational diving, and underwater photography hobbies have created great enthusiasm for the study of Indo-Pacific marine organisms by fostering aesthetic appreciation of marine biology. Many coral-reef species described in recent years were first discovered by hobbyists and many of the biologists now working on Indo-Pacific organisms developed their enthusiasm from a youthful engagement in one of these hobbies.

More than 500 fish species, over 40% of the fauna now known, have been newly recorded from waters of the Hawaiian Archipelago since 1970. These were primarily midwater and deep-benthic species but also included numerous shallow-water reef fishes. The remarkable thing about this new era of discovery is that it has not abated (Figs. 4,5). And it is ironic that this era of renewed discovery began at about the time that taxonomy and systematic zoology became disdained by scientific administrators. This attitude was exemplified by Stanford University's decision in the late 1950s to dismantle the program in systematic ichthyology established by Jordan (Brittan, 1997). In recent years this attitude spread to natural history museums which in the past were strongholds for basic biodiversity research (Culotta, 1992). The continuing discovery of large numbers of new species in Hawaiian waters demonstrates that taxonomic research is far from complete even in this well known region.

Four factors have contributed to the geometric increase in knowledge of Hawai'i's fish fauna since the 1960s. The first was the increased use of scuba along with technological advances in diving safety and underwater photography used with great effectiveness by Randall and his colleagues. Randall traveled from UCLA to Hawai'i aboard his ketch in 1950, completing his Ph.D. dissertation at the University of Hawai'i in 1955 as Gosline's student (Greenfield, 2001b). His first paper on reef-fish taxonomy included a description of a new fish species from the Hawaiian Islands (Randall, 1955a). After working at several other institutions he returned to Hawai'i in 1965 and in 1967 began a joint position as ichthyologist at the University of Hawai'i's Institute of Marine Biology and the Bernice P. Bishop Museum. As of 2005 he had described 48 new species from the Hawaiian Islands (and an additional eight subsequently recorded from the Hawaiian Islands or Johnston Atoll), and first reported many other species from the islands that were known previously only from other localities

**Table 21. Nonindigenous fish species that have become established in the State of Hawai'i, with their habitats in the state, and the general source of their introduction.** *Centropyge loriculus*, an indigenous species, is also listed here because a population with a color pattern that is clearly of nonindigenous origin is established in Kāne'ohē Bay, O'ahu.

Clupeidae	
	<i>Dorosoma petenense</i> (freshwater reservoir; fisheries research 1958)
	<i>Herklotsichthys quadrimaculatus</i> (marine; unintentional from fisheries research 1972)
	<i>Sardinella marquesensis</i> (marine, fisheries research 1955)
Cyprinidae	
	<i>Carassius auratus</i> (freshwater ponds; ornamental pre-1900)
	<i>Cyprinus carpio</i> (freshwater ponds and reservoirs; fisheries enhancement pre-1900)
Cobitidae	
	<i>Misgurnus anguillicaudatus</i> (freshwater streams; source unknown, perhaps for food pre-1900)
Ictaluridae	
	<i>Ictalurus punctatus</i> (freshwater reservoirs; fisheries enhancement 1953)
Clariidae	
	<i>Clarias fuscus</i> (freshwater reservoirs and ponds; fisheries enhancement and food pre-1900)
Callichthyidae	
	<i>Corydoras aeneus</i> (freshwater streams; aquarium release ca. 1984)
Loricariidae	
	<i>Ancistrus</i> cf. <i>temmincki</i> (freshwater streams; aquarium release 1985)
	<i>Hypostomus watwata</i> (freshwater streams; aquarium release 1984)
	<i>Pterygoplichthys multiradiatus</i> (freshwater reservoir; aquarium release 1986)
Salmonidae	
	<i>Oncorhynchus mykiss</i> (freshwater reservoirs and streams; fisheries enhancement 1959)
Mugilidae	
	<i>Valamugil engeli</i> (marine ponds; unintentional during fisheries bait studies 1955)
Belontiidae	
	<i>Xenentodon cancila</i> (freshwater reservoir; aquarium release)
Poeciliidae	
	<i>Gambusia affinis</i> (various freshwater habitats; mosquito control 1905)
	<i>Limia vittata</i> (freshwater streams and estuaries; mosquito control pre-1950)
	<i>Poecilia</i> hybrid (freshwater streams; fisheries bait research 1960)
	<i>Poecilia latipinna</i> (freshwater streams and estuaries; mosquito control and fisheries bait research 1905)
	<i>Poecilia reticulata</i> (freshwater streams; aquarium release and mosquito control 1922)
	<i>Xiphophorus helleri</i> (freshwater streams; mosquito control and aquarium release 1922)
	<i>Xiphophorus maculatus</i> (freshwater reservoirs; mosquito control and aquarium release 1922)
	<i>Xiphophorus variatus</i> (freshwater ponds; aquarium release 1960)
Synbranchidae	
	<i>Monopterus albus</i> (various freshwater habitats; unknown source pre-1900)
Serranidae	
	<i>Cephalopholis argus</i> (marine; fisheries enhancement 1956)
Centrarchidae	
	<i>Lepomis cyanellus</i> (freshwater ponds; fisheries enhancement prior to 1990)
	<i>Lepomis macrochirus</i> (freshwater reservoirs and ponds; fisheries enhancement 1946)
	<i>Micropterus dolomieu</i> (freshwater streams; fisheries enhancement 1897)
	<i>Micropterus salmoides salmoides</i> (freshwater reservoirs and ponds; fisheries enhancement 1953)
Lutjanidae	
	<i>Lutjanus fulvus</i> (marine; fisheries enhancement 1955)
	<i>Lutjanus gibbus</i> (marine; fisheries enhancement 1958)
	<i>Lutjanus kasmira</i> (marine; fisheries enhancement 1955)
Mullidae	
	<i>Upeneus vittatus</i> (marine; unintentional during fisheries enhancement 1955)
Pomacanthidae	
	<i>Centropyge flavissima</i> (marine; aquarium release ca. 1995)
	<i>Centropyge loriculus</i> (marine, non-indigenous population; aquarium release? Date unknown)
Cichlidae	
	<i>Amphilophus citrinellus</i> (freshwater reservoirs; aquarium release ca. 1989)
	<i>Amphilophus labiatus</i> (freshwater reservoirs; aquarium release ca. 1989)
	<i>Archocentrus nigrofasciatus</i> (freshwater streams and ponds; aquarium release 1983)
	<i>Archocentrus spilurus</i> (freshwater reservoirs; aquarium release 1984; current status uncertain)
	<i>Astronotus ocellatus</i> (freshwater reservoir; fisheries enhancement 1952)
	<i>Cichla ocellaris</i> (freshwater reservoirs; fisheries enhancement 1961)
	<i>Hemichromis elongatus</i> (freshwater reservoir; aquarium release 1990)
	<i>Hypsophrys nicaraguensis</i> (freshwater stream and reservoir; aquarium release ca. 1996)
	<i>Melanochromis johannii</i> (freshwater stream and reservoir; aquarium release 1993)

(continued ...)

**Table 21 (continued)**

## Cichlidae (continued)

- Oreochromis macrochir* (freshwater reservoir; fisheries bait studies 1957)  
*Oreochromis mossambicus* (various fresh- and brackish-water habitats; aquaculture and fisheries bait research 1951)  
*Parachromis managuensis* (freshwater stream and pond; aquarium release, date unknown)  
*Sarotherodon melanothron* (various fresh- and brackish-water habitats; aquaculture and fisheries bait research 1962)  
*Thorichthys meeki* (freshwater reservoirs and streams; aquarium release 1940)  
*Tilapia rendalli* (freshwater reservoirs; bait fish research 1956)  
*Tilapia zilli* (freshwater reservoirs; fisheries bait research 1955)

## Blenniidae

- Omobranchus ferox* (marine in Pearl Harbor; O'ahu; ballast water or hull fouling 1998)  
*Omobranchus rotundiceps obliquus* (marine in Kāne'ohe Bay, O'ahu; aquaculture research 1951)  
*Parablennius thysanurus* (marine in Kāne'ohe Bay; ballast water or hull fouling pre-1974)

## Gobiidae

- Mugilogobius cavifrons* (brackish-water coastal habitats; ballast water or hull fouling 1988)

## Channidae

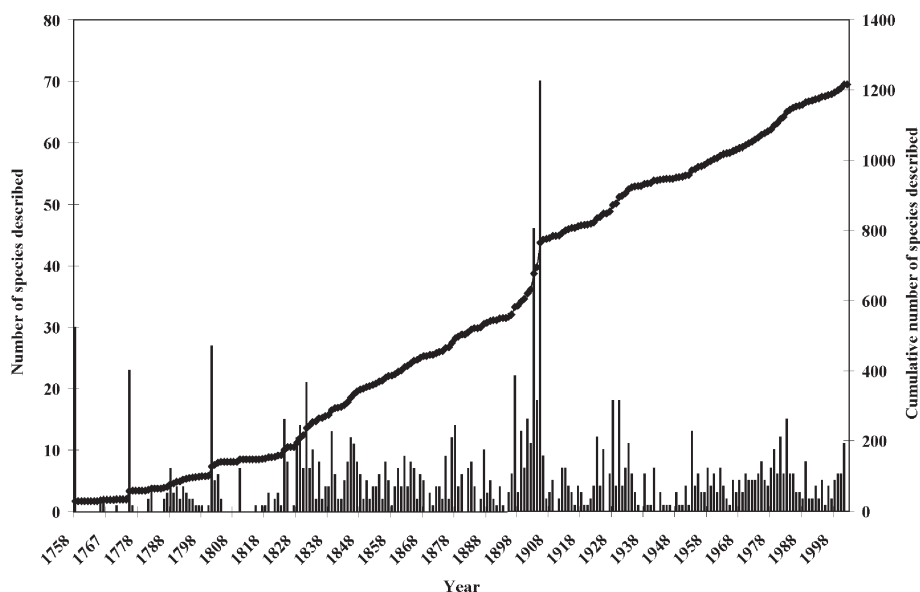
- Channa maculata* (freshwater reservoirs; food and fisheries enhancement pre-1900)

(B.A. Carlson from cover of Randall, 1996a; R.L. Pyle, pers. comm., Mar. 2005). Significant among his contributions to knowledge of Hawai'i's fishes were papers on new records of Hawai'i's fishes with comprehensive literature reviews (Randall, 1981a; Randall *et al.*, 1993a), reviews of the fishes of Johnston Atoll (Randall *et al.*, 1985b; Kosaki *et al.*, 1991), Midway Atoll (Randall *et al.*, 1993b), and of the biogeography of Hawai'i's fishes (Randall, 1976a, 1992b, 1996a, 1998c). Future discoveries of Hawai'i's fishes are anticipated from explorations below 250 feet using advanced diving technologies such as mixed gases and rebreathers, currently being pursued by Richard L. Pyle (a former student of Randall) and others (Pyle, 1995).

The second factor that contributed to the 1970s explosion of ichthyological discovery was the development of improved midwater-trawling technology and the funding of major research projects to investigate sound-scattering layers that affect sonar systems used in submarine warfare. The development of the Isaacs-Kidd midwater trawl for collecting micronekton, bongo nets for collecting plankton, variously named rectangular midwater trawls for collecting nekton and plankton, and large, commercially sized midwater trawls for collecting larger nekton revolutionized studies of oceanic fishes. The great increase in the midwater species known from Hawaiian waters came primarily from the work at the University of Hawai'i by Thomas A. Clarke, his students, and his associates (i.e., Clarke, 1971, 1972, 1973, 1974, 1982, 1984a, 1987; Amesbury, 1975; Clarke & Wagner, 1976; Maynard, 1982; Ridge-Cooney, 1987). Other contributions were made from the extensive micronekton and plankton collections taken throughout the central Pacific by the U.S. Bureau of Fisheries POFI laboratory, which later became the National Marine Fisheries Service (NMFS) PIFSC. Many of the NMFS collections went to the U.S. National Museum of Natural History, the Bernice P. Bishop Museum, the Florida Museum of Natural History, and the Los Angeles County Museum of Natural History, where they have been used by many ichthyologists. Research on midwater fishes in the United States virtually stopped by the 1990s, but additions to knowledge of the open-ocean fish fauna, including that of the Hawaiian Islands, have continued through research in other countries, notably from prolific studies by N.V. Parin and his associates in Russia.

The third factor in the continuing explosion of ichthyological discovery in Hawaiian waters was the resumption of studies on deep-sea, benthic fishes in the 1970s. Studies of deep-sea benthic fishes in Hawaiian waters were neglected after Gilbert (1905) but resumed with trap, gill net, and submersible surveys off O'ahu during 1968–1971 (Clarke, 1972). Sampling of Hawai'i's deep benthic fauna intensified in 1967, when the NMFS began systematic trawling and trapping surveys to explore the potential for a deep-water shrimp fishery in the main islands (Struhsaker & Aasted, 1974; Struhsaker & Yoshida, 1975). Little information from these surveys was published, but a large amount of data on benthic fishes captured with trawls at 61–850 m during 1967–1968 was included in an unpublished Ph.D. dissertation (Struhsaker, 1973a). This dissertation is essentially a small encyclopedia of the biology of meso-benthic fishes of the main Hawaiian Islands. Studies of deep-water benthic fishes of the region subsequent to Struhsaker (1973a) were done from submersibles of the Hawai'i Undersea Research Laboratory (HURL) from 1980 through the present (Chave & Mundy, 1994; Chave & Malahoff, 1998). Numerous records of deep-water fishes were obtained from visual observations from the submersibles *Makali'i* and *Pisces V*, although few specimens were collected to verify identifications. Even so, small collections made by the submersibles resulted in the description of several new species of fishes (Randall & Ralston, 1984; Gon, 1985; Fricke, 1992).

The fourth factor contributing to the rapid addition of species from the Hawaiian 200-nmi EEZ was the exploration of the fish fauna of the Northwestern Hawaiian Islands and particularly of seamounts north of Kure



**Figure 5.** Numbers of species found in the Hawaiian Islands that were described as new from anywhere in the world during each year from 1758 to 1998. The histograms show the numbers of Hawaiian fish species described as new by ichthyologists in each year, noted on the left vertical axis. The line with the diamond symbols shows the cumulative number of Hawaiian fish species described as new through each year, noted on the right vertical axis.

Atoll. Scattered sampling of the Northwestern Hawaiian Islands began with the early explorations and continued with the 1902 *Albatross* survey and the *Tanager* expedition of 1923 (Olson, 1996). An intensive 5-year survey of the Northwestern Hawaiian Islands began in 1975 when the NMFS, the U.S. Fish and Wildlife Service, and the Hawai'i Division of Fish and Game formed the Tripartite Cooperative Agreement to study the natural resources of the northern islands. The three agencies were joined by the University of Hawai'i in 1977. Results of the studies were published in two symposia volumes (Grigg & Pfund, 1980; Grigg & Tanoue, 1984) and numerous other papers. The fisheries results were summarized in Uchida & Uchiyama (1986). At the same time foreign trawl-fisheries developed at the Emperor Seamounts in the central North Pacific, which led NMFS to study the fishes of seamounts north of Kure as part of the Northwestern Hawaiian Islands investigations (Humphreys *et al.*, 1984). Many species were newly recorded as a result of these studies (Humphreys *et al.*, 1984; Boehlert & Mundy, 1992) as well as by Russian and Japanese surveys of the region (e.g., Borets, 1986). Much of the Northwestern Hawaiian Island sampling and most of the seamount sampling were done from the NOAA ship *Townsend Cromwell*, which remained active into the 21st century. Research directly related to the 5-year Northwestern Hawaiian Islands study ended in 1981, and NMFS sampling of the seamounts north of the Hawaiian Islands essentially ceased in 1993. Shallow water surveys at Midway Atoll in 1989 and 1991, prior to Midway's conversion from a naval base to a USFWS refuge, produced the most recent significant summary of fishes of the Northwestern Hawaiian Islands (Randall *et al.*, 1993b).

There is little indication that Hawai'i's fish fauna is completely known. The rate of discovery of named fishes previously unknown from the region (Fig. 4) and the rate at which new fish species are being described from Hawaiian waters (Fig. 5) show no sign of slowing as yet. If the fauna were almost completely known, Figures 4 and 5 should show an approach to an asymptote typical of cumulative curves (see next section) where sample numbers are adequate to assess species density. New species can be expected as previously undersampled habitats are explored. In particular, new species can be expected from waters deeper than 2000 m from which there have been almost no biological samples in Hawaiian waters. The ability to use rebreathers, submersibles, and other technologies to collect small fish species in deeper, steep-gradient, and high-porosity habitats will also produce many new fish species for the archipelago. Genetic studies also may reveal previously unrecognized, morphologically cryptic species in Hawai'i's fauna (e.g., Burrige & White, 2000). For taxonomists, this is the good news. The bad news is that the number of fish species in Hawaiian waters will also increase as more nonindigenous species are introduced here and establish breeding populations.

### What do the data from the history of ichthyological discovery tell us about how many fish species exist in the archipelago?

(Donald R. Kobayashi and Bruce C. Mundy)

A projection of the number of species in the region beyond the estimate obtained by simple counting of records can be obtained from data on the rate at which Hawai'i's fish species were first recorded. A cumulative species curve (Gray, 1997) can be fitted to the data and the curve's asymptote can be used as an estimate of the number of species expected from the region (the "species density" of Hurlbert, 1971). Collette (1967) used this technique to estimate the number of North American darter species, fitting a second-degree polynomial curve to historical data. The usefulness of this approach is demonstrated by the close agreement of the 165 darter species now known (Burr & Mayden, 1992) with Collette's conclusion that "... it can be predicted that there will be about 160 valid species and subspecies described by the year 2000."

We fit logistic functions to the data in Fig. 4, assuming that the curve would be symmetrical and that the decrease in discovery of Hawai'i's fish species during 1997–1998 was indicative of an inflection toward an asymptote. At first, we fitted a single curve to the data, ignoring the historic decrease in species reports during the doldrums of 1905–1949. This curve gave an estimated asymptotic number of 1809 species in the region. It is possible that the number of species eventually found in the area will be close to 1809, particularly with the introduction of more nonindigenous species. But we thought that a better estimate could be obtained by considering the well-documented decrease in taxonomic work during the two world wars and global depression as a hiatus that created two distinct periods of discovery with separate cumulative curves, the periods from 1778 to 1905 and 1905 to 1998. We then fitted two curves to these periods assuming that the rate of most rapid species discovery was the same in both periods, disrupted by the hiatus. This model linked the two logistic curves consecutively and assumed five parameters: a curvature, two asymptotes, and two specifications of the curves' inflection points in time. The asymptotic value estimated from the fit of double logistic curves was 1312 species. This is greater than the 1224 species currently known from the region but approximates 1306, which is the sum of the 1169 indigenous Hawaiian Islands species, 55 nonindigenous species established in the state, and 82 well-identified oceanic and deep-sea species that have been found nearby in the central North Pacific. This sum, 1306, is our best estimate of the number of resident fish species that will eventually be found in the region.

### Where do these fish species live?

#### *Where do they live within the archipelago?*

Most of Hawai'i's fish species are widely distributed throughout the archipelago. There is little evidence that any are restricted to one island and only a small number of species are found at only a few of the islands. Biogeographic divisions of the region occur at major changes in physiographic features of the archipelago. These features include the region's southeastern and northwestern boundaries, the ends of the main Hawaiian Islands that are boundaries between the high islands and low atolls or seamounts, and the end of the emergent part of the archipelago at Kure Atoll before the submerged seamounts to the northwest (Table 12). There is strong evidence for a distinct emergent-island fauna, strong evidence for a less distinct northwestern seamount fauna, and weak evidence for a poorly defined main Hawaiian Islands fauna. While there is little evidence from the presence or absence of species that a distinct Northwestern Hawaiian Island fish fauna exists, many of the fish species that are numerically dominant in the Northwestern Hawaiian Islands are different from those that are numerically dominant in the main islands (Hobson, 1984; Friedlander & DeMartini, 2002).

There are 332 species that have been found only at single islands. This might be evidence for restricted ranges of these species but a more likely explanation is limited sampling. Two-thirds (222) of these species are known only from O'ahu and most of these are deep-water species. O'ahu is the only island where meso- and bathy-pelagic species have been adequately sampled. All of the midwater fish species known only from O'ahu will likely be found throughout much of the archipelago when appropriate sampling is done. The main facilities of the region's universities, natural history museums, and government resource agencies are located on O'ahu, which contribute to the extensive sampling bias there. Sampling limitations also account for many, but not all, of the species known only from other islands. At Hawai'i Island a slickhead (*Alepocephalus blanfordii*) and the Krefft's smooth-head (*Herwigia kreffii*) were taken with very deep trawling gear that has been used only off the Kona Coast. A cusk-eel (*Typhlonus nasus*) is known here only from very deep video records off Hawai'i Island by a U.S. Navy remote-operated vehicle whose observations are generally not publicized. And three viviparous brotulas, *Cataetyx hawaiiensis*, *Diplacanthopoma riversandersoni*?, and *Diplacanthopoma* sp., are known only from specimens that floated to the sea surface at active lava flows that killed fishes on



steep, highly rugose, and porous Hawai'i Island slopes. This circumstance has occurred only at Hawai'i Island within historic times. Many species known from single islands are poorly known forms that may be naturally rare or that live in habitats that are difficult to sample. For example, the white-tipped soldierfish (*Myripristis vittata*) is known only from Molokini Islet at the lower limits of safe natural-air scuba diving. The Phoenix damselfish (*Plectroglyphidodon phoenixensis*) is known only from Maui at an extremely high-energy, rocky surf habitat that is difficult to sample safely. Many of the deep-water, bottom-associated species known only from single islands, such as the spongehead catshark *Apristurus spongiceps*, the lightfish *Araiophos gracilis*, the grenadier *Cetonus crassiceps*, the batfish *Scolocisquama erythrinus*, the viviparous brotula *Saccogaster tuberculata*, and the cusk-eel *Lucibrotula bartschi*, will undoubtedly be found to have wider ranges once appropriate sampling is done throughout the archipelago.

In contrast, some fishes recorded only from single features at the ends of the region probably do have restricted ranges in the region. These species occur more widely in the Pacific but have barely reached the southeastern or northwestern ends of the archipelago. The 28 species known only from Johnston Atoll but not the Hawaiian Islands have already been mentioned. These are generally Indo-Pacific species that have not dispersed to the north (Table 1). A similar set of 30 species is also known only from Hawai'i Island and some are only recorded as waifs. Likewise, 30 species are known only from the seamounts at the northwestern edge of the Hawaiian 200-nmi EEZ. Some of these probably have broader distributions to the south, with their apparent restricted distributions being sampling artifacts. But others are clearly North Pacific species that occur seasonally in the region of the Hancock Seamounts as the thermal fronts bounding the southern limit of the North Pacific transition zone move southward in winter (Roden, 1991). Examples of such species include the tube-shoulder *Sagamichthys abei*, the bristlemouths *Diplophos orientalis* and *Gonostoma gracile*, the scaleless black dragonfish *Opostomias mitsuii*, the pearleye *Scopelarchus stephensi*, the headlightfish *Diaphus kuroshio*, the bigscale fish *Melamphaes lugubris*, and the oceanic cardinalfish *Howella parini*.

There are southeastern and northwestern components to Hawai'i's fish fauna that diminish in number across the archipelago away from each end of the region. This pattern is more pronounced among those species from southern, warmwater habitats than it is among more northern, cool-water taxa. Of the 266 species known from the seamounts at the region's northwestern end, only 97 have the southeastern terminus of their ranges inside of the 200-nmi Hawaiian EEZ. O'ahu is the southeastern limit of 71 of these species, which is probably an artifact of the intensive sampling there. Excluding these, only 26 species from the northwestern seamounts have their southern terminus within the region. Over half of the "seamount" species (169) are found throughout the region, indicating that there are no obvious biogeographic boundaries within the Hawaiian 200-nmi EEZ for most species with northern affinities.

In contrast, 577 species known at the southeastern end of the archipelago do not range to the northwestern seamounts. If the 131 species known only from O'ahu are excluded, then 397 of these species have their northwestern range-terminus within the archipelago. Important areas of change for the fauna, moving from the southeast, are the end of the main islands (Kaua'i and Ni'ihau; 40 species not found to the northwest), Necker Island (24 species), Laysan Island (18 species), and the last two emergent islands, Midway and Kure atolls (242 species). In the last case, Midway has been more extensively sampled than Kure, and it is expected that species recorded at one of these atolls will occur at both.

Temperature and habitat distribution are probably the factors that create these southeast to northwest patterns. It is well known that physiological and behavioral temperature tolerances play a major role in determining fish distributions (e.g., p. 83–89 in Helfman *et al.*, 1997). There is strong thermal gradient in the Hawaiian Archipelago, with sea-surface temperatures differing by as much as 7 °C between Midway and South Point, Hawai'i Island, during the winter (Flamant *et al.*, 1998). Shallow-water fish species adapted to warm water are restricted from occurring in northwestern Hawaiian waters by cooler temperatures. By contrast, shallow-water fish species adapted to cooler water can find appropriate temperatures for survival in increasingly deeper water at the archipelago's southeastward part, if those species are not restricted to shallow-water habitats by other factors. This phenomenon, called "tropical submergence", has long been known from the Hawaiian Islands and elsewhere (Hubbs, 1948; Helfman *et al.*, 1997). In Hawaiian waters this phenomenon is exemplified by the yellowfin soldierfish (*Myripristis chryseres*), the Hawaiian grouper (*Epinephelus quernus*), the yellowbarbel goatfish (*Parupeneus chrysonemus*), and the masked angelfish (*Genicanthus personatus*), among others, which are common within recreational scuba-diving depths at Midway Island but occur in much deeper water in the main Hawaiian Islands (Randall *et al.*, 1993b). Deeper-living fish adapted to cool water are not as restricted geographically by temperature as are shallow-water species. Hobson (1980, 1984) discussed the factors that influence fish distributions along the archipelago in more detail.

Some readers might expect that the Northwestern Hawaiian Islands would have a unique fish fauna, based upon differences in species' abundances found between those islands and the main Hawaiian Islands. Surprisingly, only 20 Northwestern Hawaiian Islands fish species have not been found elsewhere in the archipelago (Table 13). Most of these 20 species have not been adequately sampled and probably have much wider

ranges. Twelve are deep-water or mesopelagic species; little sampling for such taxa has been done in the Northwestern Hawaiian Islands. Two others, the atoll moray (*Gymnothorax atolli*) and shortfin scad (*Decapterus macrosoma*), are species that are more widespread in the Pacific than just the Hawaiian Islands, but that are easily misidentified without specimens and recent taxonomic literature on hand. One, the louvar (*Luvarus imperialis*), is wide-ranging and distinctive, but not often collected in scientific surveys. Of the six species that seem likely to be restricted to the Northwestern Hawaiian Islands, two, the sea chub *Girella leonina* and the golden spadefish *Platax boersii*, are known in the region only as waifs at Midway and probably do not have an established populations in the islands. Only four fish species seem to be genuinely restricted to the Northwestern Hawaiian Islands within the archipelago and none of these is a Hawaiian Islands endemic. The Japanese angelfish (*Centropyge interruptus*) is a western and central North Pacific endemic known from Japan and the Northwestern Hawaiian Islands. Its distribution is similar to many deeper-water species but its shallow reef habitat prohibits it from occurring at deeper seamounts to the northwest. The blotcheye soldierfish (*Myripristis murdjan*) is an Indo-Pacific species but is similar to *C. interruptus* in its Hawaiian distribution. The slingjaw wrasse (*Epibulus insidiator*) is almost restricted to the central part of the archipelago. This distinctive, shallow-water species is associated with *Acropora* coral habitat that is also nearly restricted to the central Northwestern Hawaiian Islands in the Hawaiian Islands (Grigg, 1981). In 2000–2002 *E. insidiator* was observed by the author and J.P. Hoover (pers. comm., April 2002) in Hanauma Bay at O'ahu and by others at Maui and Hawai'i Island (J.E. Randall, & J.P. Hoover, pers. comm.) but the fish seem to have been waifs away from their usual range. The chevron butterflyfish (*Chaetodon trifascialis*) is also associated with *Acropora* coral habitat and is found primarily in the central Northwestern Hawaiian Islands within the region (Hobson, 1980, 1984; Grigg, 1981). This butterflyfish is seen more frequently in the main Hawaiian Islands than is *E. insidiator*, however. Perhaps the most puzzling species restricted to the Northwestern Hawaiian Islands within the archipelago is the black jack (*Caranx lugubris*). This species is circumtropical and subtropical in distribution, is abundant at equatorial islands south of Hawai'i, and is found at high islands elsewhere in the Pacific and other oceans. There seems to be no plausible ecological or biogeographic explanation for its absence in the main Hawaiian Islands at this time.

By contrast to the lack of a distinct Northwestern Hawaiian Islands fish fauna, 406 species are known only from the main Hawaiian Islands. This includes the 193 species known only from O'ahu that have not been well sampled elsewhere in the region. Twenty-six species are known only from Hawai'i Island, the next most intensively sampled island, four are known only from Maui, one only from Moloka'i, three only from Kaua'i, and one only from Ni'ihau. Most of these are poorly known deep-water species. Several other species recorded only from the main Hawaiian Islands are thought to have been waifs from elsewhere. These will be discussed later. But many of the remaining species are well sampled, easily identified, and are most common in habitats that are restricted to the main islands.

Most obvious among these are the freshwater fishes, including the five indigenous gobioids and numerous introduced species. Permanent freshwater habitats that can support fish populations are not found in the Northwestern Hawaiian Islands. Also among the species restricted to the main islands are those associated with estuaries or other habitats with significant freshwater influence. These are exemplified by the anchovies *Encrasicholina purpurea* and *E. punctifer*, the herrings *Herklotsichthys quadrimaculatus* and *Sardinella marquesensis*, the milkfish *Chanos chanos*, the blennies *Omobranchus rotundiceps* and *Parablemmius thysanius*, and the gobies *Mugilogobius cavifrons* and *Psilogobius mainlandi*. Several of these are nonindigenous species. A group of gobies that live in tidepool habitats, including the tidepool goby (*Bathygobius cocosensis*), the whitespotted frillgoby (*B. coalitus*), and *Kelloggella oligolepis* (which lacks a common name), may also be restricted to the main islands although the apparent restriction of these species may be a sampling artifact.

It is less easy to explain the absence of records of several coral-reef fishes from the Northwestern Hawaiian Islands. Examples are the shark *Carcharhinus melanopterus*, the moray *Gymnothorax rueppelliae*, the endemic pipefish *Doryrhamphus baldwini*, the cardinalfishes *Apogon evermanni* and *Apogonichthys perdix*, the butterflyfishes *Chaetodon lineolatus*, *C. reticulatus*, and *Hemitaurichthys polylepis*, the stripey *Microcanthus strigatus*, and the gobioids *Trimma taylori* and *Nemateleotris magnifica*. It has long been recognized that certain coral reef species are usually found at high island habitats and not at low atolls, despite the superficial similarity of reefs at the two island types (Kay, 1980; Randall, 1998c). But this does not explain the absence of records of some of these species from the Northwestern Hawaiian Islands because several of these species occur at atolls of the Line Islands south of the Hawaiian Archipelago.

There is also a group of species from the main Hawaiian Islands but not the Northwestern Hawaiian Islands that are fishes from other biogeographic areas that have been unable to colonize the entire archipelago. Two biogeographic regions are represented in this species group. The eastern Pacific saury *Cololabis adocetus* and finescale triggerfish *Balistes polylepis* occur at the main islands in the westernmost extension of their ranges. A larger set of species are those with Pacific or Indo-Pacific distributions that seem to have reached the Hawaiian Islands from the south or southwest instead of the northwestern path more often discussed in papers on

Hawai'i's marine biogeography. The best example is the black surgeonfish (*Ctenochaetus hawaiiensis*), which is known in the region almost entirely from Hawai'i Island with rare sightings as far north as O'ahu. A counterexample of successful colonization is provided by the peacock grouper (*Cephalopholis argus*), which was until recently known only as far northwest as Nihoa Island, but has now been recorded at French Frigate Shoals (E. DeMartini, pers. comm., Mar. 2002). This introduced species provides an example of an ongoing, progressive colonization of the island chain that is analogous to the past colonization of the archipelago by founder populations of indigenous species that arrived in the main Hawaiian Islands.

There are a few cases of species replacement along the Hawaiian Archipelago where different species of the same genus are found at opposite ends of the island chain. Some instances involve pelagic species-pairs that are more abundant in the different water masses at the northern and central or southern ends of the archipelago. Examples are the bristlemouths *Sigmops gracile* and *S. ebelingi*, the pearleyes *Scopelarchus stephensi* and *S. michaelsarsi*, and the lanternfishes *Hygophum reinhardi* and *H. proximum*. Other examples include deep-slope genera with one species at seamounts of the archipelago's northern end and another at the main Hawaiian Islands. Examples are the hatchetfishes *Polyipnus matsubarai* and *P. nuttingi*, the beardfishes *Polymixia berndti* and *P. japonica*, and the grenadiers *Malacocephalus boretti* and *M. hawaiiensis*. These are not necessarily phylogenetic species-pairs, though, except for the *Scopelarchus* species. The *Polyipnus* species are in entirely different lineages of their genus. Almost nothing is known about the distribution of these species in the Northwestern Hawaiian Islands, making it impossible to determine at present if their ranges overlap at some point or where one species replaces another in the archipelago. Problems with identifications and adequate sampling obscure several other possible instances of species replacement, but there seem to be relatively few examples in the archipelago.

The widespread distribution of most fish species along the Hawaiian Ridge probably results largely from the dispersal of planktonic larvae throughout the archipelago. Evidence for this is inferential because there is no information about the distribution of fish larvae between the islands and even surprisingly little descriptive information on oceanographic currents in most of the archipelago. Three observations support the hypothesis that pelagic larvae readily disperse throughout the islands. The first is the absence of clear faunal boundaries within the archipelago except for those associated with specific habitat limits. The second is the genetic homogeneity of conspecific fish populations throughout the archipelago. And the third is the rapid colonization of the archipelago by nonindigenous marine species introduced here in this century.

Studies of genetic structure in Hawai'i's fishes have revealed almost no differentiation within species between fish from different islands. Only a few such studies have been done, however, and many of these have been confined to the main islands. Species with no differentiation throughout the entire archipelago are the 'opakapaka (*Pristipomoides filamentosus*), which has planktonic eggs and larvae (Shaklee & Samollow, 1984), and the Pacific gregory (*Stegastes fasciolatus*), which has benthic eggs and planktonic larvae (Shaklee, 1984). No genetic differentiation was found in the pelagic armorhead (*Pseudopentaceros wheeleri*) from two northwestern seamounts 500 km apart (Martin *et al.*, 1992). *Pseudopentaceros* have planktonic eggs, larvae, and a protracted pelagic juvenile phase. The milkfish (*Chanos chanos*) is the single exception to the absence of genetic differentiation in fishes of the archipelago, with differences reported between fish from O'ahu and Hawai'i Island (Winans, 1980; Tamaru, 1986). *Chanos* has planktonic eggs and larvae. It theoretically should have good dispersal capabilities, but it is also one of the species restricted within the archipelago to the main islands. The genetic differentiation in *C. chanos* is consistent with its apparent limited ability to disperse throughout the archipelago. The five freshwater Hawaiian Islands gobioids are an informative example of larval dispersal within the main Hawaiian Islands. As adults these live in the highly restricted habitats of Hawai'i's freshwater streams where they spawn demersal eggs. They therefore might be expected to have restricted gene flow and fragmented populations. But they also have marine larvae with prolonged planktonic lives of up to 4.0–5.5 months (Radtko *et al.*, 1988, 2001). Electrophoretic and mtDNA analyses have found no evidence for genetic differentiation among gobies from streams on the five largest main islands, with the exception of the 'o'opu naniha (*Stenogobius hawaiiensis*) from Maui (Fitzsimons *et al.*, 1990, Zink *et al.*, 1996). The interisland dispersal of planktonic larvae is the accepted explanation for the genetic homogeneity of Hawaiian Islands gobies among the isolated, freshwater drainages where the adults live.

Evidence for the role of larval dispersal in the widespread distributions of most of Hawai'i's fish species is also provided by the rapid dispersal of nonindigenous species throughout the archipelago. In 1958, 2435 bluestripe snapper or ta'ape (*Lutjanus kasmira*) were introduced into Kāne'ohe Bay, O'ahu, from the Marquesas Islands (Brock, 1960). Possibly thousands more were brought from Moorea to O'ahu in 1961 (Randall & Kanayama, 1972). Ta'ape were previously unknown in the Hawaiian Islands. From O'ahu ta'ape quickly dispersed to Hawai'i Island by 1960 (Randall & Kanayama, 1972), to Laysan Island by 1979 (Parrish *et al.*, 1980), and to Midway Atoll by 1992 (Randall *et al.*, 1993b). Ta'ape thus dispersed throughout the islands in 34 years even though genetic evidence suggests that initially the effectively reproducing population may have been small, only 0.5–1.0% of the introduced fish (Planes & Lecaillon, 1998). Ta'ape have become so abundant in

some Hawaiian Islands locations that many fishermen consider them to be pests (Randall, 1987a). The dispersal of pelagic stages is the most likely mechanism for the rapid spread of this species. Ta'ape not only have planktonic larvae but remain pelagic as juveniles to >25 mm SL (B.C. Mundy, pers. observ.).

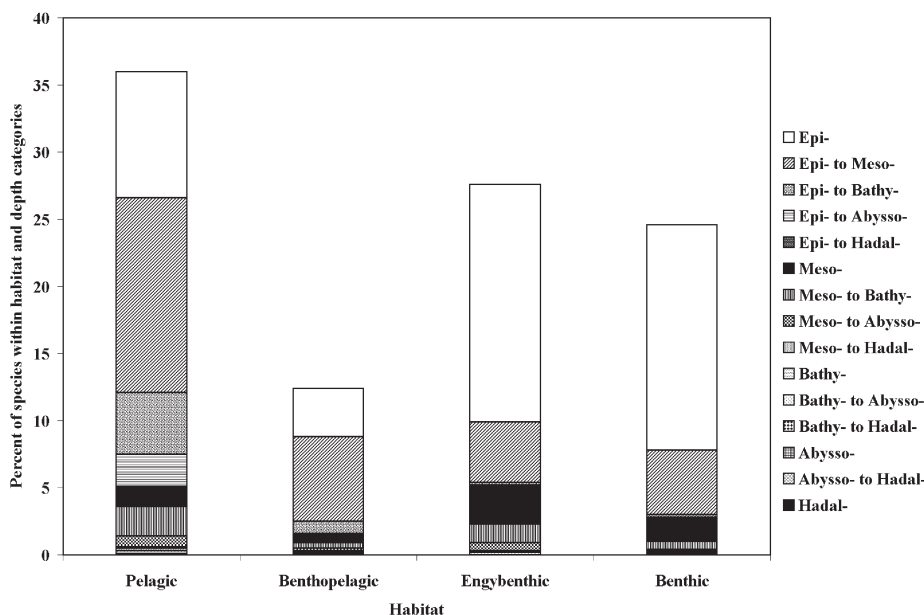
The dispersal of ta'ape in the archipelago was primarily from southeast to northwest. This prompts the question of whether such dispersal is unidirectional or if southeastward dispersal also contributes to the widespread distributions of many of Hawai'i's fish species. Circumstantial evidence for southeastward dispersal comes from the appearance of two fish species throughout the islands in recent years. Indo-Pacific sergeant (*Abudefduf vaigiensis*) and sargassumfish (*Histrio histrio*) were both absent from the islands until the late 1980s. They both have recently been found from French Frigate Shoals to Hawai'i Island. *Histrio* was first collected in the Hawaiian Islands at Kure Atoll, the extreme northern end of the islands, on a derelict fishing net that washed ashore there (J. Henderson, pers. comm., 1989). Juvenile *A. vaigiensis* were found associating with drifting nets north of Kure Atoll prior to the appearance of adults in the islands (M.P. Seki, pers. comm., 1989). The most probable source of these species to the islands was therefore juvenile dispersal in association with net debris moving from the western North Pacific to the Northwestern Hawaiian Islands in the subtropical North Pacific extensions of the Kuroshio Current. These species dispersed from the northwestern end of the island chain to the southeastern end within 10 years.

Rapid dispersal and lack of genetic differentiation of marine species throughout the archipelago may also account for the low amount of endemism in Hawai'i's marine biota compared to terrestrial species (Hourigan & Reese, 1987; Kay & Palumbi, 1987). The 18–48% of endemic species in various neritic Hawaiian Archipelago marine taxa is far less than the endemism in Hawai'i's terrestrial biota, which exceeds 90% in some groups, even though the percentage of endemism in Hawai'i's marine biota is the highest for any island group in the world (Eldredge & Miller, 1995). Because of greater dispersal in marine environments fewer of Hawai'i's marine species have remained isolated from populations elsewhere in the Pacific than have terrestrial species. The Hawaiian Islands terrestrial biota has numerous "species-flocks" in which many endemic species have evolved from a single, ancestral species (Wagner & Funk, 1995). In contrast, there are few marine species-flocks in the Hawaiian biogeographic region and even fewer instances of replacement along the archipelago in species-pairs within genera (Hourigan & Reese, 1987; Kay & Palumbi, 1987; Gosliner & Johnson, 1999). Thus, endemic Hawaiian Archipelago fish species are more closely related to species elsewhere in the Pacific than to other Hawaiian Archipelago species (numerous examples are given later in the discussion of the evidence from phylogenetic relationships for the origins of Hawai'i's fish fauna). The terrestrial biota of the Hawaiian Islands has been fragmented by the isolating effects of island separation and habitat mosaics (Wagner & Funk, 1995). Although Hawaiian Archipelago marine habitats also have a mosaic distribution, the dispersive stages of marine organisms eliminate most of the isolating effects of this fragmentation in the ocean (e.g., Godwin & Kosaki, 1989). For marine fishes, even the separation of islands within the Hawaiian Archipelago has little evolutionary influence.

#### *In what habitats do they live?*

The distribution of Hawai'i's fish fauna among depth categories and habitat types can be summarized here only in general categories. It is beyond the scope of this discussion to characterize the habitats of Hawai'i's fishes in detail. Information on the major habitat types and depth ranges in which Hawai'i's fishes live are given in the accounts of each species. More information can be found in the literature cited for individual species. Most people, including scientists, make distinctions between fishes from habitats characterized among others as "deep-sea", "open-ocean", "coral-reef", "coastal", and "shore". These distinctions are less clear than are often thought, reflecting the habits of individual fish and the experience of the observer as much as reflecting distinctions in the fish fauna as a whole. Attempts to categorize assemblages of fishes as typical of various habitats are often vague, as discussed in recent papers about the reality of a taxonomically distinct coral-reef fish fauna (Robertson, 1998; Bellwood, 1998). Therefore, broad classifications for depths and habitats are used in the following discussion.

The general habitat types used here refer to the fish species' behavior rather than attributes of the environment in which they live, such as substrate type. The general categories are "pelagic", "benthopelagic", "engybenthic", and "benthic". There is almost universal agreement about the definitions for pelagic and benthic in marine biology. Pelagic describes species that swim freely without more than ephemeral association with a substrate; examples are flyingfishes, most lanternfishes, most ceratioid anglerfishes, and tunas. Benthic describes species that keep direct contact with a substrate on a regular basis, usually resting on it or residing in crevices and holes; examples are shallow-water eels, lizardfishes, scorpionfishes, gobies, and all flatfishes. The terms benthopelagic and engybenthic require clarification because these often are used as interchangeable terms (e.g., Mead, 1970; Marshall & Merrett, 1977). Benthopelagic describes species that swim some distance above the substrate but return to within sensory range of it on a regular (usually diel) basis; examples are many

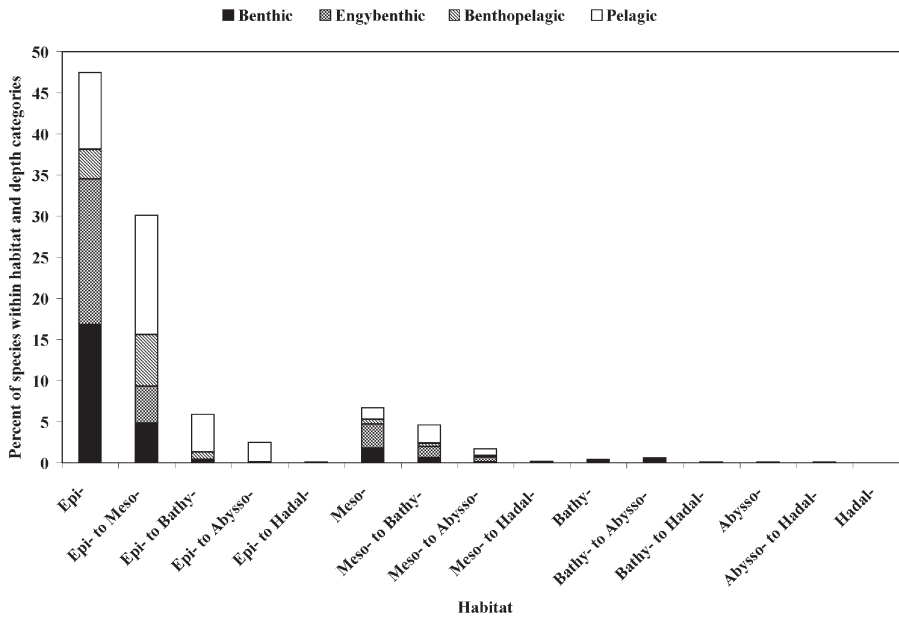


**Figure 6.** Proportions of the Hawaiian fish fauna that are found in major habitat categories: pelagic (living entirely in open water), benthopelagic (living primarily in the water column but in sensory proximity to substrates), engybenthic (living primarily at, but not resting upon, substrates), and benthic (living primarily in contact with substrates). The proportion of species found in different depth ranges (see Fig. 6) within each habitat category are also shown to illustrate the dominance of vertically-migrating (epial-mesial) species in the pelagic fauna, and shallow-dwelling (epial) species in the substrate-associated fauna.

shallow-water sharks, carangids, unicornfishes, and diel-migrating species such as the “meso-pelagic boundary fauna” discussed by Reid *et al.* (1991). Engybenthic is a less often seen term that describes fishes that usually swim just above the substrate and remain within close sensory range of it; examples are many freshwater fishes such as cichlids, many conspicuous coral reef fishes such as butterflyfishes or wrasses, and many elongate deep-sea fishes such as macrourids.

The depth ranges used to classify the species are those from the species’ entire ranges instead of only depths from the limited data from the Hawaiian region. The categories for depth are generally accepted divisions (e.g., Hedgpeth, 1957, fig. 1; Briggs, 1974; Holthus & Maragos, 1995; Angel, 1997; Helfman *et al.*, 1997). These are “epi-“ for fishes living from the surface to 200 m, “meso-“ for those living at 200–1000 m, “bathy-“ for those living at 1000–2000 m, “abyss-“ for those living at 2000–5000 m, and “hadal-“ for those living below 5000 m. The depth of 5000 m for the boundary between the abyssal and hadal zones was chosen as the intermediate value from the 4000–7000 m range given in various references. These terms are used as prefixes in conjunction with the general habitat terms.

The majority (52.4%) of fishes in the Hawaiian Archipelago live in proximity to a substrate, with 25.8% being benthic and 26.6% being engybenthic (Fig. 6). Over one-third (35.5%) of Hawai‘i’s fishes are pelagic. Only 12.1% are benthopelagic. Of the benthic species, over two-thirds (206 species) are found at 1–200 m, reflecting the dominance of coral and rocky reef species among bottom-living fishes of the region. Likewise, almost two-thirds (218 species) of the engybenthic fishes are found in waters < 200 m deep. Together, these shallow-water, substrate-associated species comprise 34.5% of the fauna. This group of species largely makes up the portion of the fauna usually described as “shore fishes” (e.g., Randall, 1996a). In contrast to the dominance of shallow-water species in the benthic and engybenthic categories, a large percentage of the pelagic (40.4%) and benthopelagic (51.2%) species are found in the mesopelagic zone of 200–1000 m. This reflects the high diversity in the pelagic realm of vertically migrating oceanic and island-slope taxa such as the Myctophidae and Stomiiformes. A significant portion (26.1%) of the pelagic fauna is found in the upper 200 m, however. Many of these species are found almost immediately at the sea surface, in the neuston, with examples including the flyingfishes, needlefishes, and coryphaenids. Despite their commercial importance, better-known, large pelagic species such as the tunas and billfishes comprise only a very small part of the Hawaiian Archipelago fish fauna.



**Figure 7.** The proportions of the Hawaiian fish fauna that are found in the major depth zones of the ocean, as categorized by the maximum depth of species occurrence: epi = 0-200 m, meso = 200-1000 m, bathy = 1000-2000 m, abyssal = 2000-5000 m, and hadal = >5000 m. Freshwater fishes are included with epial fishes. The proportion of species found within different habitat categories (see Fig. 5) within each depth zone are also shown.

Hawai‘i’s fishes range from a height of 914 m above sea level in streams (the ‘o‘opu alamo‘o, *Lentipes concolor*) to a depth of 4572 m on the abyssal plain (the cusk-eel, *Typhlonus nasus*). There is a geometric decrease in species numbers with increasing depth around the Hawaiian Archipelago (Fig. 7). Forty-seven percent of fishes in the region are restricted to the upper 200 m (the “epial” fauna in Fig. 7) and 37% range into mesial depths (200–1000 m). Only 11% are known from the region’s bathyal zone (1000–2000 m), but this is probably an artifact of the limited sampling below 800 m in the area. It is difficult to make valid statements about the distribution of Hawai‘i’s fishes in deeper waters since almost no sampling has been done of abyssal (2000–5000 m) and hadal (>5000 m) depths in the central Pacific. Only 5% of Hawai‘i’s fish species are known from abyssal depths elsewhere within their ranges and less than 1% have been recorded elsewhere into hadal depths.

The shallow-water (1–200 m) fauna is dominated by the benthic or engybenthic shore fish species familiar to recreational fishermen, snorkelers, divers, and aquarists. In contrast, the fauna that extends from shallow waters to 2000 m is dominated by pelagic or benthopelagic, vertically migrating species. Most of the non-migrating species restricted to depths of 200–1000 m are benthic or engybenthic forms. The deeper-dwelling fauna is more equally composed of bottom-associated and pelagic species.

Almost all species with extremely wide vertical ranges from surface waters to great depths are pelagic taxa. A deep-sea anglerfish, *Melanocetus murrayi*, is the species with the greatest recorded vertical range (100–6370 m). It is a good example of the problems of interpreting very broad vertical distributions. The upper depth-limit of this species is based on the capture of young specimens, perhaps even of larvae, which are typically found above or within the thermocline at more shallow depths than the species’ adult habitat. The lower depth-limit of this species may not be the actual depth of capture, but rather the deepest fishing depth of the open net that captured the deepest recorded specimen. Even so, it is possible that *M. murrayi* does regularly live at hadal depths. The point is that adequate sampling of great depths in the central Pacific has not yet been done with the opening/closing nets necessary to determine the actual depth ranges of deep-dwelling organisms.

Only 16 fish species recorded from the Hawaiian region could be called truly abyssal or hadal. Four, the bristlemouth *Cyclothone obscura* (1214–3500 m), the deep-sea anglerfish *Melanocetus murrayi*, the deep-sea anglerfish *Leptacanthichthys gracilispinus* (>1000–1265 m to 3000 m fishing depths), and the bigscale fish *Poromitra oscitans* (750–5320 m) are pelagic species with wide vertical ranges. They have been captured within the region at the upper ends of their depth ranges by nets. The slickhead *Alepocephalus blanfordii* (1900–

2000 m), the tubeshoulder *Mentodus eubranchus* (>1000 m), and the tubeshoulder *Mentodus mesalirus* (1300–2100 m) are poorly known bathyal species that might also be included in this group. The ratfish *Hydrolagus purpureus* (1150–1950), the tripodfish *Bathypterois atricolor* (258–4720 m), the deep-sea lizardfish *Bathysaurus mollis* (1683–4903 m), and the grenadier *Coryphaenoides longicirrhus* (1450–2403 m) are substrate-associated species that have been captured by deep trawls and observed from submersibles within the central North Pacific. A cusk-eel, *Xyelacyba myersi* (1075–2148 m), has also been tentatively identified from submersible videos taken within the region. A deep-pelagic relative of the gulper eels, *Monognathus rosenblatti* (2000–5266 m), is known from just outside the region from one open-net sample but its abyssal to hadal occurrence in nearby waters is verified by collections from opening/closing nets (Bertelsen & Nielsen 1987). Three deep-water species are known from the region only by pelagic larvae captured in the upper 200 m. These are a deep-sea anglerfish, *Caulophryne jordani* (1–3000 m), a pricklefish tentatively identified as *Malacosarcus macrostoma* (2985–4578 m), and the deepest-dwelling fish known from the central North Pacific, the lizardfish-like *Bathymicrops regis*. The last is an extraordinary species with larvae found within a meter of the sea surface and adults that live at 3300–5782 m (Nielsen & Merrett, 1992). The deepest confirmed record of a fish species within the 200-nmi Hawaiian EEZ is a video observation of the distinctive cusk-eel *Typhlonus nasus* (3933–4940 m) from a remote-operated vehicle at 4572 m off the Kona Coast, Hawai'i Island.

### How does the distribution of Hawai'i's fish fauna relate to the general distribution of fishes?

Knowledge of the individual biogeographic distributions of Hawai'i's fish species is necessary to understand the origin of Hawai'i's fish fauna and its relation to the fauna of the rest of the world. From an analysis of the distributional data included in the body of this checklist, the biogeographic distributions of Hawai'i's marine fishes are here classed into 11 general categories. The 11 biogeographic categories are: (1) cosmopolitan species found roughly between 50–60°N and 45–50°S in all oceans except for polar waters; (2) circumtemperate species with circumglobal distributions in waters between roughly 30–40°N and 35–45°S; (3) circumsub-tropical species with circumglobal distributions in waters between ca. 30°N and 30°S with seasonal, poleward occurrences in warm boundary currents; (4) species with disjunct ranges known only from the Atlantic and Pacific oceans; (5) Indo-Pacific species found throughout much of the tropical and subtropical Indian and Pacific oceans; (6) species found across much of the Pacific Ocean which also occur westward into the eastern Indian Ocean in the vicinity of Indonesia; (7) species endemic to the tropical and subtropical Pacific Ocean; (8) species restricted to the subarctic Pacific above and within the subtropical front, ranging northward at least to the Aleutians and found in the Hawaiian region only at the northern portion of the Archipelago; (9) species with ranges restricted to waters within or under the immediate influence of the North Pacific gyral current from Japan to the Hawaiian Islands; (10) eastern Pacific endemic species found in the Hawaiian Archipelago at the westernmost part of their range; and (11) Hawai'i's endemic species found only in the archipelago or at Johnston Atoll. (The numbers in parentheses for these categories are repeated in this section to aid the reader in following the discussion.)

(1) Twenty-two species in Hawaiian waters are cosmopolitan, found in almost all marine waters of the globe except for the Arctic and Antarctic oceans (Table 14). These comprise only 1.8% of Hawai'i's fishes. The only bottom-associated Hawaiian Archipelago fishes in this cosmopolitan fauna is a deep-sea spiny eel, *Notacanthus chemnitzii*. Over a third of these “cosmopolitan” species are absent from all or part of the eastern North and tropical Pacific Ocean. Their absence from that part of the world demonstrates the power of the factors that determined the biogeographic patterns of the central and eastern Pacific fish faunas.

(2) Circumtemperate species are 10.4% of Hawai'i's fish fauna, or 129 species, of which most are pelagic. Bottom-associated species include the cutthroat eels *Synaphobranchus affinis* and *S. brevidorsalis*, the grenadier *Hymenocephalus aterrimus*, the deepbody boarfish *Antigonia capros*, and the striped anglerfish *Antennarius striatus*. Circumtemperate species are frequently found in warm months at more poleward locations of major boundary currents that warm seasonally, such as the Gulf Stream, Benguela, Agulhas, and Kuroshio currents. Forty-nine of the 129 Hawaiian Archipelago circumtemperate species do not occur in the eastern North or eastern tropical Pacific Ocean.

(3) Circumsubtropical species are a slightly larger category with 155 species, or 12.4% of the fauna, comprising the third largest biogeographic category of Hawai'i's fishes. Examples include the whale shark (*Rhincodon typus*), a bristlemouth (*Cyclothone alba*), a grenadier (*Kuronezumia bubonis*), and the snakefish (*Trachinocephalus myops*). Several shallow-water reef fish also fall into this category, including the reface moray (*Monopenchelys acutus*), the Evermann's cardinalfish (*Apogon evermanni*), the glasseye (*Heteropriacanthus cruentatus*), and the black durgon (*Melichthys niger*). As with the circumtemperate species, subtropical species may occur poleward of their usual range limits in major boundary currents that warm in summer and early fall. Over one-third (60) of the species in this group are absent from the eastern North or eastern tropical Pacific Ocean.

(4) Thirty-nine Hawaiian Archipelago species (3.1%) are known only from disjunct localities in the Atlantic and Pacific oceans (Table 15). Many are species whose distributions are inadequately known. These may eventually be found in the Indian Ocean, where less sampling has been done than in either the Atlantic or Pacific. Some may be genuinely absent from the Indian Ocean for ecological or evolutionary reasons. The Indian Ocean is the only major ocean largely confined to the Southern Hemisphere and lacking a northern hemisphere central gyre. Much of the northern Indian Ocean is influenced by upwelling, high continental sediment inputs, and enhanced productivity. In addition, the southern Indian Ocean has few islands or seamounts that are suitable habitat for many Indo-Pacific taxa. These ecological conditions restrict the ranges of many marine organisms as illustrated by maps of coral diversity (Veron, 1995, figs. 46–50). It is difficult to understand how disjunct Atlantic and Pacific Ocean populations of a single taxon could retain enough genetic continuity to inhibit morphological divergence at the species level, however. Direct dispersal of all but the most cold-tolerant species between the Atlantic and Pacific oceans has been prohibited by land barriers for about three million years. Present day connectivity between the major oceans seems to occur primarily past South Africa, between the Indian and Atlantic oceans.

(5) The Indo-Pacific distribution is the second-largest biogeographic category for Hawai'i's fishes. Fishes that range from the central or western Indian Ocean into the central or eastern Pacific Ocean comprise 29.3% of the fauna (364 species), too numerous to list here. Examples include a lanternfish (*Myctophum lychnobium*), a cusk-eel (*Typhlonus nasus*), the longnose butterflyfish (*Forcipiger longirostris*), and the kāwakāwa (*Euthynnus affinis*). Most are found from South or east Africa into the Pacific but six are known only from as far west as the central Indian Ocean's Chagos or Maldiv Islands. Some found from the African coasts occur eastward to the American continents (72 species or 5.8% of the total Hawaiian Archipelago fauna), and a few occur eastward only to offshore islands such as the Galapagos (18 species or 1.4%). Most Indo-Pacific species (274 species or 22.1%) are not found in the eastern Pacific.

Most of Hawai'i's fishes (460 species or 36.9% of the fauna) are restricted to the Pacific Ocean and adjacent areas. These have heterogeneous distributions that are easily divided into several categories. The categories are (6) species that are primarily Pacific in range but also occur in enclosed seas between the Indian and Pacific oceans, or even westward to eastern Indian Ocean islands and shoals, (7) species restricted to the Pacific and other tectonic plates within and on the margins of the ocean, including Pacific Plate endemic species, (8) sub-arctic Pacific species, (9) species found only in the northwestern Pacific and Hawaiian waters, (10) eastern Pacific species, and (11) Hawaiian Islands endemic species.

(6) Pacific Ocean species that range into the enclosed seas between the Indian and Pacific oceans include 31 species that are found in the vicinity of Indonesia, Christmas or Cocos-Keeling Islands, or northwestern Australia. These may be Pacific Ocean fishes that have dispersed into the fringes of the Indian Ocean or Indo-Pacific taxa with truncated westward ranges. In many instances, these species are replaced in the Indian Ocean by sister, or "geminant," species with which they may have separate or slightly overlapping ranges. The bird wrasse (*Gomphosus varius*) is an example, replaced in the Indian Ocean by *G. caeruleus*. Three poorly known species will certainly be found to have wider ranges in the future. The barracudina *Lestidium nudum* has been reported from the Timor Sea, Australia, and the Hawaiian Islands (the taxonomy and biogeography of this genus is greatly in need of revision, however). Two other species, the spongehead catshark (*Apristurus spongiceps*) and the Celebes monkfish (*Sladenia remiger*), are known only from single collections at Sulawesi and the Hawaiian Islands. They may be among the species ranging only from Indonesia into the central Pacific or they may eventually be found further west into the Indian Ocean.

(7) There are 137 Hawaiian Archipelago fish species that are found only throughout wide areas of the tropical and subtropical Pacific Ocean (11.0% of the fauna; Table 16). These do not include Hawaiian Archipelago endemics and species with predominantly eastern or North Pacific distributions, discussed later as having separate biogeographic origins. Springer (1982) argued that the existence of an endemic Pacific fish fauna can be explained by plate tectonics, although he could not propose a mechanism. An examination of the distributions of Hawai'i's fish species restricted to the Pacific provides little support for a tectonic explanation of Pacific endemism. Few of the other endemic Pacific species are actually restricted to the Pacific Plate. Of fishes found in the Hawaiian Islands, only 32 of the 120 endemic Pacific fishes found at other island groups are actually restricted to the Pacific tectonic plate. Thirteen are "trans-Pacific," found from the western to eastern borders of the Pacific basin in one or both hemispheres (Table 16, I). Six of these have been collected over all of the larger tectonic plates comprising the Pacific basin (Fig. 8). Another 19 Hawaiian Archipelago fish species are found on the three western Pacific tectonic plates, 12 occur on the Australian and Pacific plates, and 22 are found on the Eurasian, Philippine, and Pacific plates. Nine species are known only from the Pacific Plate and the Ogasawara or Mariana Islands on the Pacific margin of the Philippine plate. According to Springer (1982) these could be considered to be Pacific Plate endemic species that have dispersed somewhat. Another 13 species have a puzzling distribution pattern from the central Pacific to the southeastern Pacific Nazca Plate, with nine known only from the Hawaiian Islands and the southeast Pacific. Thus, there is no dom-



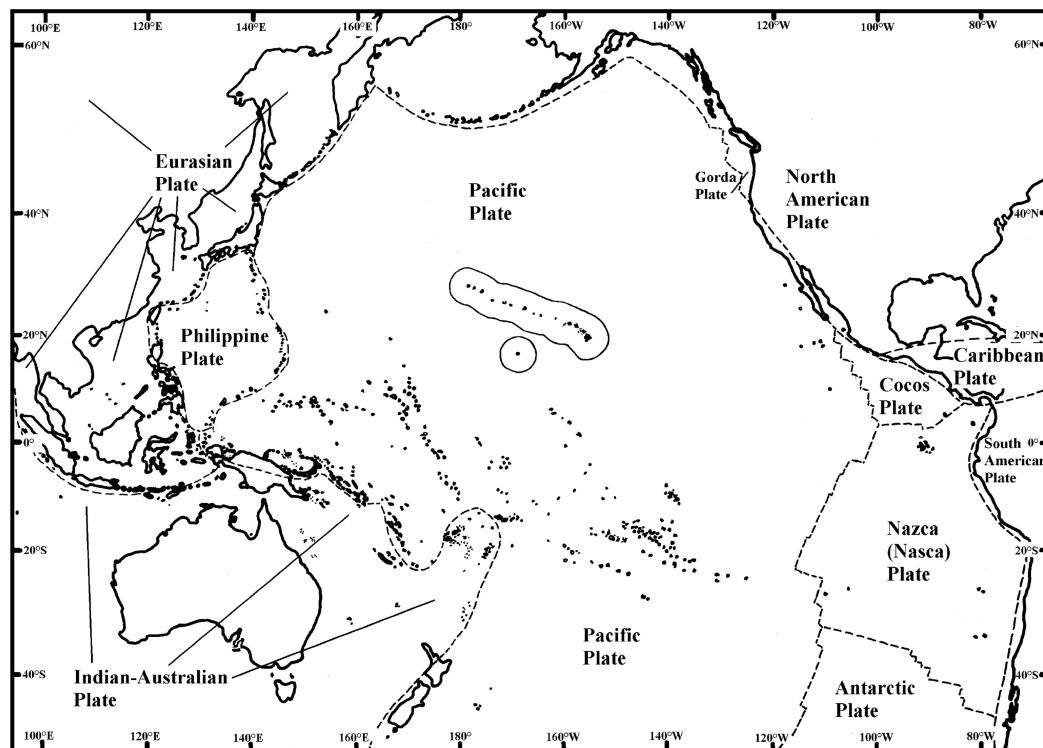


Figure 8. Map of the Pacific Ocean basin showing the locations of tectonic plates and their boundaries in relation to the island groups shown in Figure 1 (modified from Springer, 1982).

inant pattern with respect to tectonic plates in the distribution of Hawai'i's fish species that are endemic to the Pacific Ocean. Even if species that occur at the central Pacific margins of adjacent plates are considered Pacific Plate endemic species (Springer, 1982), only 54 of Hawai'i's fish species (4.3% of the total fauna and 39.4% of the endemic Pacific species) can be considered to be Pacific Plate species. Most fish species that are restricted to the Pacific Plate are endemic to single archipelagos, supporting arguments that Pacific Plate endemism is largely an artifact of smaller-scale endemism at single Pacific island groups (Randall, 1998c), and subsequent dispersal of endemic species from the archipelagos of their origin.

(8) The subarctic Pacific fauna is a distinct Pacific biogeographic category for species that have ranges restricted to the subarctic Pacific above and within the subtropical front northward toward the Aleutian Islands (McGowan, 1971, 1974). There are only nine subarctic Pacific fish species found in Hawaiian waters (Table 17A). Most of these are found within the region only at the northern portion of the Archipelago and many occur in the area only during winter when cooler water extends farther south than in other seasons. The southern Emperor Seamounts and northern Hawaiian Ridge are at the extreme southern fringe of the area seasonally occupied by the subarctic Pacific fauna. Most subarctic Pacific endemic fish species do not occur as far south as the Hawaiian Archipelago (Hart, 1973; Masuda *et al.*, 1984; Willis *et al.*, 1988).

(9) A larger component of the Hawaiian Archipelago fish fauna includes 58 species (4.6% of the fauna) with ranges restricted to waters within the influence of the gyral western and central North Pacific current from Japan or even Taiwan to the Hawaiian Islands (Table 17B). This biogeographic category has been discussed primarily in studies of pelagic organisms (McGowan, 1974; Johnson, 1974b, 1982) or of Hawai'i's fauna (Hourigan & Reese, 1987; Randall, 1992b) but has been otherwise neglected. It is a general biogeographic pattern or "track" that includes both the pelagic North Pacific transition zone species of McGowan (1974) and substrate-associated species that have ranges restricted to the seamounts and islands reached by extensions of the Kuroshio Current from Taiwan or Japan to the Hawaiian Ridge. These animals, like subarctic fishes, occur primarily at the northwestern portion of the Hawaiian region although some range into the main Hawaiian Islands. A few pelagic, transition-zone species such as the scaleless black dragonfish *Opostomias mitsuui* and the lanternfish *Symbolophorus californiensis* are found in Hawaiian waters only in winter when the subtropical front moves southward into the archipelago.

(10) Another small component of Hawai'i's fish fauna is the 22 eastern Pacific endemic species found in the archipelago at the westernmost part of their range (1.8% of Hawai'i's fauna, Table 18). The eastern tropical Pacific has a unique fish fauna in all habitats. Some species such as the bluestriped chub (*Sectator ocyurus*) are clearly distinct within their families at the generic level. Others such as the Diogenes lanternfish (*Diogenichthys laternatus*) are clearly sister-species to otherwise circumglobal congeners (*D. atlanticus* in this example). Certain circumglobal pelagic species have eastern Pacific populations that are recognized as subspecies (e.g., the frigate mackerel, *Auxis thazard brachydorax*, and the bullet mackerel, *A. rochei eudorax*), while the eastern Pacific populations of other "polytypic" pelagic fishes have been recognized as nominal species (e.g., the lightfish *Vinciguerria lucetia* and the dogtooth lampfish, *Ceratoscopelus townsendi sensu stricto*). Some eastern Pacific endemics occur in Hawaiian waters on a regular basis and reproduce here (e.g., the diamond stingray (?), *Dasyatis dipterura*, the lanternfish relative *Scopelengys clarkei*, and the finescale triggerfish *Balistes polylepis*). Others such as the green jack (*Caranx caballus*) and the bluestriped chub (*Sectator ocyurus*) appear here during certain years but do not persist and probably do not reproduce in the Hawaiian Islands. A few such as the black skipjack (*Euthynnus lineatus*) have been recorded only as isolated specimens considered to have been waifs in the Hawaiian region. Johnston Atoll lies more firmly within the western extension of the eastern tropical Pacific biogeographic region than does the Hawaiian Archipelago. Thus, more eastern tropical Pacific pelagic species are expected at Johnston Atoll than in the main Hawaiian Islands.

(11) There are 195 fish species found only in the Hawaiian and Johnston islands (Table 19). Only Nahacky's pygmy angelfish (*Centropyge nahackyi*) is considered a Johnston Atoll endemic, although a specimen was collected at Hawai'i Island. The percentage of endemism for the archipelago is 15.6% when compared to all fishes with verified records from the region, excluding waifs and introduced species. This is lower than the percentage usually given because of the large number of oceanic and otherwise deepwater species included here that have been omitted from other analyses. It is fair to argue that the percentage of endemism should be calculated to exclude the wide-ranging pelagic species because regional endemism is not exhibited by those species. If this is done, the percentage of endemic species for Hawai'i's fish fauna is 22.3%, a number that agrees fairly closely with earlier estimates of endemism in the area of about 24.3% (Randall, 1996a) and the current estimate of endemism for shore fishes of 23.1% (Randall, 1998c). Thus, the high percentage of endemism for the fish fauna of the Hawaiian Archipelago relative to that in other marine regions continues to be demonstrated even with the increased number of species now recorded from the archipelago. Species endemic to the Hawaiian Archipelago are an exception to the generality that pelagic and substrate-associated fish species share biogeographic patterns. There is little evidence that any pelagic fishes are restricted to the archipelago with two possible exceptions, the Hawaiian lanternshark (*Etmopterus villosus*) and the fickle-spotted flyingfish (*Cypselurus simus*). Most pelagic species known only from Hawaiian waters are also known from single specimens or samples, suggesting that there has been insufficient sampling to determine their distributions. Examples are the scaleless black dragonfishes *Eustomias curtatus*, *E. deofamiliaris*, *E. tomentosus*, *E. inconstans*, *E. melanstigmoides*, and *Leptostomias macronema*, and the deep-sea anglerfish *Linophryne escaramosa*. Two better-known, endemic Pacific-plate oceanic species, the scaleless black dragonfish *Eustomias bituberoides* and the lanternfish *Protomyxophum beckeri*, could be considered to be Hawaiian Archipelago endemics even though they have also been collected far outside the Hawaiian 200-nmi EEZ. In this sense, Hawaiian Archipelago endemics can be considered to be central North Pacific gyre species (McGowen, 1974). But almost all of Hawai'i's endemic fish species are bottom-associated species restricted as adults to the only available island or seamount habitats within the gyre, giving them more limited distributions than pelagic central gyre species.

It is noteworthy that within the broader biogeographic patterns (1–7) there are many Pacific Ocean fish taxa that are absent from all or portions of the eastern and North Pacific. This has received little attention in the biogeographic literature except as it relates to the so-called "east Pacific barrier" to larval dispersal (Briggs, 1974; Sulak & Shcherbachev, 1997). In comparison to the rest of the Pacific, the eastern tropical and particularly the eastern North Pacific Ocean are highly unusual in the composition of their fish faunas. This unusual composition exists in eastern Pacific fish biodiversity from the species to the subordinal level (Hart, 1973; Eschmeyer & Herald, 1983; Masuda *et al.*, 1984; Willis *et al.*, 1988; Allen & Robertson, 1994), in the early life history attributes of the fishes (Kendall, 1981), and in the ecology of the species found there (Hobson, 1994). These differences are strong in bottom-associated fishes but are also exhibited in varying degrees by holopelagic fishes (Loeb, 1986). In fact, the eastern Pacific fish fauna is second only to the Southern Ocean's fish fauna in its differences from the fish fauna of the rest of the globe. At the least, it can be said that something highly unusual happened in the eastern tropical and North Pacific during the evolution of the modern fishes.

Within most of the 11 biogeographic categories exhibited by Hawaiian Islands fishes, species may be found that are pelagic or benthic, and that live at all depths. The circumglobal categories (1–4) are the main exceptions, composed mostly of pelagic species. Many biogeographic patterns in the general ranges of Pacific fishes conform to the biogeographic patterns proposed for oceanic plankton by McGowen (1971, 1974) and

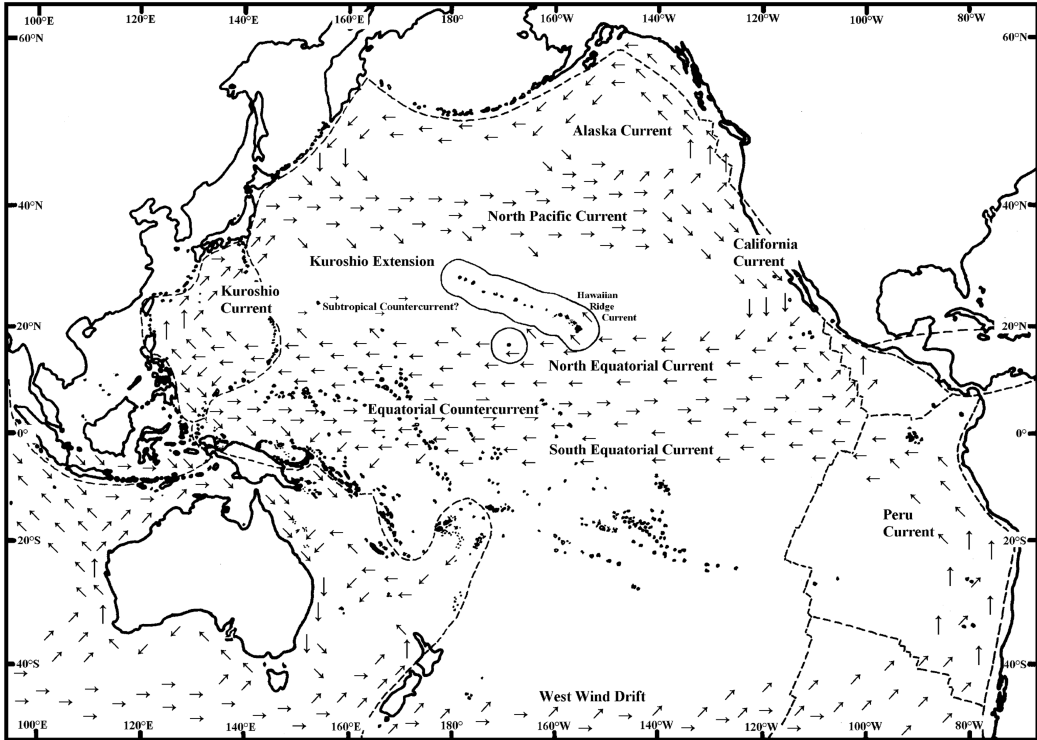
Reid *et al.* (1978). The Indo-Pacific (5) and central Pacific distributions (7, in part) of fishes are major exceptions. McGowan's categories have been applied to fishes by Johnson (1982) and were used by Longhurst (1998) to develop a more general description of oceanic biogeography. McGowan's biogeographic patterns apply to the shore fishes and deepwater, bottom-associated fishes of the central Pacific as well as to pelagic fishes. In the discussion that follows of the origins of the Hawaiian Islands fish fauna, a salient point is that the processes that created most of the biogeographic patterns of Hawai'i's fishes affected species in all habitats. This suggests that the factors that created and maintain the biogeographic patterns of Hawai'i's fish fauna operated on a life-history stage shared among most species. The only stage that is shared among most fishes of all habitats is the pelagic larva.

### What were the origins of Hawai'i's fish fauna?

Supporting arguments are developed for the following six hypotheses about the origins of Hawai'i's fish fauna: (1) The species-rich, Indo-Pacific marine biota that includes Hawai'i's fishes was created by vicariant speciation resulting from ancient changes in oceanic circulation patterns (White, 1994; Veron, 1995) and more recent sea-level changes that affected continental margins (McManus, 1985; Springer & Williams, 1990; Randall, 1998c). Changes in sea level and currents increased species numbers by isolating populations, and changes in currents extended species ranges beyond their areas of origin by dispersing pelagic stages (Kay, 1984; Newman, 1986). (2) The marine biotas of Pacific Islands were further shaped by local extinctions, colonizations, and the evolution of endemic island species by peripheral isolation (Grigg, 1981; Kay, 1984). The colonization of the Hawaiian Archipelago by coastal organisms increased after ocean currents intensified first in the Oligocene (Grigg, 1988) and repeatedly in glacial periods thereafter. (3) The ancient Tethyan circulation contributed an eastern Pacific/Caribbean component to Hawai'i's fishes that still persists at the species level through a minor influence of dispersal during anomalously strong currents from the eastern Pacific in some years (White, 1994; Veron, 1995; Randall, 1992b). (4) There has been a strong connection to the numerous islands to the south and west of the Hawaiian Islands, most likely through the Line Islands, when sea levels were lower than at present, currents were deflected more along island chains, and dispersal was enhanced by increased current velocities (Gosline, 1955; Gosline & Brock, 1960; Newman, 1986; Benzie & Williams, 1997). This connection is not evident in present-day current patterns but may still operate as evidenced from rare occurrences of waifs of western Pacific species at the southern end of the Hawaiian Archipelago. (5) There was also a connection of the Hawaiian Archipelago with southeastern Pacific islands and seamounts evidenced at the species level (Newman, 1986; Parin *et al.*, 1997). (6) A strong, present-day connection of Hawai'i's fish fauna with the northwestern Pacific via extensions of the Kuroshio Extension connects islands near Japan to the Emperor Seamounts and Northwestern Hawaiian Islands (Hobson, 1984; Randall *et al.*, 1985b; Hourigan & Reese, 1987; Randall, 1998c).

An assumption of this discussion is that the distribution patterns of Hawai'i's fishes were created by vicariant speciation and dispersal, and that ecological factors act only to maintain the boundaries of these patterns (Johnson & Zahuranec, 1998). The dominant mode of speciation (see Lynch, 1989) that created endemic Hawaiian Archipelago species was probably peripheral isolation with a possible small contribution of microvicariance. The dominant mode of speciation for more widely spread fishes found in Hawaiian waters was probably vicariance followed by dispersal. Vicariant events that created Hawai'i's fish fauna were likely more directly influenced by oceanographic circulation than by land-mass movements because the islands were isolated from major land masses. This contrasts with the emphasis given to plate tectonics in recent discussions of Indo-Pacific fish evolution (e.g., Springer & Williams, 1990; Mooi, 1995). The "hydrotectonic" model of White (1994) and the "surface circulation vicariance" model of Veron (1995) thus have greater explanatory power for the origins of Hawai'i's fish fauna than do pre-Miocene movements of continental land masses. The traditional paradigm of an Indo-West-Pacific "center of origin" and eastward dispersal of species across the central Pacific (Briggs, 1974, 1999a,b) that was the underlying theory in early discussions of Hawai'i's fish biogeography is rejected as unsupported. Analyses of the problems with this classical paradigm have been amply presented elsewhere (Croizat *et al.*, 1974; Nelson & Platnick, 1981; Springer, 1982; Veron, 1995; and many others). While there has been a tendency to think of Hawai'i's fishes as having originated elsewhere (Briggs, 1974, 1999a,b), it is also likely that many taxa in Hawaiian waters originated in the archipelago and dispersed outward (Kay, 1984; Jokieli & Martinelli, 1992). This may be true even for some species now widespread throughout the Pacific.

Four approaches were taken to develop the hypotheses about the biogeographic origins of Hawai'i's fish fauna. The first was to review hypotheses that other ichthyologists have proposed for the origins of the fauna and to compare them with what is now known about the biogeography of these fishes. The second was to examine the various biogeographic categories of which Hawai'i's fish species are components, discussed in the previous section. The third, considered by some biogeographers to be the only valid biogeographic method,



**Figure 9.** Map of the Pacific Ocean showing the generalized mean geostrophic flow of major ocean currents in the basin (modified from Springer, 1982). The current patterns were taken from Sverdrup, Johnson, & Fleming (1942) with the exception of the hypothetical position of the subtropical countercurrent. The position of this countercurrent was suggested by Grigg (1981) as a mechanism influencing the biogeography of Hawaii's marine species; the subtropical countercurrent is highly variable and more weakly defined than the other currents shown on this map.

was to examine phylogenetic relationships of fish species found in Hawaiian waters and to interpret the biogeography of Hawai'i's fishes from area cladograms (Wiley, 1988). The fourth was to consider the geologic and oceanographic history of the Pacific basin and to place the conclusions from the first three approaches in this temporal context. Hypotheses about biogeographic patterns in the central Pacific may likely be refuted by future discoveries when this region is better explored. It is important to remember that there has been minimal sampling of the small central Pacific islands south of the Hawaiian Archipelago. The central Pacific Ocean outside of the Hawaiian Archipelago is one of the most poorly known regions of the earth in many respects.

*What have other marine biologists suggested about the origins of Hawai'i's fish fauna?*

Throughout the 20th century the origins of Hawai'i's fish fauna have been of great interest to ichthyologists. Larval dispersal has been a theme in almost all discussions of these origins. Jordan & Evermann (1905) briefly discussed the biogeography of Hawai'i's fishes, emphasizing the role of currents that "serve to transport young fishes from one place to another." They noted that the Hawaiian Islands have tropical Pacific fish genera but distinctive species, suggesting that isolation of the islands by the directions of the region's currents was the cause. The specific current patterns that Jordan & Evermann (1905) described are now known to be false, but their general suggestion is the basis for subsequent discussions, including this one.

A modern understanding of ocean circulation (Fig. 9) was first incorporated into a hypothesis of the origins of Hawai'i's fish fauna by Gosline (1955). He proposed that Johnston Atoll is a "filter bridge" for dispersal of Pacific fishes to the Hawaiian Islands. From his statements, it is obvious that he thought at the time that Johnston Atoll was the best candidate for the source of many of Hawai'i's fish species. He later modified this view in Gosline & Brock (1960), proposing more diverse origins including the dispersal of fishes to the region from Johnston Atoll, Wake Island, and the first suggestion of an important pathway via the Kuroshio Current from Okinawa and adjacent areas (Fig. 9). Gosline & Brock (1960) noted again that Hawai'i's fish fauna is essential-

ly Indo-Pacific and “... that America played a negligible role.” They also suggested that “... it is fairly certain that many if not most of the species have arrived at the western end regardless of where they started from (Gosline 1955).” Grigg (1981) based independent evidence of recruitment of marine organisms to the Hawaiian Islands from Johnston Atoll on the occurrence of *Acropora* corals in the central Northwestern Hawaiian Islands. He concluded that recruitment of *Acropora* to the central part of the archipelago was a post-Pleistocene, and likely ongoing, highly intermittent phenomenon. The proposed pathway was a northeastward flowing extension of the Subtropical Countercurrent moving into the archipelago from Johnston Atoll (Fig. 9). Grigg (1981) concluded that this pathway was probably not used by many other taxa found in the Hawaiian Islands.

The developing geological paradigm of plate tectonics prompted new hypotheses about the origins of Hawai‘i’s fishes in the 1980s. Springer (1982) emphasized the affinities of Hawai‘i’s fish fauna with that of the southeastern Pacific in an analysis of Pacific fish biogeography that linked this distributional pattern with tectonic plate geology (Fig. 8). He discussed in detail several hypotheses for factors that could have created north/south distributional relationships. One of these hypotheses, island integration (Rotondo *et al.*, 1981), has since been rejected because the geological events upon which it depends occurred long before the evolution of present-day fish species (Newman, 1986). Springer’s (1982) discussion of the origins of Pacific fishes was quite detailed, mentioning many factors including tectonic plate-boundaries, island distributions, island submergence from erosion and plate movements (“island extinction”), sea level fluctuations, changing sea surface temperatures, and dispersal along the Kuroshio Extension and Emperor Seamounts. It was one of the major influences on the development of this discussion. Readers who are interested in this topic are encouraged to read it if they have not done so already.

Hobson (1984) also suggested multiple origins for the fauna in his study of fish distributions throughout the island chain: “The fauna is basically derived from the tropical western Pacific, a relationship that is generally most evident in communities at the southeastern end of the archipelago, but it is also particularly evident at French Frigate Shoals which is located at the center of the archipelago. Although communities at the northwestern end of the archipelago similarly show close ties to the tropical Pacific, they also include species from more temperate regions of the western Pacific.” His suggestions are affirmed from the review of the entire fauna included in this checklist.

Randall *et al.* (1985b) reevaluated Gosline’s (1955) suggestion that Johnston Atoll had served as a stepping stone for dispersal of fishes to the Hawaiian Islands and rejected it with more complete information on the fishes there. Randall *et al.* (1985b) stated “We believe that the great majority of fishes that have colonized the Hawaiian Islands have come from the Ryukyu Islands and southern Japan, beginning with the Kuroshio Current, and arriving at seamounts or low islands at the northwestern end of the Hawaiian Chain.”

Newman (1986) reexamined hypotheses of Kay (1980) and Springer (1982) in a discussion of the origins of Hawai‘i’s marine fauna that has received little attention from ichthyologists. Springer’s (1982) reliance on pre-Miocene, vicariant mechanisms was found to be incongruous with the post-Oligocene origins of modern Pacific genera and particularly species. Newman (1986) noted that biogeographic patterns are shared between shore species and oceanic plankton because of the common influence of oceanographic factors on the distributions of both groups of organisms. He discussed the role of basin-wide, eustatic sea-level changes in altering the connectivity patterns of Pacific islands, pointing out that lowered sea levels would have increased the number of emergent islands in the basin. The connectivity between islands would have thereby been increased, including that of the Hawaiian Archipelago to Wake and the Line Islands. He also explained the distributions of anti-equatorial species known only from the southeast Pacific and Hawaiian islands by past oceanographic connections and equatorial extinctions between the Hawaiian Archipelago and islands of the southeast Pacific. Newman’s (1986) conclusions are congruent with those of Benzie & Williams (1997) for the western and South Pacific. They found the counterintuitive result that genetic connectivity among giant clam (*Tridacna*) populations was usually greater across present-day current flows instead of along them. They suggested that currents during ice-age, low sea-level stands would have flowed more along island-chain and ridge-axes than do currents at present. Benzie & Williams (1997) also discussed the probability that current strengths and eddy formation were stronger during glacial periods, which acted together with deflection of currents by island archipelagos to increase the dispersal of marine organisms between island groups.

In a general review of the evolution of Hawai‘i’s fishes, Hourigan & Reese (1987) relied on the hypothesis of Randall *et al.* (1985b), stating: “Hawai‘i does not lie directly in the path of any current system which might quickly transport larval fishes to the islands. The major current systems affecting the Hawaiian Islands are the North Pacific Drift and the related Kuroshio Extension of the North Pacific Equatorial Current. These have resulted in an inshore Hawaiian fish fauna whose primary affinity is with the Ryukyu Islands and southern Japan.” Although they emphasized the northwestern Pacific connection to the Hawaiian Islands, Hourigan & Reese (1987) also noted that “A third current system, the Subtropical Counter-Current, extends from west to east. Johnston Island lies within this system and may be a stepping stone for fishes colonizing the Hawaiian

Archipelago 800 km to the northeast. Faunal affinities of Johnston Island with the Hawaiian Islands rather than the central Pacific, however, suggest that colonization occurred primarily in the opposite direction.” The hypotheses summarized in these statements by Hourigan & Reese (1987) have essentially become the recent paradigm to explain the origins of the Hawai‘i’s fishes (e.g., Randall, 1996a).

Grigg (1988) presented strong evidence that the present-day coral fauna of the Hawaiian Archipelago colonized the region beginning in the early Oligocene after extinction of the islands’ earlier corals. His analysis of ancient changes in ocean currents, ocean temperatures, sea level changes, and the positions of the Hawaiian Islands suggest a benchmark date for the origins of extant Hawaiian biogeographic relationships at about 35 million years ago (ma). But some of his arguments for the evolution of Hawai‘i’s coral reefs do not apply to animals that live at greater depths or in habitats different than those of scleractinian corals.

Kosaki *et al.* (1991) suggested that lowered sea levels would have left only a narrow fringe of shoreline habitat around Johnston Atoll, drastically reducing the habitat suitable for shore fish survival. Johnston Atoll may therefore have experienced local extirpation of species during Pleistocene with recent recolonization from the Hawaiian Archipelago. This intriguing suggestion explains the present-day composition of Johnston Atoll’s shore fish fauna while leaving open the possibility that Johnston Atoll was a stepping-stone at an earlier time for the recruitment of Indo-Pacific fish species from islands to the south and west of the Hawaiian Islands. The suggestion that Johnston Atoll’s fishes suffered extirpation from sea level change-induced habitat loss applies to the atoll’s present-day size, elevation, and geographic position. It becomes less applicable moving back farther in time with the ancient geographic position of the atoll, its erosional and subsidence history from a high island to a sea-level atoll, and the altered current directions and strengths during glacial periods (Schlanger *et al.*, 1984; Benzie & Williams, 1997). But Kosaki *et al.* (1991) noted that the Line Island Ridge between Johnston and Kingman Reef 1200 km to the south has no features that would have been emergent islands since the Eocene, casting doubt upon the stepping stone connectivity of Johnston in that direction. They also discussed the island integration hypothesis of Rotondo *et al.*, (1981) but did not mention Newman’s (1986) refutation of it.

Randall (1996a, 1998c) discussed multiple origins for the archipelago’s fauna in reviews of the biogeography of Hawai‘i’s fishes and the entire Indo-Pacific shore fish fauna. The importance of the present-day, Kuroshio-influenced flow in dispersing fish larvae to the Hawaiian Islands was emphasized in both papers but other origins for portions of Hawai‘i’s fish fauna were also discussed. The reader is encouraged to examine these papers directly for a better overview of these hypotheses than can be given here; they were very influential in the development of this discussion. Randall (1998c) summarized hypotheses about the origins of Pacific island fishes thus: “A successful spawning of a shore fish, coupled with the appearance of an unusual current pattern at just the right time could result in a pulse of larvae to a distant new shoal area. If this event is followed by a long period of little or no gene flow, speciation may take place in the new locality, particularly if ecological conditions there are different. No vicariant event is needed unless one wants to regard the vagaries of ocean currents and eddies as a form of vicariance.”

A major argument in the discussion that follows is that the changes in ocean circulation are indeed prominent among the vicariant events that shaped the present-day biogeography of Hawai‘i’s fish fauna. Geological vicariance helped create the species-rich Indo-Pacific fauna through the isolation of the Indian Ocean from the Pacific (Springer & Williams, 1990), the isolation of the Andaman, South China, Sulu, Celebes, and Banda seas during low sea level periods (McManus, 1985), or the severing of the Tethyan circulation by the closure of the Panamanian Isthmus (Veron, 1995). But changes in ocean circulation must have been the vicariant events that shaped the marine biogeography of the islands of Oceania because of the absence of continental shelves at Pacific islands (Veron, 1995). These ancient changes in ocean circulation were not highly transitory but rather were different from present patterns for vast periods of time, changing in different geological epochs (White, 1994; Veron, 1995). There were likely long-term connectivity patterns of larval dispersal to islands that were later severed, leading to speciation in the Indo-Pacific at different times since at least the Miocene. The history of these events will be outlined later in this discussion.

#### *What is known about the dispersal mechanisms for fishes of the Hawaiian Islands?*

An axiom of marine biogeography is that most of the dispersal of demersal species occurs in planktonic early life-history stages (Sverdrup *et al.*, 1942; Briggs, 1974; Grigg, 1981; Hourigan & Reese, 1987; Kay & Palumbi, 1987; Benzie & Williams, 1997). Oceanic species and species lacking larvae are obvious exceptions. Pelagic species such as most myctophids and many scombrids probably disperse easily across open waters throughout their lives, although this is constrained by the same currents, frontal systems, and environmental factors that constrain the dispersal of planktonic stages. Likewise, truly deep-sea benthic, eurybenthic, or benthopelagic species probably disperse in all life stages along contiguous isobaths with appropriate environmental conditions. This accounts for the small number of pelagic, abyssal, and hadal fish species with very limited distributions, including limited, endemic Hawaiian Island distributions. In contrast, species which live on or near shallow sub-

strates as adults usually do not disperse very far after settling from the plankton. Movements of their juveniles or adults between archipelagos are probably rare occurrences. The major differences between the dispersive abilities of pelagic species and shore fishes are the duration of the pelagic stages and their swimming capabilities. Otherwise, the congruent distribution patterns shared by pelagic, deep-sea, and shore fish species can be explained by the dominant role of larval dispersal, controlled by oceanographic factors, in shaping species' ranges throughout the Indo-Pacific islands.

A flaw in this axiom is its failure to explain the distributions of non-teleost fishes that lack larvae. Many of these, such as the blue shark (*Prionace glauca*) or the pelagic stingray (*Pteroplatytrygon violacea*), are pelagic and thus need no further consideration. But others such as hagfishes (e.g., *Eptapretus carlhubbsi*), stingrays (e.g., *Dasyatis dipterura*), and eurybenthic sharks (e.g., *Echinorhinus cookei*) share distribution patterns with teleost species despite the absence of obvious dispersive stages. An adequate explanation remains to be found for the origins of the biogeographic distributions of these non-pelagic, non-teleost species.

The larvae of most marine teleosts occur primarily in the mixed layer and upper thermocline; Boehlert *et al.* (1992) and Boehlert & Mundy (1992, 1996) give examples from the Hawaiian Archipelago. The mixed layer and upper thermocline are in the upper 100–200 m in the Hawaiian 200-nmi EEZ (Flamant *et al.*, 1998). Wind-driven currents dominate ocean circulation in this surface layer. It is this circulation that maintains the general distribution of marine fishes, although present-day circulation patterns are not the same as those that influenced the evolution of extant marine species and created their distribution patterns (Veron, 1995; Benzie & Williams, 1997). An excellent review of present-day, global sea-surface circulation and its biological influence was presented by Longhurst (1998).

There are a few exceptions to the generality that larval fish occur in the ocean's surface layers. For example, larval hatchetfishes (Sternoptychidae) are generally found in the thermocline and not the mixed layer (Boehlert & Mundy, 1992, 1996). Larvae of a few other deep-sea fish families are rare or unknown in standard ichthyoplankton surveys conducted in the upper 200 m, with most known specimens collected in deeper tows. It is inferred that these families have larval stages that occur below the wind-driven currents of the mixed layer and upper thermocline. Examples include the slickheads (Alepocephalidae), tubeshoulders (Platyroctidae), whalefishes (Cetomimidae), grenadiers (Macrouridae), and the bathyal and abyssal genera of the Ophidiiformes. The codlings (Moridae), sea toads (Chaunacidae), and jellynose fishes (Ateleopodidae) may also have predominantly deeper-dwelling larvae, judging from the scarcity of these larvae in collections relative to the abundance of adults. Chave & Mundy (1994) mentioned this to suggest that the larvae of certain deep-sea fishes are affected by deep currents different from the currents that disperse most shallow-dwelling larvae. This could create zoogeographic dispersal patterns differing from the patterns of most shallow-water species. While this may be true for the few families noted above, it is misleading to assume that deep-sea fishes in general have different larval dispersal patterns from shallow-water taxa. In fact, the opposite is probably true. Ichthyoplankton tows at 0–100 m in Hawaiian waters catch a mixed assemblage of larvae of neritic, mesopelagic, and deep-sea, benthic species. Deep-sea fishes with larval stages concentrated in the mixed layer and upper thermocline include most Stomiiformes, Myctophiformes, Aulopiformes, Ceratioidei, and Stephanoberyciformes, among others. Indeed, some of the deepest-living fishes, the Ipnopidae, have larvae that are found very near the sea-surface during part of their development (e.g., Nielsen & Merrett, 1992). Most deep-sea fishes have dispersive larval stages that occur at the same depths as larvae of shore fishes, where they are all subject to the same, broad-scale biogeographic influences of sea-surface circulation patterns.

Shore fish species capable of dispersing to the Hawaiian Archipelago and maintaining genetic homogeneity with other Pacific populations seem to be those with larvae or juveniles that are pelagic for prolonged times. Selective pressures within the region have retained, enhanced, or at least have not acted against these lengthy pelagic larval durations in endemic Hawaiian Archipelago species (Thresher & Brothers, 1985; Victor, 1986b; McCormick, 1999). In an analysis of 115 species, for example, mean larval durations of non-endemic fishes from the Hawaiian Islands were 68.4% longer than the mean larval durations of central Pacific species not found here (Brothers & Thresher, 1985). Likewise, two endemic Hawaiian Islands angelfishes, the Fisher's angelfish (*Centropyge fisheri*) and Potter's angelfish (*C. potteri*), had the longest times until transformation to settlement of 31 pomacanthid species investigated (Thresher & Brothers 1985). The Hawaiian Islands population of the non-endemic flame angelfish (*C. loriculus*), also had a long presettlement period for the family but the emperor angelfish (*Pomacanthus imperator*), which has been recorded from the Hawaiian Islands only as a waif, did not. Although no general correlation between geographic range and larval duration was found, Brothers & Thresher's (1985) results support the presence of prolonged pelagic phases in pomacanthids that have dispersed to the Hawaiian Islands. Similar results were found for labrids and pomacentrids, although Hawai'i's endemic pomacentrids do not have exceptionally long larval durations within their genera perhaps because they can remain pelagic after transforming to juveniles (Victor, 1986a; Wellington & Victor, 1989; Thresher *et al.*, 1989; Cowen & Sponaugle, 1997). Longer-than-average larval durations in Hawai'i's fishes have also been found within single species when specimens from the Hawaiian Islands have been compared

to specimens from elsewhere (Victor, 1986b; McCormick, 1999). The longer pretransformation phase of Hawai'i's convict tang (*Acanthurus triostegus*) compared to those from French Polynesia has been attributed to delayed metamorphosis and settlement in individual fish, as opposed to selection for a longer pelagic duration in the entire Hawaiian Islands population (McCormick, 1999).

Based on the absence of a clear relationship between time to settlement and biogeographic range, Victor (1986b, 1991) argued that the variation in larval durations among fish species may be irrelevant for biogeographic conclusions. He suggested several factors that could contribute to this. Larval durations vary among individuals within a given region and between populations of the same species in different regions. Some species such as certain labrids delay transformation until an appropriate juvenile habitat is found, while others such as pomacentrids cannot. Continued pelagic dispersal after transformation from the larval stage may also confound the correlations of larval duration with biogeographic dispersal in some genera. For example, sergeants (*Abudefduf* species) can transform to semipelagic juveniles under floating objects (Wellington & Victor, 1989). Victor (1991) also noted the importance of the relative isolation of the island groups from which samples come. The Hawaiian Islands are the most isolated archipelago in the world and Hawai'i's fishes have a longer than average larval duration. Fish species with restricted ranges in other regions tend to have short pelagic phases with the exception of eastern Pacific species which are also isolated by a great distance from other populations. The inclusion of Hawaiian Islands and eastern Pacific fishes with endemic species from other areas obscures the relationship between larval duration and biogeographic dispersal in studies of the effect of larval duration on dispersal capability. This suggests that larval duration is important in the biogeography of Hawai'i's fishes, although other factors may be equally or more important in some biogeographic situations (M. Vecchione, pers. comm., Sept. 1999).

Relationships between biogeographic distributions and larval durations are also unnecessarily obscured by speculations about the dispersive capabilities of egg and larval stages in the absence of direct observations. For example, it is conventional wisdom in ichthyology that species with demersal eggs or parental care of embryos have limited dispersal capabilities compared to species with planktonic eggs. Likewise, species with large larvae are often thought to have long pelagic durations compared to species with small larvae. Until recently it was assumed that pelagic fish larvae drift passively in currents with little active control over their distribution.

Empirical tests indicate that there is much species-specific variability in dispersive capabilities even among species in families having uniform early-life-history attributes. For example, eels are thought to have greater than average dispersive capabilities because their exceptionally large, leptocephalus larvae should theoretically have long pelagic durations. But there is almost no empirical data on the duration of the leptocephalus stage in tropical eel species. An extended larval phase would imply that long-range dispersal would reduce endemism in eel families, yet about 25% of the congrid and ophichthid eel species in the Hawaiian Islands are endemic. Cardinalfishes (Apogonidae), on the other hand, should have low dispersive capabilities because of their mouth-brooding habits, larger than usual egg sizes, and transformation at a small larval size. The occurrence of the Evermann's cardinalfish (*Apogon evermanni*) in the Atlantic, Indian, and Pacific oceans would therefore not be predicted from assumptions about its early life history. Gobies should also have low dispersive capabilities, according to conventional wisdom. But the 'o'opu naniha (*Stenogobius hawaiiensis*) and 'o'opu nākea (*Awaous guamensis*) have larval durations that are among the longest known for Hawai'i's fishes, between 3–4 months based on empirical data from daily otolith growth-rings (Radtke *et al.*, 1988). Spangule & Cowen (1994) have shown that there is a wide variation in the larval pelagic duration of goby species, of at least 27–161 days when combined with the data of Radtke *et al.* (1988).

Other studies have shown that some fishes stop growing as larvae and delay transformation for long durations while others do not (Victor, 1986a, 1987; Wellington & Victor, 1989; Cowen, 1991; McCormick, 1999). And recent studies have shown that fish larvae exert previously unexpected behavioral control on their dispersal (Leis *et al.*, 1996; Leis & Carson-Ewart, 1997; Stobutzki & Bellwood, 1997, 1998; Stobutzki, 1997, 1998). Even genetic studies contradict predictions based on theoretical expectations from egg or larval attributes. According to theory, damselfish with demersal eggs and small larvae should disperse less than surgeonfish with planktonic eggs and a large, specialized, pelagic larval stage. But in French Polynesia, greater genetic homogeneity among populations from different islands was found in a damselfish, the whitetail dascyllus or humbug (*Dascyllus aruanus*), than in a surgeonfish, the convict tang (*Acanthurus triostegus*) (see Planes, 1993; Planes *et al.*, 1993). Genetic homogeneity presumably results from greater dispersal between islands. Discussions about the dispersive capabilities of various fish species based on general early life history attributes instead of empirical data, including this one, should be viewed skeptically.

It is likely that pelagic stages of fishes continue to disperse sporadically to or from the Hawaiian Islands, connecting with populations elsewhere in the Pacific. If this were not true, the percentage of endemism in Hawai'i's fish fauna would be much greater than it is. There is a wide variation in the morphological divergence of Hawai'i's fishes from their conspecific populations elsewhere but about two-thirds of Hawai'i's fish



species are indistinguishable at the species level from their sister populations elsewhere in the Pacific. It is evident that for this two-thirds, either genetic continuity has been maintained with other Pacific locations or that neither genetic drift nor selective pressures have resulted in morphological divergence of Hawaiian Islands populations. Given the environmental differences between the subtropical Hawaiian Islands and the more tropical islands elsewhere in the Pacific, maintenance of genetic continuity seems the more likely factor. The dispersal of a few larvae to the Hawaiian Islands from elsewhere in the Pacific every 25–100 years might be sufficient to eliminate the genetic distinctiveness of Hawaiian Islands populations if those individuals eventually spawn successfully with resident fishes. Schultz & Cowen (1994) have argued that this is the frequency of larval interchange sufficient to maintain genetic homogeneity of island fish populations with populations at other locations. In the Hawaiian Islands, this hypotheses is congruent with Radtke *et al.*'s (2001) conclusion that populations of endemic 'o'opu alamo'o (*Lentipes concolor*) at different islands are likely self-recruiting despite the absence of genetic differentiation in those populations. The time scales for genetic isolation are thus not the same as those for population recruitment and should not be confused. Rare events of larval dispersal and colonization can result in isolation of islands in ecological time but not evolutionary time (Schultz & Cowen, 1994).

In a discussion of the role of larval duration and dispersal in central Pacific fish evolution, Thresher *et al.* (1989) concluded that “founder speciation” following dispersive colonization was the dominant mode of evolution for endemic Hawaiian Islands species. Founder speciation is the same mode of evolution as peripheral isolation (Lynch, 1989). The dispersal and colonization events that would lead to peripheral isolation would occur at even rarer intervals than those required for the maintenance of genetic continuity (Schultz & Cowen, 1994). It is doubtful that scientific observations could directly detect events of such rare occurrence and probable localized spatial distribution, particularly when those events involve relatively few tiny fish larvae or juveniles. The time scale between these events is probably on the order of millennia or epochs.

The potential importance of these unusual events in the dispersal of Pacific island marine organisms suggests that biogeographic interpretations of present-day ocean current patterns need to be reexamined. Long-term, average descriptions of geostrophic flows (Fig. 9) have been used by the authors who have previously discussed the influence of current patterns on the distributions of Hawai'i's fishes (e.g., Hourigan & Reese, 1987; Randall, 1996a). The major features of this geostrophic flow in the Hawaiian region (Sverdrup *et al.*, 1942; Longhurst, 1998) are summarized as follows. The Hawaiian Archipelago is within a central gyral circulation that is bisected and altered by the Hawaiian Ridge itself. The North Pacific Current (NPC) flows eastward from Japan to the Emperor Seamounts at the northern end of the Hawaiian Ridge (Fig. 9). Meanders and eddies from the NPC create a system of flow southward of the main NPC into the central gyre. This flow system is often called the Kuroshio Extension. Grigg (1981) discussed an eastward-flowing current between ca. 22–25°N, moving from Japan past Wake Island to the Hawaiian Islands, called the subtropical countercurrent (SCC). Grigg (1981) described the SCC as “... a train of anticyclonic eddies about 300–600 km across (mesoscale phenomena), which break off from the Kuroshio and head east at about lat. 20°N ...” This description is congruent with the Kuroshio Extension. A strong westward flowing current just south of Hawai'i Island called the North Equatorial Current (NEC) is the western extension of the California Current off North America, which in turn is the southward-deflected continuation of the NPC. The northern fringe of the NEC is deflected north-westward by the Hawaiian Ridge to form the Hawaiian Ridge current along the islands. Just south of the NEC, but still north of the equator, the narrow Equatorial Countercurrent (ECC) moves eastward. The most important features of this flow pattern for Hawai'i's marine biogeography are the two currents that directly reach the Hawaiian Islands: the NPC/Kuroshio Extension from Japan to the northernmost islands and seamounts, and the NEC from the eastern tropical Pacific to the southernmost main islands.

Numerous refinements of this overall pattern have appeared in the decades since World War II. Wyrтки (1982) pointed out that the NEC is not a uniform current, despite its strong westward flow, but rather spins off large eddies. Using traditional oceanographic methods, Wyrтки *et al.* (1980) and Wyrтки & Kilonsky (1984) added numerous details to the understanding of current strengths, directions, and variability in the equatorial region between the Hawaiian Islands, the Line Islands, and French Polynesia. Johnson *et al.* (1988) used an acoustic current profiler along the same transects to refine these details. Roden (1991) reviewed the oceanography of the subtropical North Pacific, including the region of the Emperor Seamounts influenced by the NPC and Kuroshio Extension. Taft & Kessler (1991) discussed the geostrophic currents over the entire central tropical Pacific using a much larger data set than had been available to Sverdrup *et al.* (1942). And locally, features of the Hawaiian Ridge Current, other topographically associated currents, and large-scale eddies at the Hawaiian Islands were reviewed by Qiu *et al.* (1997) and Polovina (1997).

One discussion of Hawai'i's fish biogeography is noteworthy because it was based on observations of specific events rather than large-scale, averaged current patterns. Randall *et al.* (1985b) supported their hypothesis that the Kuroshio Current is the main path for dispersal of fishes to Hawaiian Islands with obser-

vations of satellite-tracked buoy movements from Japan to the vicinity of the Northwestern Hawaiian Islands (McNally *et al.*, 1983). An examination of the drifter tracks discussed by McNally *et al.* (1983) reveals another intriguing result. Three drifters that were entrained in the eastward-flowing ECC south of the Hawaiian Islands turned northward and were then entrained in the westward-flowing NEC. None of these reached Hawaiian waters but one of these events occurred southeast of Hawai'i Island at ca. 10°N, 148°W. Similar northward components of the ECC were found earlier, farther to the east (Wyrтки, 1965; Wyrтки *et al.* 1980) and have been seen in more recent tracks of ARGOS satellite tracked drifting buoys (The Global Drifter Center, NOAA - <http://www.aoml.noaa.gov/phod/dac/gdc.html>, Jan. 1996– Jan. 1997). If such northward veerings and entrainments accelerate during transient events such as El Niños or more persistent events such as glacial periods, they could enable the recruitment of fishes to the Hawaiian Archipelago from islands to the south. There is now a wealth of information on ocean currents, including transient events, from satellite-tracked buoy deployments and satellite measurements of sea-surface heights and temperatures. Unfortunately, much of this information has yet to be published in summarized forms useful to biogeographers. Better information on current patterns may alter our ideas about dispersal paths for Pacific Island marine species. It is now possible to evaluate the effect of current patterns on Pacific-island fish distributions using real data on pelagic larval-durations and current patterns at scales appropriate for larval dispersal (e.g., Polovina *et al.*, 1999).

*What is the evidence from general distribution patterns for the origins of Hawai'i's fish fauna?*

An analysis of the biogeographic categories of which Hawai'i's fishes are components supports multiple origins for the fish fauna of the archipelago. These categories were discussed in the previous section subtitled "How does the distribution of the Hawaiian fish fauna relate to the general distribution of fishes?" (see pages 66–75). Species with circumglobal ranges, most Indo-Pacific species, and endemic Pacific species with broad distributions are presently uninformative about their origins because of their wide distributions. The remaining Hawaiian Archipelago fish species with more restricted distributions are those that suggest multiple origins for Hawai'i's fish fauna. Hawai'i's fishes have come from the northwest, north, east, southeast, and southwest.

There are 58 species that have ranges restricted to portions of the central western Pacific or the northern transition zone of the central North Pacific gyre and the Hawaiian Islands. These support the hypothesis that the northern boundary current moving from the Kuroshio Current off Japan and the Ogasawara Islands toward the Hawaiian Archipelago is a major biogeographic pathway for Hawai'i's fishes (Randall *et al.*, 1985b; Hourigan & Reese, 1987).

Other distributions support connections in different directions. The 22 species known only from the Hawaiian Islands and the eastern tropical Pacific corroborate an existing biogeographic connection from the eastern Pacific to the islands. Nine subarctic Pacific fish species that occur in the northern part of the archipelago demonstrate a connection to that northern area of endemism. Twenty-five species of fishes found only in the Hawaiian Archipelago and areas to the southeast indicate that there is a biogeographic connection between the archipelago and the South Pacific. This last connection has been dismissed as improbable in some discussions of Hawai'i's fish biogeography based upon evidence from long-term averaged, present-day ocean-current patterns. The Hawaiian Island to South Pacific biogeographic connection is best illustrated by the 18 species known only from the Hawaiian Islands and French Polynesia, Easter Island, or the Sala y Gomez/Nazca ridges. Five Pacific Plate endemic species, a snake eel (*Apterichtus flavicaudus*), a scaleless black dragonfish (*Eustomias bimargaritoides*), a soldierfish (*Ostichthys sandix*), the Deetsie's cardinalfish (*Apogon deetsie*), and the Whitley's boxfish (*Ostracion whitleyi*), are known only from the Hawaiian and French Polynesian Islands. Species found across two tectonic plates are the Capricorn lizardfish (*Synodus capricornis*), two dories (*Cyttomimus stelgis* and *Stethopristis eos*), a goby (*Kelloggella oligolepis*), and a lefteye flounder (*Engyprosonon arenicola*).

The hypothesis that tectonic-plate boundaries (Fig. 8) are also biogeographic boundaries for Pacific fish species (Springer, 1982) is corroborated in the Hawaiian Islands fauna only by 32 species that are restricted to the Pacific Plate without being restricted only to Hawaiian waters. A slightly greater number of species that occur across the margins of plates adjacent to the Pacific Plate suggest that Pacific fish distributions are constrained by factors that cross plate margins. Springer (1982) was unable to find a proximate mechanism to explain his associations of fish distributions with tectonic plate boundaries. The most likely proximate mechanism is the influence of ocean currents on dispersal. Much of the congruence of biogeographic pattern with tectonic morphology is aliased by the congruence of tectonic plate-boundaries with major oceanographic currents and the distances between island groups. It has long been recognized that oceanographic currents, modified by the interaction of fronts, temperatures, productivity patterns, and other oceanographic factors, are the dominant influence on the distributions of marine organisms (Sverdrup *et al.*, 1942; Veron, 1995; Longhurst, 1998). The major currents in the Pacific Ocean cross the boundaries of the basin's tectonic plates and the distributions of Pacific fishes match prevailing current patterns better than they match tectonic plate boundaries. Springer

(1982) concluded that “physicochemical parameters” of oceanographic circulation do not explain shore fish distributions. Tests of this conclusion are found in those regions where the plate boundaries do not conform to major oceanographic features, including the margins of the Philippine/Pacific plates and the Nasca/Pacific plates. In these areas, fish distributions are generally not constrained by plate boundaries but do match oceanographic patterns. Springer (1982) made numerous exceptions to account for the distributions of many species across these plate boundaries. Oceanography-based biogeographic hypotheses such as the vortex model of coral reef biogeography (Jokiel & Martinelli, 1992), the hydrotectonic model (White, 1994), and the surface circulation vicariance model (Veron, 1995) provide better explanations of Pacific fish biogeographic patterns than a plate-tectonics model (Springer, 1982).

Some of the strongest evidence for dispersal paths of marine organisms to the Hawaiian Islands comes from the occurrence of waifs (Table 6). The absence of reproducing populations of these species in the Hawaiian Archipelago demonstrates that their ephemeral appearances here are the direct result of dispersal. There are acknowledged difficulties in clearly being able to distinguish species that are waifs from those that are merely rare or difficult to observe (Randall, 1998c), as well as in distinguishing naturally occurring waifs from anthropogenic introductions. But there are several species recorded ephemerally from the Hawaiian Islands that are in taxa or that live in habitats that are so well sampled that it is probable that specimens collected in the Hawaiian Islands were truly waifs. Species considered to be waifs are those not usually transported by people, making it unlikely that the specimens collected in the Hawaiian Islands were introductions. Aquarium species are thus excluded from this discussion, including the lemonpeel angelfish (*Centropyge flavissimus*), the regal angelfish (*Pygoplites diacanthus*), and anemonefish (*Amphiprion* species), that have recently been seen by divers in Honolulu’s coastal waters. Early records of some nonindigenous species (e.g., the sargassumfish *Histrio histrio*, the Pacific double-saddle butterflyfish *Chaetodon ulietensis*, or the peacock grouper (*Cephalopholis argus*) have often been discounted as false. Recent well-corroborated records of waifs suggest that it might be worth reexamining these early records as also being of valid but ephemeral occurrences.

Of the waif species recorded from the Hawaiian Islands, five are clearly eastern Pacific in origin, four clearly originated from the northwestern Pacific near Japan or the Ogasawara Islands, two could have come from either the eastern or the western Pacific and eleven could have originated from a variety of points in the Pacific, one remarkable species of which must have come from the far South Pacific. The last example clearly suggests a dispersal mechanism across the ECC and NEC to the Hawaiian Islands.

The five eastern Pacific endemic species are the California headlightfish (*Diaphus theta*), the Diogenes lanternfish (*Diogenichthys laternatus*), the bluestriped chub (*Sectator ocyurus*), the green jack (*Caranx cabal-lus*), and the black skipjack (*Euthynnus lineatus*). *Sectator* has been recorded from the Hawaiian Islands, French Polynesia, and Japan, but clearly is an eastern Pacific species that is capable, rarely, of dispersing widely across the Pacific. It is not known to have reproducing populations outside of the eastern Pacific. *Diaphus* species are notoriously difficult to identify, so the status of *D. theta* as a waif is uncertain. In contrast, *Diogenichthys later-natus* is a distinctive species with a clearly delimited range, leaving no doubt that its occurrence in the Hawaiian Islands was as a waif. It would be instructive to learn more about the oceanographic conditions during the years when eastern Pacific waifs have been recorded from the Hawaiian Islands. This could elucidate mechanisms of colonization from the eastern Pacific.

The four species of northwestern Pacific origin are the sargassumfish (*Histrio histrio*), the Indo-Pacific sergeant (*Abudefduf vaigiensis*), a sea chub (*Girella leonina*), and the golden spadefish (*Platax boersii*). The Japanese angelfish (*Centropyge interruptus*) is not included as a waif because reproducing populations have been found at Midway. The *Girella* and *Platax* were found at Midway Atoll and have not been seen at points south, suggesting a northern origin. The source nearest to Midway that is within the ranges of the species is Japan. The *Histrio* and *Abudefduf* were found in association with nets or net debris at the northern end of the Hawaiian 200-nmi EEZ at the same time that they first appeared in the Hawaiian Archipelago. Even though they have now been found throughout most of the archipelago, this early evidence indicates that they arrived here in association with flotsam of the Kuroshio extension. These cases demonstrate the existence of a dispersal pathway for colonization of the Hawaiian Islands by fishes via the NPC/Kuroshio extension as suggested by Randall *et al.* (1985b).

The two species that could have either eastern or western Pacific origins are the tripletail (*Lobotes surina-mensis*) and the yellowtail (*Seriola lalandi*). *Lobotes* was recorded from the main Hawaiian Islands by Gosline & Brock (1960), who suggested that the species may have come from the eastern Pacific. Springer (1982) later suggested that a more likely dispersal pathway was the NPC or Kuroshio extension. The origin of *Lobotes* in Hawaiian waters may never be known with certainty. In contrast, *S. lalandi* probably arrived here from both areas. Specimens taken at the northern end of the archipelago dispersed in the Kuroshio extension, as corroborated by their presence in driftnet catches in that current during the 1980s (M.P. Seki, pers. comm., 1990). *Seriola lalandi* taken at the southern end of the archipelago in 1998 appeared at the same time as the green jack

(*Caranx caballus*), which unquestionably came to the Hawaiian Islands from the eastern Pacific.

The dispersal pathways for the remaining eleven waif species are more difficult to determine, but circumstantial evidence suggests that at least some of their origins were to the south. The Pacific double-saddle butterflyfish (*Chaetodon ulietensis*), the emperor angelfish (*Pomacanthus imperator*), the dusky wrasse (*Halichoeres marginatus*), the striped surgeonfish (*Acanthurus lineatus*), the yellow boxfish (*Ostracion cubicus*), and the striped puffer (*Arothron manilensis*) occur in the Pacific from at least Indonesia to Japan and French Polynesia, making their origins in the Hawaiian Islands as waifs plausible from either the Kuroshio Extension or a southern dispersal route. Their collection at Hawai'i Island and O'ahu suggests that a northwestern source may be unlikely but the greater chance that waifs will be detected in the main islands versus the northwestern islands makes this very speculative. The blackfin barracuda (*Sphyrna genie*) may belong in this group although the occurrence of this barracuda off Central America also makes dispersal from the eastern Pacific a possibility. In contrast, the multicolor angelfish (*Centropyge multicolor*) almost certainly arrived at Hawai'i Island by way of Johnston Atoll. This species is otherwise known only from the central Pacific between Micronesia, Fiji, the Cook Islands, and French Polynesia. *Centropyge multicolor* thus could not have dispersed in the Kuroshio Extension but must have arrived at Johnston from the west or south. Likewise, the spotted toby (*Canthigaster solandri*) is unknown from Japan but is found from Indonesia and the Philippines eastward to the Line Islands and French Polynesia. A westward or southward origin for the *C. solandri* collected at O'ahu is thus also indicated.

The most remarkable waifs were two butterfly mackerel (*Gasterochisma melampus*) taken north of the Hawaiian Islands and a bluefin gurnard (*Chelidonichthys kumu*) taken at Hawai'i Island. The identifications of the Hawaiian Islands specimens have been verified by experts in their taxonomy. These species are otherwise known only from the Southern Hemisphere. The *Gasterochisma* may have dispersed as pelagic adults across the equator to the central North Pacific. The exact pathway will never be known, but it is likely that the fish traveled in cold, deep water between the hemispheres. With the exception of the Hawai'i record, *Chelidonichthys kumu* occurs only in the Southern Hemisphere from South Africa to Australia, New Zealand, and perhaps South America. Records from off China, Japan, and Korea are based on misidentifications of a similar species. If the Hawai'i record is valid, this was a case of dispersal from the south even more remarkable than the case of the *Gasterochisma*. *Chelidonichthys* is a demersal fish that could not have traveled northward in cold water as an adult; this case is a true mystery.

Less is known about waifs at Johnston Atoll than in the Hawaiian Islands but there is general agreement about the dispersal pathways to the Atoll. Kosaki *et al.* (1991) noted that the multicolor angelfish (*Centropyge multicolor*) should probably be considered a waif from the south at both Johnston Atoll and the Hawaiian Islands. They considered Nahacky's pygmy angelfish (*C. nahackyi*) to be a Johnston Atoll endemic that has been recorded from Hawai'i Island as a waif. Conversely, the following Hawaiian Island endemic species were considered to be waifs with nonreproducing expatriate populations at Johnston Atoll: the Hawaiian sergeant (*Abudefduf abdominalis*), the Hawaiian bigeye (*Priacanthus meeki*), the flame wrasse (*Cirrhitilabrus jordani*), the Hawaiian longfin anthias (*Pseudanthias hawaiiensis*) (see Kosaki *et al.*, 1991), the milletseed butterflyfish (*Chaetodon miliaris*), the Potter's angelfish (*Centropyge potteri*), and the fantail filefish (*Pervagor spilosoma*) (see Randall *et al.*, 1985b). The evidence from waifs thus indicates bidirectional dispersal between Johnston Atoll and the Hawaiian Islands with the dominant present-day direction being from the Hawaiian Islands to Johnston Atoll (Gosline, 1955; Grigg, 1981; Randall *et al.*, 1985b; Kosaki *et al.*, 1991).

As with the information from present-day current patterns and the general ranges of resident Hawaiian Islands fish species, records of waifs in the region suggest multiple dispersal pathways for fishes to the Hawaiian Islands. Dispersal along the NPC or Kuroshio Extension is certainly a strong mechanism but dispersal from the eastern Pacific also occurs, and there is evidence for dispersal from island groups to the southwest or south by a mechanism that is not adequately understood at present.

#### *What is the evidence from analyses of phylogenetic relationships for the origins of Hawai'i's fish fauna?*

The analysis of phylogenetic relationships can be a powerful tool for determining the patterns of vicariance that created biogeographic distributions (Wiley, 1988). Unfortunately, many of the Hawaiian Archipelago fish species included in phylogenetic studies to date have circumglobal distributions, and little more can be said of these than that their occurrence in the Hawaiian Islands is part of their worldwide dispersal. Few phylogenetic analyses have included endemic Hawaiian Archipelago fish species in well-resolved cladograms. The phylogenetic analyses of Hawai'i's fishes can, for now, only suggest hypotheses about biogeographic connections in the "weak" sense of Wiley (1988). The majority of Hawai'i's fish species in these analyses are most closely related to widespread Indo-Pacific taxa, but there is also evidence for strong evolutionary connections of

Hawai'i's fishes to faunas of the eastern tropical Pacific, Caribbean Sea, and Atlantic Ocean.

Several systematists have found only unresolved polychotomies for the relationships of fish species that occur in the region, including the pearlfishes *Onuxodon fowleri*, *O. parvibrachium*, and *Encheliophis gracilis* (see Markle & Olney, 1990), the codling *Laemonema rhodochir* (see Melendez & Markle, 1997), the frogfishes *Antennarius commerson*, *A. nummifer*, and *A. pictus* (see Pietsch & Grobecker, 1987), the butterflyfishes *Chaetodon citrinellus*, *C. quadrimaculatus*, and *C. miliaris* (see Blum, 1988), the blennies *Cirripectes quagga*, *C. vanderbilti*, *C. variolosus*, and *Enchelyurus brunneolus* (see Williams, 1988, and Springer, 1982), and the unicornfishes *Naso annulatus*, *N. brevirostris*, *N. caesioides*, and *N. hexacanthus* (see Borden, 1998). No conclusions can be drawn from these until their relationships are better resolved. Little information can be gained about the biogeographic origins of widely distributed Hawaiian Archipelago species that have other circumglobal taxa as their sister groups, including the lamniform sharks (Compagno, 1990), hatchetfish species in the genus *Argyropelecus* (Harold, 1993), most lampridiforms (Olney *et al.*, 1993), and the bigeyes *Heteropriacanthus cruentatus* and *Cookeolus japonicus* (see Starnes, 1988). Somewhat more information has been obtained in an analysis of the vicariant biogeography of pelagic Pacific Ocean taxa (White, 1994) for circumglobal species of scaly dragonfishes (*Stomias*; see Fink & Fink, 1986), the pearleyes (Scopelarchidae; see Johnson, 1984), and the sabertooth fishes (Evermannellidae; see Johnson, 1984). Widely distributed bristlemouth species in the genus *Cyclothone* are also informative when examined in the light of an approximate chronology of speciation inferred from the genetic analysis of Miya & Nishida (1996) and the biogeographic analysis of White (1994). The biogeography of *Cyclothone* will be discussed in detail later.

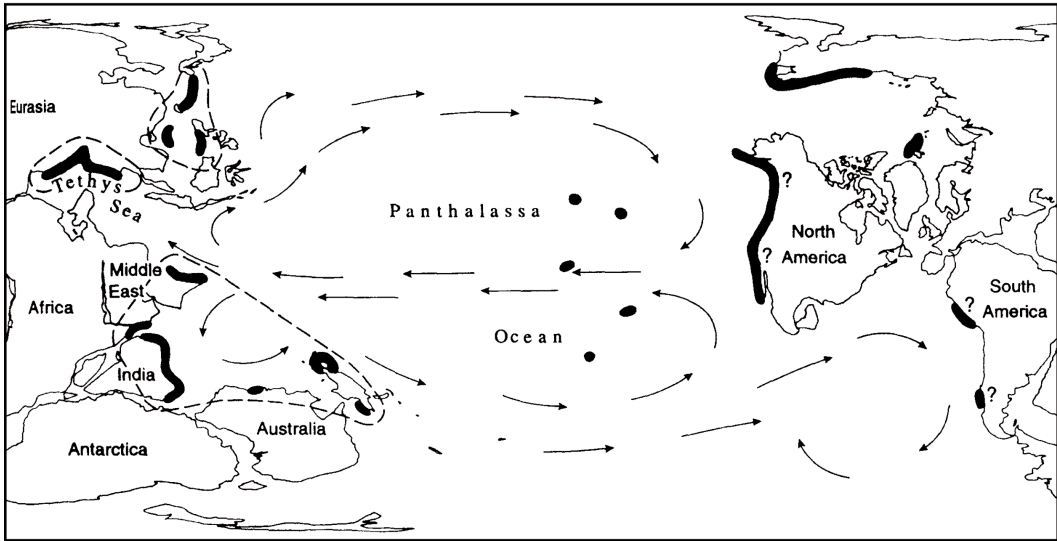
Some phylogenetic studies suggest a pattern of wide dispersal of species found in the Hawaiian Islands after vicariant speciation within the Indo-Pacific fauna. Widespread Hawaiian Archipelago fish species that have Indo-Pacific taxa as their sister groups include: a velifer, *Metavelifer multiradiatus* (see Olney *et al.*, 1993); a pearlfish, *Snyderidia canina* (see Markle & Olney, 1990); a codling, *Laemonema robustum* (see Melendez & Markle, 1997); the striated frogfish, *Antennarius striatus* (see Pietsch & Grobecker, 1987); the butterflyfishes *Forcipiger longirostris*, *F. flavissimus*, *Heniochus diphreutes*, *Chaetodon auriga*, *C. lineolatus*, *C. trifascialis*, and *C. ornaticornis* (see Blum, 1988); the wrasses *Oxycheilinus bimaculatus*, *Wetmorella albofasciata* (see Westneat, 1993); the bullethead rockskipper, *Blenniella gibbifrons* (see Springer & Williams, 1994); the barred blenny, *Cirripectes polyzona* (see Williams, 1988); the unicornfishes *Naso lituratus* and *N. unicornis* (see Borden, 1998); and the boxfishes *Lactoria diaphana* and *L. fornasini* (see Klassen, 1995). These indicate that there were speciation events within this broad biogeographic area whose histories have been obscured by the subsequent widespread dispersal and intermingling of sister taxa that created the present-day, diverse Indo-Pacific fish fauna. The same may be said of Pacific basin species that have wide-spread Indo-Pacific sister taxa, such as: the Pacific pearlfish, *Encheliophis dubius* (see Markle & Olney, 1990); a frogfish, *Antennarius dussumieri* (see Pietsch & Grobecker, 1987); the reticulated butterflyfish, *Chaetodon reticulatus*; the Hawaiian brown-banded butterflyfish, *Roa excelsa* (see Blum, 1988); the ringtail wrasse, *Oxycheilinus unifasciatus* (see Westneat, 1993); the spotted unicornfish, *Naso maculatus* (see Borden, 1998); and the Whitley's boxfish, *Ostracion whitleyi* (see Klassen, 1995).

Other species apparently evolved when the Indian and Pacific oceans were isolated from each other during low sea level stands, dispersed only within those basins, and remained separated by the barriers between those oceans (Springer & Williams, 1994). These species include Pacific fishes with Indian Ocean sister-species that together form Indo-Pacific clades, such as the butterflyfishes *Hemitaurichthys polylepis*, *Chaetodon ephippium*, *C. lunula*, *C. lunulatus*, and *C. unimaculatus* (see Blum, 1988; Allen *et al.*, 1998; Randall, 1998c).

A few phylogenetic hypotheses indicate the fragmentation of Pacific Ocean taxa by speciation without subsequent widespread dispersal. Examples of these are found in Hawai'i's species that have sister species with small ranges in the southwestern Pacific Ocean, such as the pebbled butterflyfish *Chaetodon multicinctus*, the Tinker's butterflyfish *C. tinkeri* (see Blum, 1988; McMillan & Palumbi, 1995; Allen *et al.*, 1998), the gargantuan blenny *Cirripectes obscurus*, and the red-speckled blenny *C. variolosus* (see Williams, 1988).

The phylogenetic relationships of three species indicate that some Pacific fishes evolved by the fragmentation of a biogeographic track that extended from the southeastern Pacific to the Hawaiian Islands. The butterflyfishes *Chaetodon kleini*, *C. tinkeri*, and *Hemitaurichthys thompsoni* have sister species in French Polynesia or on the Nazca Plate (Blum, 1988; Allen *et al.*, 1998). This is the same neglected biogeographic pattern demonstrated by the extant distributions of the dory *Stethopristis eos* and the goby *Kelloggella oligolepis*. The combination of the extant distributions and phylogenetic patterns indicates that a small component of the Hawaiian Archipelago fish fauna has its origins in a southeastern to central Pacific connection.

Only one endemic Hawaiian Islands fish species, the Hawaiian beaked sandfish (*Gonorynchus moseleyi*), has been identified as having a northwestern Pacific endemic sister species (*G. abbreviatus*, restricted to waters around the Japanese Archipelago; Grande, 1999). It is puzzling that more examples of this northwestern Pacific/Hawaiian Islands dispersal track have not appeared in phylogenetic analyses, considering that this has



**Figure 10.** Hypothetical ocean currents, ocean basin morphologies, and continental relationships in the late Triassic, prior to 210 ma (from Veron, 1995, who gives the primary source citations for this reconstruction). The darkly shaded areas are regions with coral reefs and the dashed lines enclose principal coral provinces. Principal features of note are the single, large ocean basin ("Panthalassia") and two hemispherical, gyral currents. The Tethys Sea began to open but the Atlantic Ocean was not formed. None of the extant Hawaiian Islands or Emperor Seamounts existed at this time.

been the biogeographic pathway most often discussed for the origins of Hawai'i's fauna in recent literature (Hourigan & Reese, 1987; Randall, 1996a). The paucity of phylogenetic relationships of Hawaiian Archipelago endemics to western North Pacific taxa, when compared to the extant distributions of fishes and contemporary current patterns, suggests that this connection is relatively recent.

Phylogenetic analyses have identified several endemic Hawaiian Archipelago fishes that are the sister species of widespread Indo-Pacific forms. Examples are: a hatchetfish, *Polyipnus nuttingi* (see Harold, 1994); zebra blenny, *Istiblennius zebra* (see Springer & Williams, 1994); the scarface blenny, *Cirripectes vanderbilti* (see Williams, 1988); the Ewa fangblenny, *Plagiotremus ewaensis*; Gosline's fangblenny, *P. goslinei* (see Smith-Vaniz, 1976); the noble goby, *Priolepis eugenius* (see Winterbottom & Burrige, 1989); and the farcimen goby, *P. farcimen* (see Winterbottom & Burrige, 1993a). These species clearly evolved by peripheral isolation from their ancestral Indo-Pacific populations.

Phylogenetic analyses also identify central Pacific or Indo-Pacific sister species for a few fish species that occur in the Hawaiian Islands at the southern extremes of their ranges in the subarctic or transition zone regions of the North Pacific. Examples are: a hatchetfish, *Polyipnus matsubari* (Harold, 1994); a scaly dragonfish, *Stomias pacificus* (Fink & Fink, 1986); a pearleye, *Scopelarchus stephensi* (Johnson, 1984); and the whiptail ribbonfish, *Desmodema lorum* (Rosenblatt & Butler, 1977; Olney *et al.*, 1993). These evolved when the subarctic and northern transition zone Pacific biotas became isolated from the rest of the Pacific.

Likewise, fish species unique to the Antarctic and transition zone of the Southern Ocean evolved when the central Pacific was isolated from the circum-Antarctic circulation, but none of these species occurs in Hawaiian waters. Instead, these evolutionary events contributed to the Hawaiian Islands a few widespread species which have Southern Ocean sister species. Examples are a pearleye, *Benthalbella infans* (see Johnson, 1984); a pearl-fish, *Pyramodon ventralis* (see Markle & Olney, 1990); and a pelagic cod, *Melanonus zugmayeri* (see Howes, 1993).

The most unexpected result from phylogenetic studies of Hawai'i's fishes is the evidence for a connection to the eastern tropical Pacific, Caribbean Sea, and Atlantic Ocean. This biogeographic pattern clearly indicates that some Hawaiian Archipelago species originated from the remnant fauna of the Tethys Sea, before the connection between the Atlantic and Pacific oceans was eliminated by the formation of the Panama Isthmus ca. 3.1–3.5 ma. Hawai'i's fish species having phylogenetic relationships with eastern Pacific species include the reticulated frogfish, *Antennatus tuberosus* (see Pietsch & Grobecker, 1987); the 'alalaua, *Priacanthus alalaua* (see Starnes, 1988); and a wrasse, *Polylepion russelli* (see Gomon, 1997). Hawai'i's fish species having close relationships to Caribbean Sea and Atlantic Ocean species include: the pincushion star pearlfish,

*Carapus mourlani* (see Markle & Olney, 1990); the goosefishes *Lophiodes bruchius* and *L. miacanthus* (see Caruso, 1981), Randall's frogfish, *Antennarius randalli* (see Pietsch & Grobecker, 1987); and the Hawaiian bigeye, *Priacanthus meeki* (see Starnes, 1988). The Hawaiian grouper, *Epinephelus quernus*, is an endemic species that has sister taxa in the eastern Pacific and Atlantic oceans (Randall & Heemstra, 1991, 1993). There is even phylogenetic evidence of a Tethyan connection for the Hawaiian Archipelago fish fauna from a mitochondrial DNA study of populations within a single bristlemouth species (*Cyclothone alba*). In *C. alba*, central North Pacific individuals were found to be most closely related genetically to western North Atlantic individuals instead of to individuals from elsewhere in the Pacific Ocean (Miya & Nishida, 1997). These species provide strong evidence for an eastern to central Pacific origin for some of Hawai'i's fish species. This origin is supported by the distributions of the few Hawaiian Islands species such as finescale triggerfish (*Balistes polylepis*) that occur only in the Hawaiian Islands and eastern Pacific, along with the occasional recruitment to the islands of eastern Pacific species such as the bluestriped chub (*Sectator ocyurus*). This connection has apparently persisted for a long time.

### **What was the temporal context for the evolution of Hawai'i's fish fauna in the geologic and oceanographic development of the Pacific Ocean?**

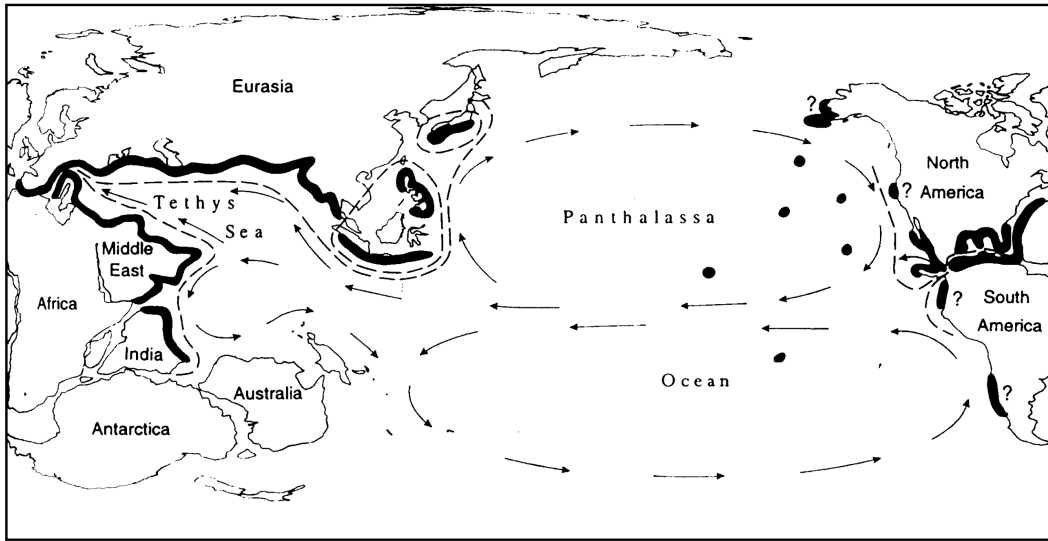
In the discussion that follows, the geological and oceanographic chronology has been taken primarily from Kennett (1982), Springer (1982), Kay (1984), Grigg (1988, 1997), Clague & Dalrymple (1989), Walker (1990), Patterson (1993), White (1994), Carson & Clague (1995), and Veron (1995). These sources will not be cited for individual events. The following temporal context for major events in the origin of Hawai'i's fish fauna was synthesized from the geological and oceanographic history of the Pacific basin, the phylogenetic relationships of Hawai'i's fish species, the extant distributions of Hawai'i's fish species, and the discussions of Hawai'i's marine biota's origins proposed by previous authors. The evolution of the bristlemouth genus *Cyclothone* (Miya & Nishida, 1997) is given as an example of how vicariant events in this temporal context created species of widespread pelagic fishes found in Hawaiian waters.

#### *What events in deep geologic time set the stage for the origins of the Pacific Ocean, the Hawaiian Archipelago, and the evolution of their fish fauna?*

There is good justification for beginning the history of Hawai'i's fish fauna in the Mesozoic (250–67 ma), even though the Hawaiian Islands and extant families of fishes probably did not exist until the end of that era. Before the Mesozoic, tectonic activity had rearranged the continents into a single mass, Pangea, which in turn created a single world ocean, Panthalassa, within which the present-day Pacific developed (Fig. 10). Mass extinctions at the Permian/Mesozoic boundary altered the earth's terrestrial and marine biotas to an extent not seen since, setting the stage for the origins of the earth's modern biota. It is likely that the deep ocean was anoxic with weak vertical circulation and no formation of cold, oxygenated deep-sea water. As a result the Mesozoic deep-sea fauna may have been nonexistent or at least adapted to warm water relative to the extant fauna. Neither the Hawaiian Archipelago nor the Pacific tectonic plate existed in the early Triassic (250–210 ma), the beginning of the Mesozoic. Both developed within Panthalassa. The basin and biota of the Pacific Ocean are the oldest on Earth, formed long before the Atlantic, Indian, and Antarctic oceans appeared. The basic ocean-circulation pattern of two hemispheric, cyclonic gyres probably existed in this basin long before the development of the Hawaiian Archipelago (Fig. 10). These gyres are the most ancient oceanographic features still present on the planet. For these reasons, the ancestral marine biota of the Hawaiian Islands may well predate the formation of the archipelago.

In the Triassic, the global climate was generally warm without circumglobal polar currents to cool the oceans. The marine biota probably had little provincialism, although it seems likely that distinct coastal biotas existed on either side of Panthalassa at the eastern and western sides of Pangea. Neopterygian fishes ("modern bony fishes") and scleractinian corals first became diverse in the fossil record during this time. At the Triassic/Jurassic boundary (210 ma) mass extinctions occurred that again reduced marine biodiversity to the levels of the Permian/Triassic boundary. All Triassic scleractinian genera became extinct and reef development halted for ca. 4–10 million years. The global climate remained stable with little latitudinal or seasonal variation and the deep ocean remained warm with low oxygen content.

The first significant event in the origins of the Hawaiian Archipelago occurred in the Jurassic (ca. 190 ma) when tectonic spreading in the middle of Panthalassa created the Pacific tectonic plate at the junction of the Kula, Farallon, and Phoenix plates. The Hawaiian hot-spot may have originated at this time but if this is true all evidence of the event was destroyed by subduction. Another significant development was the splitting at ca. 180 ma of the eastern margin of Pangea into the precursors of Laurasia and Gondwanaland (Fig. 11).



**Figure 11.** Hypothetical ocean currents, ocean basin morphologies, and continental relationships in the late Jurassic, prior to 140 ma (from Veron, 1995, who gives the primary source citations for this reconstruction). The darkly shaded areas are regions with coral reefs and the dashed lines enclose principal coral provinces. Principal features of note are the widening Tethys Sea, and the splitting apart of North America and Eurasia with the formation of the proto-North Atlantic Ocean. The Panthalassian circulation continued to persist as two hemispherical gyral currents, but the Tethyan circulation to the west became more complex. None of the extant Hawaiian Islands or Emperor Seamounts existed at this time but the Pacific tectonic plate first formed at ca. 190 ma.

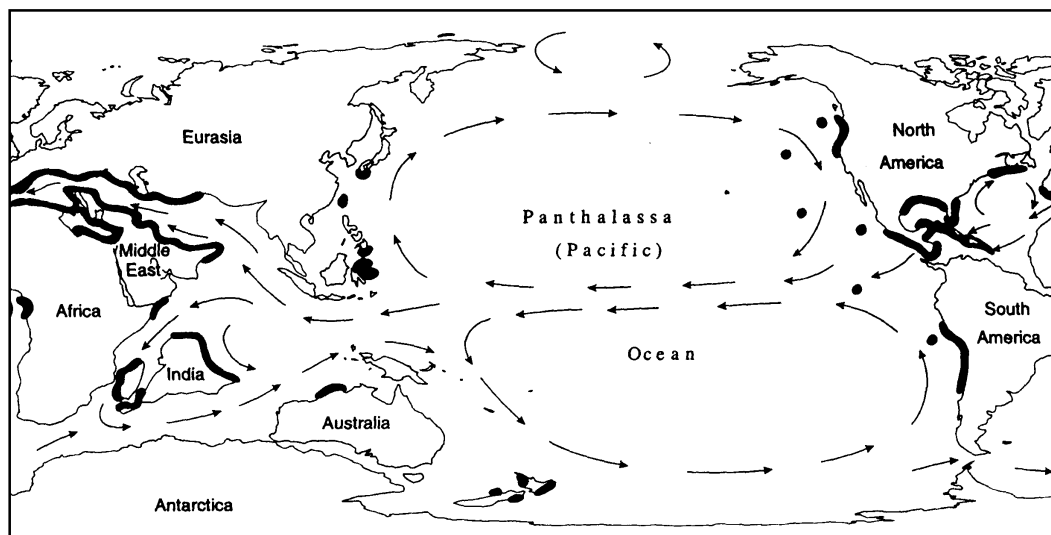
This created the Tethys Sea at the western side of Panthalassia and provincialism in the region's marine biota. At ca. 165 ma North America began to rift from North Africa to create the proto-Atlantic Ocean, which also became a distinct biogeographic province. But both the proto-Atlantic and Tethyan centers of diversity were isolated from central and eastern Panthalassia by a vast expanse of open ocean. It is thus likely that the biota of the incipient Hawaiian region was oceanic in the Jurassic.

Increased volcanic activity at the Jurassic/Cretaceous boundary (ca. 140 ma) created the first of the numerous islands in the incipient Pacific Ocean. Elevated  $\text{CO}_2$  levels from volcanic activity contributed to the generally warm global climate. Tropical and subtropical conditions extended to ca.  $45^\circ\text{N}$  and S and even the polar regions were probably temperate. Sea surface temperatures were ca.  $10\text{--}15^\circ\text{C}$  warmer than at present, sea levels were high, and only 18% of the earth's surface was emergent. Many marine environments were subject to anoxia during the Cretaceous due to the warm, high- $\text{CO}_2$  climate and high biotic productivity. Shallow seas covered much of the continents which, along with the progressive fragmentation of Panagea, created extensive opportunities for vicariant speciation. The proto-Pacific had developed within Panthalassia (Fig. 12). Its central ocean gyres were larger than ever but current speeds were weak, which may have enhanced biotic provincialism through reduced dispersal. The first fossil record of extant fish orders dates to about this time.

In the mid- to late Cretaceous (ca. 105–80 ma), mid-Pacific volcanism increased to create the first islands of the Marshall, Gilbert, Caroline, and Line archipelagos. The Pacific Plate was smaller than at present and these early islands may have been close to one another, enhancing inter-archipelago dispersal of marine organisms despite the reduced ocean-current strengths of this period. At about this time, shifting continental positions altered climate patterns to initiate global cooling. By ca. 90 ma, sea levels were lower than before, which may have increased vicariant speciation by isolation of continental basins but also may have enhanced inter-island dispersal as more island shoreline became emergent, increasing connectivity. In addition to these general events, specific developments in the late Cretaceous were of tremendous importance to the development of the Hawaiian Islands. The oldest ocean crust upon which part of the Hawaiian Ridge exists was created at 90–80 ma. Johnston Atoll was created at about 85 ma, although far from its present position. The Necker Ridge upon which Necker Island would eventually arise was formed in the South Pacific at ca. 77.8–77.4 ma. This ridge was later incorporated into the Hawaiian Chain by plate movement.

Ocean circulation in the late Cretaceous was primarily latitudinal along the margins of the continents (Fig. 12). Meridional flow that could have influenced dispersal of non-pelagic marine species to the central ocean basins was weak. The deep sea likely remained a low-oxygen habitat as were many shallow epicontinental seas.





**Figure 12.** Hypothetical ocean currents, ocean basin morphologies, and continental relationships in the late Cretaceous, prior to 67 ma (from Veron, 1995, who gives the primary source citations for this reconstruction). The darkly shaded areas are regions with coral reefs. Veron (1995) noted that there was much less emergent continental land in the Cretaceous than is shown in this figure (shallow seas covered much of the continents), and that the direction of circumglobal Tethyan circulation is disputed. Principal features of note are the precursor of a Subarctic North Pacific gyre, the Tethyan circulation between Eurasia and Africa as well as between North and South America, the formation of the Atlantic Ocean, the movement of the Indian subcontinent, and the early precursors to a circum-Antarctic circulation in the far south. Many Pacific Ocean islands were formed by the end of the Cretaceous, including those that later became the oldest Emperor Seamounts, Johnston Island, the Necker Ridge.

The modern cold-water deep-sea circulation did not exist but ocean salinity first began to increase and deep-sea temperatures first began to decline in the late Cretaceous, possibly as a result of the appearance of a limited southern-Ocean current between Antarctica and South America/Africa as those continents began to separate. These developments were reflected in the appearance of cold-adapted, deep-sea radiolarian species in the fossil record of this time. Fragmentation of the marine biota among progressively smaller ocean basins continued.

A late-Cretaceous event of great biogeographic significance was the complete opening of the Tethys Sea, connecting the proto-Indian, Atlantic, and Pacific basins and creating a circumtropical ocean circulation (Fig. 12). This linked the central proto-Pacific to currents coming from the east, although biotic dispersal was probably inhibited by anoxic conditions along the eastern margins of the basin. The precursors of oceanographic currents in the widening Indian and Atlantic basins developed at this time as well.

Another highly significant late-Cretaceous event was the development of the precursor to the Pacific subarctic gyre, north of 45°N and distinct from the single, large central North Panthalassian gyre that had existed before (Fig. 12). This may have led to the first major oceanic vicariant event of the Pacific basin, suggesting an ancient origin for the unique fish fauna of the subarctic Pacific. Certainly, such an ancient origin would help explain the distinctiveness of the subarctic Pacific ichthyofauna at the subordinal level, including its dominance by such groups as the Zoarcoidei, Cottoidei, and Hexagrammoidei which are not major components of the fish fauna of most of the globe. This development marks the early origin of that component of Hawai'i's fauna which is found at seamounts at the northwestern part of the region.

The oldest existing feature of the Hawaiian/Emperor Seamount Chain, Meiji Seamount, was formed on the Hawaiian hot-spot at the end of the Mesozoic (ca. 75–68 ma). There is controversy as to whether the hot-spot was at the same latitudinal position as today but it may have been as much as 7° north of its present location when the first Emperor Seamounts were formed as islands. In any case, the palaeo-equator was at that time also likely farther to the north than it is now by 10–16°, keeping the newly forming Hawaiian Islands in subtropical water of mean temperature >22 °C where calcareous reefs could have formed. Late Cretaceous fossils exist from elsewhere on the globe of modern fish groups, including the Polymixiidae, Trachichthyoidei, and Holocentroidei, with weaker evidence for the existence of Zeiformes, Gasterosteiformes, Tetradontiformes, and perhaps Perciformes. Some of these gave rise to modern reef fish taxa. The Hawaiian Archipelago thus existed during the early evolution of extant fish orders and some suborders that are now found in the region. Of greater significance, the archipelago existed before the evolution of almost all fish families and certainly all of the fish genera now extant.

*How did dispersal and “surface circulation vicariance” or “hydrotectonics” direct the history of the evolution of Hawai‘i’s fish fauna?*

Mass extinctions of terrestrial and shallow-water marine organisms at the Cretaceous/Tertiary (K/T) boundary (ca. 67 ma) reset the evolution of the earth’s biota once again. Because the first known Hawaiian Islands clearly were created at this time, this “resetting” can be considered the beginning of the modern Hawaiian Archipelago fish fauna’s evolution.

The K/T extinctions were associated with a collapse of primary productivity throughout the world’s oceans. As a result of the extinctions and productivity collapse, a highly diminished “Strangelove biota” was present throughout the shallow waters of the proto-Pacific basin at the beginning of the Tertiary. These events apparently had a lesser effect on deep-sea organisms, which were spared the mass extinctions seen in other habitats but were undoubtedly affected by the reduction in primary productivity.

At the beginning of the Paleogene, a globally warm climate existed but the climate was cooling from that of the Cretaceous. The terrestrial flora was almost globally tropical, even to the Arctic. Sea levels were lowered from Cretaceous levels, with reduced continental-shelf areas and less extensive shallow seas than had previously existed. Low oxygen conditions persisted in the deep sea. The coral fauna was cosmopolitan although highly reduced, a condition which would persist into the early Miocene. Oceanic primary productivity reached its minimum at ca. 67 ma and did not begin to recover for another half million years, with the gradual recovery of both primary productivity and coral development occurring between ca. 66.5–64.5 ma. In the Hawaiian Ridge, Suiko Seamount was created at ca. 65.8–58 ma. This seamount is now halfway up the Emperor Seamount chain.

By ca. 60 ma, the first Cenozoic provincial plankton taxa were recorded in the fossil record from tropical localities, marking the fragmentation of the cosmopolitan marine “Strangelove biota”. This probably marked the first major vicariant event in the evolution of the modern Indo-Pacific biota. The fossil record of extant fish suborders and genera began at this time and diversified for the next 30 million years. This was the time of evolutionary radiation of modern fish families and genera, including the perciform fishes that now dominate the nearshore fish fauna of the Hawaiian Islands.

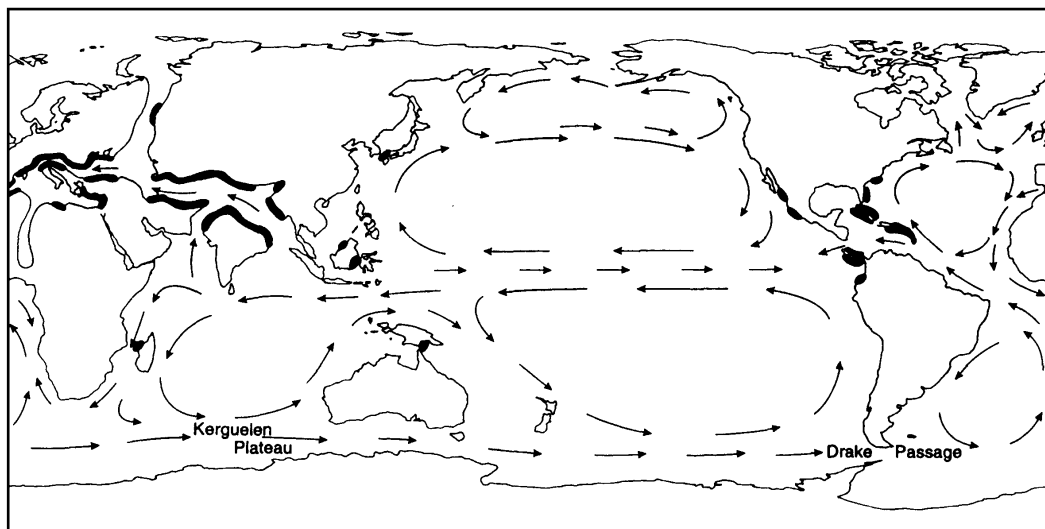
At the Paleocene/Eocene boundary (ca. 55 ma), the subantarctic circulation developed as Australia separated from Antarctica. The global climate was warm in the early Eocene with subtropical conditions extending to ca. 77°N but as Antarctica separated from the other continents the global climate began to cool. This led to the development of strong latitudinal temperature gradients, increased seasonality, and the formation of polar ice caps. High latitude plankton communities toward both poles differentiated from tropical communities as a result.

The circumglobal Tethys Sea circulation persisted in the Eocene but was progressively baffled as continents approached their present-day positions (Fig. 13). Continental fragments that began to intrude into the Tethys Sea included the Italian peninsula, Asia Minor, the proto-Antilles, the Indian subcontinent, and the Indonesian Archipelago. Changes in climate and land positions increased the distinctiveness of hemispheric gyral circulation in all oceans. The proto-Indian Ocean circulation became increasingly isolated from that of the Pacific in the Eocene with the movement of Indonesian continental masses between the two basins, initiating the vicariant separation of the Indian Ocean and Pacific biotas (Fig. 13).

In the Eocene Pacific, the subarctic North Pacific gyre became more strongly developed with the closure of the Beringian land bridge between Asia and North America (Fig. 13). Gyral current strengths increased in most of the Pacific, with a stronger meridional component developing. An equatorial countercurrent developed between the northern and southern Hemispheric gyres. The meridional strengthening of currents and countercurrent created the first opportunity for dispersal of a trans-Pacific biota including dispersal of organisms to the Hawaiian Ridge. These dispersal pathways were probably not those that exist now because the Tethys Sea had a direct connection to the Pacific through the open seaway between North and South America. In the Hawaiian Archipelago, island formation continued with what are now the Nintoku (56.8–55.6 ma), Jingu (56.3–54.5 ma), and Ojin Seamounts (55.9–54.5 ma).

The first fossil record of a modern reef fish fauna was preserved in the early Eocene (ca. 50 ma), from the Monte Bolca formation of Italy. These fossils include the oldest-known Pomacentridae, Labridae, Ehippididae, Siganidae, Acanthuridae, and Zanclidae. At the same time, the volcanic activity that formed the islands of the Tuamotu Archipelago began, and the island that became Jingu Seamount was created.

Major changes in the earth’s development continued at ca. 49–45 ma when the Indian subcontinent began to collide with Asia (the exact timing is still debated). The consequent uplifting of the Tibetan Plateau and resultant orogeny altered the Jet Stream’s meanders, bringing cooler air southward over that region of North America where the Laurentian Great Lakes now are and over Europe. This may have enhanced northern-hemispheric cooling that resulted in the development of monsoonal conditions in southeast Asia, arid conditions in



**Figure 13.** Hypothetical ocean currents, ocean basin morphologies, and continental relationships in the Eocene, prior to 38 ma (from Veron, 1995, who gives the primary source citations for this reconstruction). The darkly shaded areas are regions with coral reefs. Principal features of note are the formation of a Subarctic North Pacific gyre, the well-developed Tethyan circulation, the widening of the Atlantic Ocean with two gyral currents, the formation of the Indian Ocean and its circulation, and the almost complete formation of the circum-Antarctic circulation. By this time, the southernmost Emperor Seamounts, including Colohan Seamount, had formed as islands.

North Africa and southwest Asia, and eventually in extensive Laurasian glaciation. Cooling of the earth's climate may also have been accelerated by changes in CO<sub>2</sub> entrainment by weathering of Himalayan rock during orogeny or by the reduction in CO<sub>2</sub> input from a slowing of tectonic activity after the early Eocene. For whatever reasons, ocean circulation intensity increased as a result of Eocene climatic change, with major consequences for both increased vicariance and dispersal of the marine biota. Genetic evidence suggests that the Scaridae had diverged from the Labridae by this time, and that the two subfamilies of that family had diverged by at least 42 ma (Streelman *et al.*, 2002).

In the development of the Hawaiian Ridge, Koko Seamount formed at ca. 48.9–47.3 ma. This was one of the largest of the Hawaiian Islands at its time of maximum emergence. Koko Seamount was the last high island to be formed on the Hawaiian Ridge for almost 19 million years as Pacific-plate tectonic activity was temporarily diminished by the uplift of the Tibetan Plateau and the separation of the Australian plate from Antarctica. At ca. 44.6–41.4 ma, Yuryako Seamount was formed in the Hawaiian Ridge. Soon thereafter, at ca. 43 ma, the direction of movement of the Pacific tectonic plate changed from its northward direction to its present day north-westward orientation. Koko Seamount was eroded to sea level by about 40 ma, removing high island habitats from the Hawaiian Islands. The absence of high island habitats in the archipelago surely limited the ability of many species to colonize the region. These habitats included freshwater streams, high-productivity waters needed by clupeiform and atheriniform fishes, rocky shores necessary for intertidal species such as certain blenniids, estuaries for engraulidids and other species, seagrass beds, dense algal flats, potential mangrove habitats, and protected deepwater lagoons. The absence of high islands may have caused the extinction of much of the terrestrial biota of the archipelago and undoubtedly prohibited the recolonization of the islands by a high-island biota until the formation at ca. 30–28 ma of the island that would become Kure Atoll. The effects on most of the archipelago's marine species were probably much less drastic, with local extinctions only eliminating species such as engraulidids that required high island habitats. Reef and deep-water fishes were probably only affected to a minor extent. Thus the Hawaiian Islands in the late Eocene may have had an impoverished fauna more similar to that of Johnston Atoll than that of the present high islands.

Formation of low islands in the Hawaiian Chain continued, however, with the creation of the Daikakuji (46.7–40.1 ma), Kimmei (41.1–38.7 ma), Abbott (39.6–37.8 ma), Colahan (38.9–38.3 ma), and Kanmu Seamounts (43.0–37.5 ma). During this time, at ca. 40 ma, the Necker Ridge had moved northward to 10°N, approaching the Hawaiian Archipelago from its ancient point of origin in the Southern Hemisphere.

At the end of the Eocene (ca. 38 ma), the earth may have experienced the most severe ice age ever. The splitting of Antarctica from previously connected continents, with the subsequent development of subantarctic-

tic ocean currents, and the progressing blockage of the circum-tropical Tethyan circulation by various continental fragments altered oceanographic circulation (Fig. 13) and accelerated global cooling. The proximate cause of this cooling was the first formation at the poles of very cold water which submerged to initiate the formation of cold, oxygen-rich Arctic and Antarctic bottom water. This bottom-water formation drives the present day deep thermohaline circulation of the world's oceans. Among the other consequences of this polar cooling were increased latitudinal temperature gradients and a strengthening gyral circulation that gradually changed from a predominantly shallow, latitudinal pattern to the thermohaline, meridional circulation now present. This slowly strengthened the western boundary current of the North Pacific Ocean, which set the stage for the dispersal of marine organisms from the western North Pacific to the Hawaiian Archipelago.

At the Eocene/Oligocene boundary (37 ma), mass extinctions of marine taxa occurred once more, particularly in the tropics, although these were not as extensive as the K/T extinctions. Many recognizable, extant fish genera appeared in the fossil record after the Eocene/Oligocene extinctions at ca. 38–25 ma.

The deepening of the Tasman Seaway at 38–25 ma continued formation of the circum-Antarctic current and resulting cold Antarctic bottom water. By ca. 34 ma glaciation had begun on Antarctica. As a result, the Southern Hemisphere's poleward circulation became progressively isolated from the larger southern hemispheric gyres, resulting in a major vicariant event that created an oligotrophic, southern-ocean biogeographic area dominated by downwelling of cold water. Abyssal temperatures decreased and the deep ocean was no longer anoxic. Colonization of the newly oxygen-rich deep sea by modern families increased.

Oligocene ocean currents may have first connected the biotas of the western and central Pacific as indicated by the oldest Hawaiian Archipelago fossil corals from Yuryaku Seamount, ca. 34 ma. The dispersal of marine organisms to the Hawaiian region was probably facilitated not only by gyral-current intensification but also by the reduction in size of the Pacific basin as North America and Eurasia moved apart during the formation of the Atlantic. Yuryaku Atoll was drowned by sea level transgressions at ca. 33 ma, when it was at about the same latitude where French Frigate Shoals is today.

At ca. 30–28 ma, Hawaiian hot-spot volcanic activity resumed in force with the formation of Kure, which became the first high island in the chain since Koko's erosion. This created habitats that allowed increased colonization of the archipelago by shallow water organisms, at the time when currents from the western Pacific and along the tropics were intensifying.

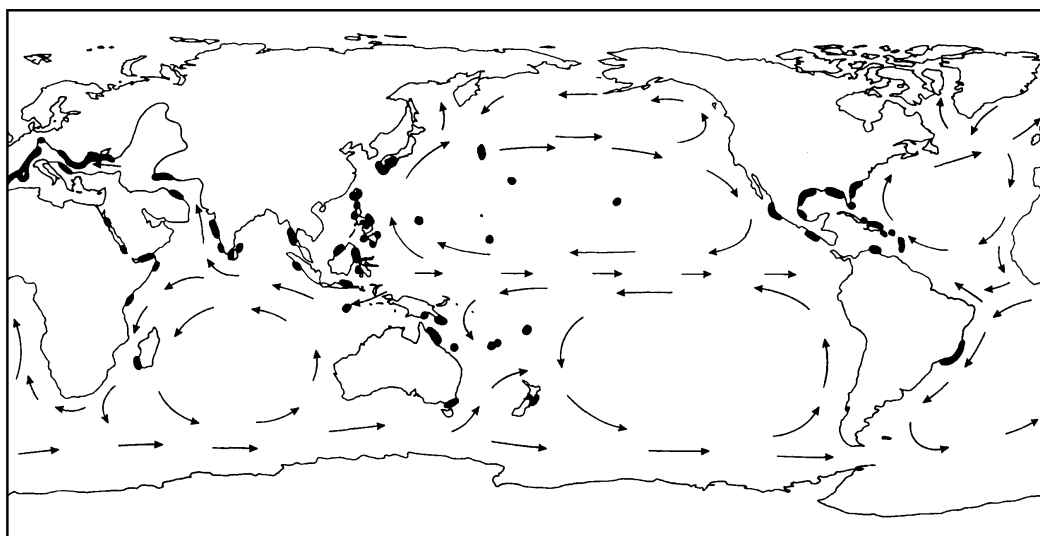
An Antarctic circulation pattern equivalent to that found today developed in the late Oligocene. The Drake Passage between Antarctica and South America opened at ca. 30–25 ma, which along with subsidence of the Tasman Plateau completed the formation of the circumglobal Southern Ocean circulation. Latitudinal gradients in global temperatures continued to intensify as a consequence, and the global climate became distinctly seasonal for the first time since the Cretaceous. The present water masses of the oceans began to form at this time. In the Oligocene Hawaiian Archipelago, the Hancock Seamounts were formed at ca. 27.9–26.9 ma and Midway Atoll formed at ca. 28.3–27.1 ma.

By the Oligocene/Miocene boundary (ca. 24 ma), the global climate was warmer and wetter than at present, but not as warm as in previous eras. Global thermal gradients continued to intensify. As a consequence, the Southern Hemisphere subtropical and subpolar gyres became decoupled. Weather patterns in the western Pacific became more similar to those of today than they had been in the past. El Niños and related climatic events may have first developed at about this time, with significant effects on the alternating dispersal and isolation of marine organisms in the central Pacific. Low-oxygen conditions reappeared in coastal areas of the Pacific, eventually exerting a strong influence in the eastern Pacific. The fossil record of coral families shows an increasing provincialism in the fauna of the early Miocene.

By ca. 22 ma, the non-Austral water masses of the Pacific became progressively more distinct (Fig. 14). The subarctic Pacific gyre cooled and the North Pacific transition zone currents and associated fronts intensified. The subarctic Pacific thus became increasingly isolated from the rest of the Pacific. Speciation in this region may have increased from this time on to create the diverse, unique North Pacific fish fauna. A continuous Tethyan circulation persisted around the tropics through increasingly complex Indonesian and Central American seaways. At roughly the same time, the Austral water masses also became more isolated from one another, with similar oceanographic and biogeographic consequences.

In the Hawaiian Archipelago during the early Miocene, Pearl and Hermes Reef formed at ca. 21.1–20.1 ma, Wentworth Seamount and Ridge became incorporated into the southeastern end of the Hawaiian Ridge (18°N) at ca. 20 ma, and Laysan Island formed at ca. 20.2–19.6 ma. During this time, more of the islands were exposed by sea level regressions resulting from the entrainment of water into the Antarctic ice cap as the Antarctic Convergence developed.

The Miocene was a time of significant changes for global biogeography, with the initiation of many of the vicariant events that led to the evolution of present-day species. During 20–15 ma the circumglobal, warm water Tethyan oceanographic circulation was progressively severed, leading to greater provincialism in marine species (Fig. 14). At ca. 18 ma, Africa and southwestern Asia moved into contact with each other, disrupting the Tethyan



**Figure 14.** Hypothetical ocean currents, ocean basin morphologies, and continental relationships in the late Miocene, prior to 5.2 ma (from Veron, 1995, who gives the primary source citations for this reconstruction). The darkly shaded areas are regions with coral reefs. Principal features of note are the near-modern configuration of most ocean currents and continental relationships, except for the remnants of the Tethyan circulation across the Panamanian Isthmus and between Africa and Eurasia. By this time, French Frigate Shoals had existed for some time, Kaua'i was forming, and the Hawaiian Islands had been populated with a near-modern coral reef fauna.

circulation in this region although intermittent connections were reestablished at ca. 14–13 ma. The Caribbean Sea had only a shallow connection to the eastern Pacific as the highly fragmented components of Central America and the Antillean island-arcs moved toward their present-day positions. As a consequence of these events, gyral and equatorial currents developed in the major oceans that became the modern patterns. Coral reef development also had a pattern similar to that found today, although reefs extended into higher latitudes due to the persistently warmer climate than at present. In fish evolution, the Scaridae first appeared in the fossil record of this time (Bellwood, 1991) although genetic data suggest a much earlier origin for the family, prior to 42 ma (Streebman *et al.*, 2002).

At ca. 17 ma, the closure of the Indonesia Seaway intensified the mid-latitude westerlies, strengthening the North Pacific subtropical gyre (Fig. 14). The North Pacific transition zone circulation became more isolated from the subarctic water mass and vicariant separation of the biotas of these regions was enhanced. For example, the pelagic radiolarian faunas of these biogeographic regions became more differentiated in the mid-Miocene fossil record. In the Hawaiian Islands, Midway Atoll had subsided to sea level at ca. 16 ma.

In the mid- to late Miocene, major Antarctic glaciation and subsequent water mass cooling were under way and the eastern Tethyan circumglobal circulation had been severed. For the first time since the Paleozoic, the climate of the tropics warmed while that of the polar regions cooled. A notable exception was that cool water in the eastern tropical Atlantic inhibited coral reef formation and disrupted the previous Tethyan dispersal of marine organisms across the Atlantic Ocean. During this time the Hawaiian Archipelago saw the formation of Brooks Bank at ca. 13.6–12.4 ma, Gardner Pinnacles at ca. 13.3–11.3 ma, and French Frigate Shoals at 12.1–11.3 ma. The Necker Ridge had finally moved northward to the Hawaiian hot spot from its origins in the South Pacific by 10.4–9.8 ma, and Necker Island was created in the newly integrated Necker and Hawaiian Ridges. Present-day antitropical biogeographic patterns may have begun during this time. For example, genetic evidence suggests that northern and Southern Hemisphere sister populations of the morwong, *Cheilodactylus vittatus*, diverged in the mid-Miocene at ca. 12.7–18.3 ma (Burrige & White, 2000), a relatively ancient origin for morphologically cryptic species. The wrasse genus *Thalassoma* began to differentiate during this time, with a clade containing the endemic Hawaiian species *T. ballieu* and the endemic western Australian species *T. septemfasciata* diverging from the common ancestor of other species in the genus (Bernardi *et al.*, 2004).

By ca. 14.0–9.8 ma the increased global thermal gradient enhanced the strength and isolation of the northern and southern mid-ocean gyres, leading to major anti-tropical vicariant events in Pacific Basin biogeography. The eastern Pacific circulation became oceanographically isolated from the central Pacific gyres as well, creating a trichotomous vicariant event when combined with the antitropical separation.

Near the Miocene/Pliocene boundary (ca. 5.2 ma), one of the greatest sea-level regressions of the earth's entire history occurred as a result of extreme poleward glaciation. This event was "catastrophic for coral reef development" (Veron, 1995) and had other consequences as well. Continental shelf areas were reduced to a minimum, ocean and interior sea basins became more isolated, emergent island numbers and areas were increased, winds intensified, and ocean currents accelerated. These factors may have enhanced the vicariant evolution of marine taxa in continental shelf habitats through increased isolation of marine populations, but they may also have increased the connectivity of island populations by increasing dispersal between insular habitats (McManus, 1985; Benzie & Williams, 1997). Despite the overall reduction of coral reef development, corals proliferated in the eastern Pacific at the Miocene/Pliocene boundary. This may have been a result of the movement of the Line Island chain into the equatorial countercurrent which temporarily reduced the effectiveness of the eastern Pacific biogeographic barrier. Early Pliocene vicariant events in reef fish evolution included the divergence of the butterflyfish *Chaetodon punctatofasciatus* and *rhombochaetodon* species groups (McMillan & Palumbi, 1995) and the parrotfish subfamilies Sparisomatinae and Scarinae (Bellwood, 1991). In addition, divergence of most clades within the wrasse genus *Thalassoma* occurred between 5–10 ma (Bernardi *et al.*, 2004).

The initiation of glacial and interglacial periods may have started cycles of antitropical vicariant isolation and transequatorial dispersal between the northern and southern hemispheric gyres. These may have created antitropical species pairs which subsequently dispersed and intermingled, becoming in turn widespread ancestral taxa from which more antitropical species pairs would evolve (Brinton, 1962).

Several unassociated events in the early Pliocene can be mentioned in juxtaposition to one another in order to place the evolution of Hawai'i's marine biota into a wider context. At ca. 5.5 ma, drastically lowered sea levels cut off the Mediterranean Basin from the Atlantic and evaporation caused the Mediterranean to dry completely (the "Messinian Crisis"). Kaua'i was formed as the first present-day high island at ca. 5.3–3.9 ma and Ni'ihau formed at ca. 5.0–4.7 ma. The first of the Society Islands, Motu Iti, formed at ca. 4 ma in the south-eastern Pacific; that island group is therefore of a much more recent origin than the Hawaiian Archipelago. The mid-water fish fauna may have approached its present day diversity by this time (Miya & Nishida, 1996), but reef-fish evolution was still occurring within present day genera as suggested by a genetic analysis of the butterflyfish *Chaetodon punctatofasciatus* group (McMillan & Palumbi, 1995). For perspective in human phylogeny, fossil evidence suggests that the Hominidae first evolved at about this time.

The mid-Pliocene saw the formation of west O'ahu's Waianae Mountains (ca. 3.8–3.6 ma). Soon thereafter (ca. 3.5–3.1 ma) the final, major geotectonic/vicariant event occurred when the Panamanian Isthmus closed. This severed the last remnant of the circumtropical Tethyan circulation, blocking the flow of warm, salty water entering the Pacific from the Atlantic. The northward deflection of this water increased precipitation in eastern North America and Greenland, thereby enhancing development of the Arctic ice cap. This created the conditions at ca. 3.0–2.5 ma that initiated the ice age cycles that have dominated the earth's climate to the present. Temperatures in the Caribbean Sea increased as that sea became isolated, but the eastern Pacific became subject to sporadic, localized cooling events as coastal upwelling intensified there. As a consequence of this eastern Pacific upwelling, primary productivity was enhanced in the surface water and oxygen depletion developed in subsurface layers. This initiated the present-day oxygen-minimum layer that characterizes the eastern Pacific biogeographic region. The northern and southern hemispheric oceanographic central gyres became completely isolated from each other as the eastern Pacific and central equatorial Pacific circulations developed. Formation of distinct eastern Pacific, central equatorial, northern central-gyre, and southern central-gyre water masses separated the biotas of these regions from one another to varying degrees. For example, Tethyan scleractinian corals in the eastern Pacific were isolated from their sister populations in the Caribbean and the central Pacific.

At ca. 3–2 ma, the subarctic Pacific and Arctic water masses and biotas were separated. Northern hemisphere glaciation was accelerated with increased formation of Arctic "bottom water" in the North Atlantic, increasing markedly at ca. 2.7 ma. Sea levels dropped by ca. 100 m, sea surface temperatures changed by ca. 2–6 °C, and marked changes occurred in upwelling, current and wind patterns. The fossil record of the North Atlantic documents the rapid extinction of many marine species during this time, with a subsequent pulse of high speciation. The modern "Ice Age" cycle began with this event and continued. The trade winds and local upwelling were enhanced during these glacial periods. In the Hawaiian Archipelago, the Ko'olau Mountains of O'ahu were formed at ca. 2.7–2.6 ma. In human evolution, the first *Homo* species appeared in the fossil record during this time.

At ca. 2 ma, sea level regression again created many higher islands and table reefs that could have served as "stepping stones" for enhanced dispersal. Indonesia and Sahul (the combined Australian and New Guinean continental mass) were exposed as larger continental masses than at present. In the gap between Indonesia and Sahul, upwelling of cool water intensified, which, together with the emergence of these continents, separated

the biotas of the Indian and Pacific oceans. Genetic evidence suggests that the Indian and Pacific Ocean populations within the butterflyfish *Chaetodon punctatofasciatus* and *rhombochaetodon* species groups diverged at ca. 2.0–0.8 ma as a result of the isolation of the two great ocean basins, initiating the vicariant evolution of endemic Indian and Pacific ocean species within both of those groups (McMillan & Palumbi, 1995). At the end of the Pliocene (ca. 2.5–1.7 ma), Moloka‘i formed in the Hawaiian Archipelago and *Homo erectus* first appeared in the fossil record.

At the Pliocene/Pleistocene boundary (1.6 ma), the Tethyan coral fauna of the eastern Pacific became extinct. Glaciation of the northern hemisphere induced invigoration of the gyral boundary currents and exposure of islands and seamounts by sea level regression, leading to increased dispersal of Indo-Pacific species across the basin. This resulted in the subsequent colonization of the eastern Pacific, and likely the Hawaiian Archipelago, by Indo-Pacific marine organisms. In the Hawaiian Archipelago, significant events of the early Pleistocene included the formation of Lāna‘i and the west Maui Mountains at ca. 1.3 ma, Kaho‘olawe at ca. 1.2–0.8 ma, O‘ahu’s Ko‘olau Pali (cliffs) from a massive landslide that caused slumping of eastern (windward) O‘ahu into the sea at ca. 1 ma, and Haleakala on eastern Maui at ca. 0.84–0.71 ma.

At ca. 1.10–0.61 ma, ancestral populations in the butterflyfish *Chaetodon punctatofasciatus* species group diverged into the western North Pacific spot-banded butterflyfish (*C. punctatofasciatus*), the South Pacific dot-and-dash butterflyfish (*C. pelewensis*), and the Hawaiian Islands endemic pebbled butterflyfish (*C. multicinctus*) (see McMillan & Palumbi, 1995). This event is significant because it is the only well-documented identification of the time of vicariant origin for an endemic Hawaiian Islands fish species. It is a benchmark for the most recent evolution of a fish species found in the islands and the most recent vicariant event in the evolution (but not the colonization) of Hawai‘i’s fish fauna. The hydrotectonic change that preceded and likely caused this vicariant event was the intensification of the gyral circulation that led to the extinction and dispersive recolonization of the eastern Pacific’s biota at ca. 1.6 ma during the first Pleistocene ice age. *Thalassoma duperrey* is another Hawaiian endemic species of extremely recent divergence from its more widely distributed sister species (Bernardi *et al.*, 2004). It is interesting to note that the fossil record of our own species, *Homo sapiens*, began in Africa at about this time (ca. 0.8–0.7 ma). Our species is therefore about the same age as the most recently evolved elements of the endemic Hawaiian Islands fish fauna.

There is detailed documentation of a series of events from the mid-Pleistocene to the present that greatly influenced the biogeography of terrestrial organisms in the Hawaiian Archipelago, particularly in the present day high islands. These events also created the present-day shelf and drop-off habitats of the main islands, including drowned and elevated (“bench”) reef platforms. It seems unlikely that these had a significant impact on the evolution of Hawai‘i’s marine fauna because these events were very localized compared to the dispersal of marine organisms, although these platforms are important as habitat for the archipelago’s fishes. At ca. 0.5 ma, sea levels were high due to transgressions induced by glacial recession. Fossil reef platforms of O‘ahu that are now above sea level were created at this time when O‘ahu was within the Hawaiian trough. At ca. 0.5–0.3 ma the large island of Maui Nui was divided into the current islands of Maui, Moloka‘i, Lāna‘i, and Kaho‘olawe as subsidence and sea level rise created the channels between them. At ca. 0.43 ma the Big Island of Hawai‘i formed over the Hawaiian hot spot with the creation of the Kohala Mountains. During this process, at ca. 0.37 ma, the channel between Haleakala and the Kohala Mountains was much more narrow than at present, only 13 km wide, and would have been less of a barrier to dispersal than it is today. Fringing reefs off west Hawai‘i Island now at 1300 m indicate that the Big Island was elevated above its present height from the sea floor during its early formation, before the massive weight of the conglomerate Hawai‘i Island volcanos caused subsidence of the sea floor to the depth of the present-day Hawaiian Trough. Mauna Kea formed at ca. 0.40–0.37 ma and Mauna Loa began to form shortly thereafter, although the timing of the later event is disputed. The eruption of Kilauea began after Mauna Loa’s eruption, at ca. 0.3 ma, but was not the major point of island formation until ca. 1000 years ago. Kilauea’s formation continues today.

Interglacial periods at 0.24–0.20 ma and 0.130–0.075 ma caused sea levels to rise, reducing the biogeographic isolation of the Indian Ocean from the Pacific, reducing the isolation of the small western Pacific sea basins, but also reducing dispersal of marine organisms in the central Pacific by submerging central Pacific seamounts and low-lying islands. At ca. 22,000 years ago, glaciation increased, causing a sea level regression to 110–120 m below present levels. This had numerous biogeographic consequences in the Indo-Pacific, including the isolation of the Red Sea from the Indian Ocean, the joining of Sri Lanka with India, the isolation of the Indian and Pacific oceans by the emergence of the Indonesian and Sahul continental land masses and enhanced upwelling of cool water in the remaining gap between them, the emergence of the Yellow and East China Seas as dry land, and the near or complete isolation of the basins of the South China, Sulu, and Arafura Seas. Central Pacific island connectivity would have been increased once again as more islands and seamounts emerged or had their tops at shallow waters, and as trade wind and meridional current strengths intensified. The Kuroshio Current also intensified as a result of glacially enhanced climate gradients. The cycle continued

at ca. 21,000–17,000 years ago when glacial melting caused sea level transgressions of < 100 m above earlier levels for three distinct times of up to 1000 years each. These events were probably too short to be significant in the evolution of the Indo-Pacific's or Hawai'i's marine species, but probably had a great influence on the formation of present-day distribution patterns and genetic connections of populations (Benzie, 1999).

The last great ice age, the Wisconsin glaciation, occurred at ca. 18,000 years ago during the maximum global cooling of the Pleistocene. Sea levels regressed to ca. 120–150 m below present-day levels with the same consequences discussed in the previous paragraph. Sea surface temperatures cooled by ca. 2.3 °C during this time and thermal gradients intensified toward the polar fronts, events which surely had an effect on Hawai'i's marine biota. Numerous effects of the Wisconsin glaciation are documented in the fossil record for scleractinian corals (Grigg, 1988; Veron, 1995). The great Pleistocene glaciation ended at ca. 10,000 years ago, and sea levels returned to "normal." It has been suggested that the fragmented biota of the central Indo-Pacific was repopulated at this time from peripheral refugia, including centers of endemism to the east and smaller, western sea basins that were temporarily isolated during the ice ages (Veron, 1995). This may have been a time when the biogeographic processes suggested in the "vortex model" or similar hypotheses began to operate in full force (Kay, 1984; Jokiel & Martinelli, 1992; Veron, 1995).

#### *An example of this history of evolution for Hawai'i's fish fauna*

White (1994) gave examples of the influence of this history of geological and oceanographic "hydrotectonics" on pelagic fish evolution. He analyzed the evolution of the Stomiidae and Evermannellidae to support his hypothesis that changing current patterns were the primary vicariant events in the evolution of the Pacific's pelagic fish fauna. A test of White's (1994) hypothesis is provided by a more recent phylogeny of bristlemouths in the genus *Cyclothone* developed from mitochondrial DNA characters for genetic relatedness (Miya & Nishida, 1996). Inferences about the relative timing of vicariant events are possible from the genetic analysis if certain assumptions are made. One is that nucleotide substitution rates have been constant throughout the evolution of this genus. Another is that the subset of nucleotide substitution rates analyzed accurately reflects the entire component of the genome necessary to describe genetic evolution and speciation patterns. In the example of *Cyclothone*, it is also assumed that the two most recent vicariant events, which created species that are endemic to well-defined regions, are clearly associated with geologic and oceanographic events that can be assigned dates of occurrence with relative precision. One event was the desiccation and subsequent flooding of the Mediterranean Sea at ca. 5.5 ma that created the Mediterranean endemic *C. pygmaea*. The other event was the isolation of the eastern tropical Pacific starting at about 9 ma and ending with the closure of the isthmus of Panama at ca. 3.1–3.5 ma that created the eastern tropical Pacific endemic *C. signata*. These vicariant events serve as benchmarks against which the times of occurrence of earlier speciation events in the genus can be calibrated.

Given these assumptions, the vicariant history of *Cyclothone* demonstrates a remarkable congruence with the geologic and oceanographic history outlined in the previous discussion. This congruence corroborates White's (1994) hypothesis that changes in major ocean-circulation patterns were the primary vicariant events that shaped the evolution of pelagic Pacific fishes.

The bristlemouth genus *Cyclothone* likely diverged from the ancestor of its sister taxon in the early Cenozoic (Paleocene) at about 60 ma. It was at this time that the K/T "Strangelove biota" was diversifying, that early colonization of the deep-sea began, and that modern fish families and genera began to evolve. The colonization of the deep sea was a result of the development of the subantarctic circulation during the separation of Australia from Antarctica. The evolution of *Cyclothone* therefore began after the formation of the oldest extant features of the Hawaiian Ridge and Emperor Seamounts.

The first major vicariant event in the history of the genus *Cyclothone* is indicated from molecular evidence at about 32 ma when the genus was split into what would become two major circumglobal clades. The timing of this vicariant event approximately matches the development of the psychrospheric ocean. This occurred roughly after what may have been the greatest "ice age" in the earth's history, when the circum-Antarctic circulation formed with the opening of a deep Tasman seaway. The formation of the circum-Antarctic circulation created the cold, oxygen-rich polar water that drives the present-day thermohaline circulation of the deep ocean, establishing the habitat suitable for the modern deep-sea biota. This major event in the evolution of pelagic animals also occurred at about the time that fossil modern corals first appeared on the Emperor Seamounts, indicating that the Indo-Pacific fauna had begun to colonize the archipelago. The vicariance of *Cyclothone* into two large clades occurred after the formation of Colahan and Kanmu Seamounts, after the direction of the Pacific Plate's movement changed from northward to north-westward, and after the formation of high islands ceased for over 40 ma.

Subsequent dispersal of the ancestral species of the two major *Cyclothone* clades must have occurred



because present-day species within both these clades are found throughout the world's oceans. The next vicariant event in *Cyclothone* evolution fragmented both major clades within *Cyclothone* at ca. 30–25 ma. In one clade, the ancestor of the bathypelagic species *C. obscura* split from the ancestor of the mesopelagic *C. pallida* and the bathypelagic *C. parapallida*. The other clade split into two smaller lineages that were subject to later vicariant events. These events resulted from the opening of the Drake Passage between Antarctica and South America, which completed the circum-subantarctic circulation in the Oligocene and formed the present-day oceanic water masses. These events probably occurred as or just before the Hancock Seamounts and Midway Atoll were created on the Hawaiian Ridge.

Both lineages within the largest clade of *Cyclothone* were split again by a vicariant event at ca. 24 ma. In one lineage, the eastern Atlantic populations that would become *C. livida* diverged from the remaining populations of the clade that would be later split into four species. In the other lineage, the common ancestor of what would become two mesopelagic species diverged from a clade that would eventually contain three upper mesopelagic species. With the exception of *C. livida*, which would retain a limited distribution, the other lineages would disperse again to have overlapping circumglobal distributions. These events occurred near the Oligocene/Miocene boundary, when global thermal gradients intensified, the southern-hemisphere subtropical and subpolar gyres became decoupled, and modern weather patterns such as El Niños began.

In the Miocene at ca. 22 ma vicariant events split the circumtemperate, mesopelagic *Cyclothone pallida* populations from what are now disjunct Pacific and Atlantic populations of the bathypelagic *C. parapallida*. The Atlantic/Austral populations of *C. microdon/pygmaea* also diverged from the circumtropical/Austral populations of *C. kobayashii/pseudopallida*. These events occurred when the northern and southern central gyres of the Atlantic and Pacific oceans, the Austral water masses of both oceans, and the subarctic Pacific circulation became more isolated. The oldest existing Northwestern Hawaiian Islands formed as high islands at this time.

Evolution of the modern fish fauna had reached the level of present-day species in the Miocene, ca. 20–15 ma. In the example of *Cyclothone*, the ancestral upper-mesopelagic populations of the Austral species *C. kobayashii* diverged from the circumtemperate species *C. pseudopallida*, and populations of the Atlantic and Austral species *C. braueri* diverged from the ancestral populations of two species with a combined circumsubtropical distribution. These vicariant events were caused by the isolation of the subantarctic and Antarctic water masses and biotas resulting from the completion of the circumglobal Antarctic Convergence circulation.

A mid-Miocene (ca. 17 ma) vicariant event separated the subarctic Pacific endemic, lower mesopelagic species *C. atraria* from its circumsubtropical sister-species *C. acclinidens*. This isolation of the Pacific subarctic water mass from the central gyre resulted from the intensification of the North Pacific transition-zone circulation when the Indonesian Seaway closed, causing mid-latitude westerly winds to strengthen.

Ancestral populations of the eastern Atlantic endemic *C. livida* also diverged from the common ancestor of four more widely distributed *Cyclothone* species in the mid-Miocene. This coincided with the cooling of the eastern Atlantic resulting from the disruption of the tropical Tethyan circulation by the collision of Africa with Asia and movements of the Antillean and Central American island arcs.

Ancestral populations of the eastern Pacific endemic species *C. signata* began to be isolated from the ancestral populations of the otherwise circumglobal *C. alba* at ca. 14.0–9.8 ma. The eastern Pacific circulation became increasingly isolated from the circulation of the Caribbean and the central Pacific by the blockage of the Panamanian Isthmus at that time. This was also when the youngest of the Northwestern Hawaiian Islands were formed.

The desiccation and refilling of the Mediterranean at the Miocene/Pliocene boundary (ca. 5.2 ma) caused the most recent recognizable vicariant event in the evolution of present-day *Cyclothone* species. The Mediterranean was recolonized by *Cyclothone* populations, which were then isolated to become the endemic *C. pygmaea*, the sister species of *C. microdon*. At this time, the present-day ocean circulations and geologic ocean-basin forms were well developed and the oldest main Hawaiian Islands were being created. The evolution of extant *Cyclothone* species was essentially complete after the Miocene/Pliocene boundary.

The analysis of genetic structure within populations of *C. alba* has shown genetic divergence of populations within an oceanic species (Miya & Nishida, 1997). This structure may be related to the oceanographic changes that created the antitropical distributions of other taxa (Brinton, 1962; Newman, 1986) resulting from global climate changes in the past 1–3 million years (Benzie & Williams, 1997; Benzie, 1999). Alternatively, they may be remnants of more ancient vicariant events that affected *C. alba* but were obscured by incomplete genetic isolation and subsequent re-dispersal in that species' populations. This last suggestion reflects the greater dispersal capability of oceanic species relative to shore fish species. Genetic vicariance at the species level in the pelagic, bristlemouth genus *Cyclothone* reached its present-day state at a far earlier time than that in the reef dwelling, butterflyfish genus *Chaetodon* (Miya & Nishida, 1996, 1997; McMillan & Palumbi, 1995). The events that drove vicariant speciation in oceanic taxa such as *Cyclothone* undoubtedly also directed the evolution of shore fish species. But there is also good evidence that more recent climate changes have

continued to induce vicariant speciation, dispersal, and colonization events in the island-associated marine biota (Benzie, 1999) without affecting the oceanic fauna (White, 1994; Miya & Nishida, 1996, 1997). There is clearly much more work to be done before the origins and evolution of Hawai'i's fish fauna are well understood.

### **What is the present state of Hawai'i's fish fauna with respect to the conservation of its biodiversity?**

The natural formation of the modern Hawaiian Archipelago fish biota was mostly complete at the Pleistocene/Holocene boundary (10,000 years ago) as evidenced by modern coral reef development at ca. 9000–6000 years ago (Veron, 1995). But another factor has emerged in the past few thousand years to reshape the taxonomic composition of the archipelago's biota. This is the global reworking of environmental processes by human activity. The present-day anthropogenic alteration of biogeographic patterns began on a global scale about 2000 years ago when exponentially growing human populations began to both spread into new regions and to develop technologies that strengthened human power to rework nature. This process began in the Hawaiian Islands with their colonization by Polynesians 1500 or more years ago (Juvik & Juvik, 1998). Impacts on terrestrial ecosystems were tremendous, with numerous extinctions of endemic terrestrial species (Kirch, 1982; Cuddihy & Stone, 1990; Olson & James, 1991; James & Olson, 1991; Steadman, 1995). Early impacts on the archipelago's marine biota were probably far less extensive than on terrestrial species. Alteration of littoral habitats by the construction of Hawaiian fish ponds likely had a significant effect at coastal margins (Kirch, 1982).

Anthropogenic alterations of marine biogeographic patterns have only been extensive during the past 200 years after developing engine technologies initiated both increased transportation activities and changes in climate patterns from atmospheric pollution. The effects of these activities can now be detected in increased habitat destruction, overexploitation of marine populations for human consumption, the disruption of ecosystem linkages between marine and terrestrial communities, and the extirpation of large marine vertebrates at many islands. For biogeographers the most significant alteration may be the transport of nonindigenous species around the world. In Hawai'i's fish fauna this is best illustrated by the presence of ca. 40 nonindigenous freshwater species where there were once only five amphidromous taxa. The increasing rate of marine species introductions throughout the world by vectors such as ballast water, hull fouling, and commercial sales of organisms may be creating a homogenous circumglobal biota in urbanized coastal areas.

Ehrlich (1997) eloquently argued that biologists interested in the natural world can no longer afford to ignore the human alteration of the biosphere. Biogeographers, including those who study the Hawaiian Islands, can no longer assume that the distributions of organisms are only the result of phylogenetic, geological, oceanographic, or natural ecological processes. Human alteration of biogeographic patterns must now be considered to be a potential explanation for observed patterns as well.

Considerations of human alterations of the biosphere lead to the question: What is the conservation status of fishes in the Hawaiian Archipelago? The brief answer is: Exceptionally good compared to many other places in the world, but not perfect. There are numerous conservation problems in the region which would lead many to dispute this conclusion but by comparison to fish populations elsewhere (Helfman *et al.*, 1997) or especially with terrestrial ecosystems in the Hawaiian Islands (Stone & Stone, 1989; Loope, 1999) the conservation status of Hawai'i's fishes is good. The primary threats to Hawai'i's fish populations are from habitat destruction, overexploitation by humans, and impacts from introduced species. The fish communities at greatest risk are, in order of susceptibility, the indigenous stream fishes, reef and estuarine fishes at developed sections of the islands, and species taken by fisheries.

No fish species in Hawai'i's waters are listed as threatened or endangered under the U.S. Endangered Species Act or the Convention for International Trade in Endangered Species. Only the 'o'opu alamo'o (*Lentipes concolor*) has been formally considered for such listing, but even this species is more abundant than previously thought (Higashi & Yamamoto, 1993). It and the other Hawaiian Islands freshwater gobioids live in habitats that are highly susceptible to damage; 86% of the streams in which these fish live have been physically degraded and even more have been biologically altered by introduced species (Parrish *et al.*, 1978).

Two shark species found in Hawaiian waters, the whale shark (*Rhincodon typus*) and the white shark (*Carcharodon carcharias*) have become of conservation concern because of threats to their populations in other parts of their ranges (Musick *et al.*, 2000). These may someday be given legal protection in the region because of threats to their populations worldwide, but at present they are not considered threatened or endangered in Hawaiian waters. Another shark that has been found in the state only as a waif, the basking shark (*Cetorhinus maximus*), and one of questionable occurrence here, the sandtiger shark (*Odontaspis taurus*), are similarly considered at risk elsewhere (Musick *et al.*, 2000).

Few fish populations in Hawaiian waters are formally considered to be at risk for overexploitation by fisheries, although a perusal of periodicals such as newspapers, *Hawaii Fishing News*, or *Environment Hawaii* will

demonstrate that public perception within the state is very different. What is true is that fish populations in certain areas are greatly reduced from their historic levels. This may be particularly true in the most heavily populated, developed portions of the islands, especially O'ahu (Birkeland & Friedlander, 2001; Friedlander & DeMartini, 2002).

Habitat degradation is probably now only of great concern along the developed shores of the main Hawaiian Islands (e.g., Maragos, 1993; Clark & Gulko, 1999). Hawai'i's freshwater streams are at greatest risk from degradation because of their limited, confined spatial distribution and the high demands placed on these systems by human activities. These factors also place the state's few estuaries and enclosed bays at risk. Kāne'ōhe Bay is an example. It once contained large coral reefs in its southern basin. These reefs suffered damage first from dredging in the 1930s and 1940s, then from sedimentation increased by shoreline construction, and then from sewage outflow pollution in the 1950s–1970s. Moving the sewage discharges outside of the bay and implementing stricter controls on sediment runoff in the late 1970s led to recovery of the coral reefs and their fish fauna. But non-point-source pollution and increased diversion of stream flow into the bay became increasing threats to the habitat integrity of Kāne'ōhe Bay in the 1990s (Hunter & Evans, 1995). Other harbors and urbanized shorelines in the main islands suffer similar threats. For example, there has been concern that the population of nehu or Hawaiian anchovy (*Encrasicholina purpurea*) in Pearl Harbor has been affected by freshwater diversions and fishing, like the population in Kāne'ōhe Bay (Clarke, 1992; Somerton *et al.*, 1993). In the main islands habitat damage directly resulting from tourism activities is noticeable in very limited areas, with Hanauma Bay on O'ahu, Molokini Islet at Maui, and Kāhala'u Bay on Hawai'i Island being well-known examples. Management measures such as the installation of boat moorings and limits to the daily numbers of visitors to some sites have reduced some of the impacts in recent years (Clark & Gulko, 1999).

Habitat alteration at the islands northwestward of Ni'ihau is most evident in the alterations of shoreline habitats at a few islands (United Nations Environment Programme/The World Conservation Union, 1988; Maragos & Gulko, 2002). Midway Atoll was heavily modified into a military base with an airstrip and suffered bombing damage in World War II. French Frigate Shoals was similarly modified, but to a lesser extent than Midway. Kure Atoll had a permanent Coast Guard base for a number of years. Aside from these cases, habitat alteration in the Northwestern Hawaiian Islands from human occupation is negligible compared to the main Hawaiian Islands. Like Midway Atoll, Johnston Atoll was highly modified by dredging, filling, and shoreline construction for a military base; two of the four islands now at Johnston Atoll are manmade and the other two were substantially enlarged (United Nations Environment Programme/The World Conservation Union, 1988).

Bottom-trawling by foreign fishing fleets at seamounts north of Kure Atoll likely caused alteration of deep habitats, but most of this activity was at seamounts outside of the Hawaiian 200-nmi EEZ. Trawling at the few U.S. Hawaiian Ridge seamounts has been restricted since 1988. Many studies in recent years have documented that trawl damage to bottom habitats can persist long after trawling has occurred, however (e.g., see Koslow *et al.*, 2000 for review and examples).

Alteration of deep-sea habitats within the northwestern and main Hawaiian Islands is likewise probably minimal except perhaps from limited harvesting of precious, deepwater corals. The early use of tangle nets and dredges for harvesting these corals undoubtedly caused habitat damage, but after 1973 the domestic Hawaiian Islands coral harvest was done selectively by scuba diving or with submersibles (Grigg, 1993, 2001). Habitat loss from this fishery is therefore likely limited to small-scale removal of habitat for fishes that use the corals as substrate or shelter. Examples are the longnose hawkfish (*Oxycirrhites typus*) and the black coral goby (*Bryaninops tigris*) on shallow-water antipatharians, or a cutthroat eel (*Meadia abyssalis*) and the Hawaiian spikefish (*Hollardia goslinei*) in deeper-water gorgonians, antipatharians, and zoantharians. Broader implications of habitat loss from precious coral harvesting emerged recently when it was suggested that Hawaiian monk seals might forage to a limited extent on fishes associated with deep-water coral habitats (Parrish *et al.* 2002). As of 2002, there was no ongoing harvest of precious corals in the Hawaiian Islands, but proposals were being considered for new harvests in the Northwestern Hawaiian Islands.

Damage to reef habitats in the Northwestern Hawaiian Islands from marine debris including derelict netting, anchor damage, and vessel groundings is a growing concern (Clark & Gulko, 1999). As this checklist was written, an intensive program was initiated by the NMFS and other organizations to remove marine debris from the Northwestern Hawaiian Islands (see Maragos & Gulko, 2002). Effects of sedimentation and pollution are probably negligible in the Northwestern Hawaiian Islands except at those islands that are inhabited permanently or seasonally.

In some cases, it is difficult to determine if declines in the populations of fishes in the main Hawaiian Islands are due to habitat degradation, fishing pressure, or both. Examples are the striped mullet (*Mugil cephalus*) and moi or six-fingered threadfin (*Polydactylus sexfilis*). These have juvenile stages that use estuaries or coastal beaches as nurseries, both of which are habitats greatly at risk from human activities. Fishing pressure on both species has been great as well. Perceived declines in the populations of both species have led

to stock enhancement programs whereby wild populations are augmented by the release of juvenile fish produced in aquaculture (Leber, 1995; Leber *et al.*, 1998). How effective this will be remains to be determined.

There is solid evidence for overfishing of only a few species in the Hawaiian Islands and even for these the concerns are mostly at the main islands. If fish of each species from the entire archipelago are considered to be a single stock, which is supported by biological evidence, none of these stocks was considered overfished as of October 1998 (Western Pacific Regional Fishery Management Council, 1998). New legal definitions of overfishing may alter this conclusion in the future, however. If only fish from the main Hawaiian Islands are considered, four snapper species and one grouper are overfished: onaga (*Etelis coruscans*), ehu (*Etelis carbunculus*), 'opakapaka (*Pristipomoides filamentosus*), uku (*Aprion vireescens*), and hāpu'u or Hawaiian grouper (*Epinephelus quernus*). Of these, onaga, ehu, and hāpu'u are of greatest concern. A State of Hawai'i bottomfish management plan became law in June 1998, giving hope for reversal of overfishing of these species in the main islands. Overfishing of pelagic armorhead (*Pseudopentaceros wheeleri*) by foreign fleets is also indicated from older data from within the Hawaiian 200-nmi EEZ, but this may be misleading because only 10% of the armorhead benthic habitat is within U.S. waters. Even so, fishing for armorhead is now closed at U.S. seamounts within the Hawaiian 200-nmi EEZ. Fisheries data for bottomfish in the Hawaiian Islands suggest that fishing has caused local depletion of some species instead of overfishing of entire stocks or populations throughout the archipelago (National Oceanic and Atmospheric Administration, 1996; Western Pacific Regional Fishery Management Council, 1998).

There are fewer data to demonstrate overfishing of shallow-water, nearshore species in Hawaiian waters. Great public concern has been expressed about overfishing of various carangids and other nearshore species in the Hawaiian Islands but until recently information was inadequate to analyze this concern (Smith, 1993; Clark & Gulko, 1999). Populations of large carangids are noticeably smaller around the main Hawaiian Islands than in the Northwestern Hawaiian Islands (Maragos & Gulko, 2002; Friedlander & DeMartini, 2002) and from past "anecdotal" accounts by fishermen, large carangids have become scarce near urbanized areas of the main islands (Birkeland & Friedlander, 2001). Comparisons of surveys done at the turn of the last century with those done in the 1980s suggest that catches of many nearshore species declined by 50%–80% in the 20th century (Cobb, 1902; Shomura, 1987; Smith, 1993). It is difficult not to conclude that fish populations in the main Hawaiian islands have been diminished in the past century, despite the difficulty in obtaining historical, quantitative data to verify this conclusion.

Another area of concern is offshore longline fishing from the Hawaiian islands, which has become controversial in recent years. The main controversies over this fishery have been about the bycatch of sea turtles, marine mammals, seabirds, and sharks. The fish species caught by longliners are primarily tunas, billfish, sharks, and other circumglobal, large pelagic species, many of which are caught in international waters. These are widespread, highly abundant species which have healthy populations even if fluctuations in their abundance in Hawaiian waters or disputes about fisheries issues sometime give the impression that their numbers are reduced. Swordfish (*Xiphias gladius*) stocks are healthy in the Pacific (Kleiber & Yokawa, 2002), in contrast to the Atlantic where they were the focus of a conservation campaign in recent years (National Oceanic and Atmospheric Administration, 1999). Concern that blue marlin (*Makaira nigricans*) stocks were potentially overfished (National Oceanic and Atmospheric Administration, 1996) were recently refuted (URS Corporation, 2000; Kleiber *et al.* 2003). The bycatch of sharks, from which fins were taken for Asian markets, generated much attention in Hawai'i at the end of the 20th century. Most of the sharks taken by longliners were blue shark (*Prionace glauca*), a relatively fast-growing and fecund oceanic species. Blue shark are not overfished in the North Pacific (URS Corporation, 2000; Kleiber *et al.*, 2001). Nevertheless, state and federal laws now prohibit the landing of shark fins without the shark attached, which greatly reduced the landing of shark fins in Hawai'i.

Many shark species other than blue shark are easily overfished, however, because of their low reproductive rate and slow growth (Bonfil, 1994). Two other fisheries targeted sharks in Hawaiian waters in the past. Shark eradication efforts in the 1950s to 1990s resulted from public reactions to shark attacks on swimmers (Wetherbee *et al.*, 1994) and a small, nearshore, bottom longline fishery for sharks existed briefly in the 1990s. Both stopped when public concern for shark conservation increased.

Fishes associated with coral reefs are another group of concern for population depletion (Clark & Gulko, 1999). Many of these species are most abundant at healthy coral reefs and are thus very susceptible to habitat damage. This is particularly true of obligate corallivores such as the blue-eye damselfish (*Plectroglyphidodon johnstonianus*) and the butterflyfishes *Chaetodon multicinctus*, *C. ornatissimus*, and *C. lunulatus*. But there is no evidence at present that these species are at risk in the Hawaiian Islands. The more subtle effect of alteration of coral-reef ecosystem function through changes in trophic structure of fish communities by removal of large predators is an emerging conservation concern (DeMartini *et al.*, 1999; Friedlander & DeMartini, 2002). Changes in dominance from carnivores to herbivores due to the removal of large predatory species have had drastic effects on coral reefs at many places in the world, including shifts toward reef-fish populations composed

of smaller, more rapidly reproducing species and even replacement of corals on reefs by algae (Jackson *et al.*, 2001). Comparisons of reef fish communities in the main and Northwestern Hawaiian Islands suggest that shifts in trophic dominance due to fishing have occurred in the main islands (Maragos & Gulko, 2002; Friedlander & DeMartini, 2002). Several large research initiatives were begun at the turn of the 21st century to assess the health of coral reef ecosystems in Hawai'i, as well as at other U.S. islands of the Pacific (Clarke and Gulko, 1999; Maragos & Gulko, 2002). These will provide more information on the conservation status of reef fishes within the Hawaiian Archipelago.

There is great concern about the depletion of coral reef fish numbers in certain areas by the fishery for the aquarium trade. These concerns often arise from conflicts between aquarium fish collectors and recreational divers or diving businesses, which rely in different ways on healthy reef fish populations. These conflicts have been most pronounced on the Kona Coast of Hawai'i Island, although they also have occurred at Maui, O'ahu, and Kaua'i. There is evidence of depletion of reef fish populations and alteration of fish community structure off the Kona Coast that have been linked to the fisheries in addition to environmental changes (Clark & Gulko, 1999; Tissot & Hallacher, 2003). In 1996, Act 306 was passed by the Hawai'i State Legislature which set aside at least 30% of the Kona Coast as fish replenishment areas (FRA) within which aquarium fish collecting would be prohibited. All fishing would be prohibited within certain small areas of the FRA. If successful, this effort could ensure that reef fish populations along that coast would remain robust.

Introduced species are another threat to indigenous fish populations, although the damage from species introductions in Hawai'i's aquatic ecosystems are far less than the damage to terrestrial ecosystems (Stone & Stone, 1989; Devick, 1991; Loope, 1999). As with habitat alteration, the threats to Hawai'i's fishes from introduced species are far greater for the five indigenous freshwater species than for marine species. There is a widespread perception among fishermen that introduced marine species, particularly ta'ape or bluestripe snapper (*Lutjanus kasmira*), have harmed indigenous fish populations through competition and predation (Oda & Parrish, 1981; Randall, 1987a). But in general, there is little evidence for diminishment of marine fish populations in the Hawaiian Islands from the direct effects of introduced species. The worst effects of introductions are from their impacts on marine ecosystem function in general, particularly by habitat alteration (Clark & Gulko, 1999). Introduced marine algae may have the greatest adverse impact in this regard. A review of marine species introductions in Hawaiian waters can be found in Coles *et al.* (1997) and in the references cited therein. Thirty-seven marine fish species have been introduced to the Hawaiian Islands, of which 14 have established reproducing populations (Tables 7 and 20). Introductions prior to 1980 were primarily by federal or state government agencies for research or fisheries enhancement. This practice has almost entirely stopped. In more recent years, the primary source of additional species released into Hawai'i's marine waters is suspected to have been the aquarium trade and hobby. Only two of these recently released species, the lemonpeel angelfish (*Centropyge flavissimus*) and the flame angelfish (*Centropyge loriculus*), may have become established. *Centropyge loriculus* is an indigenous Hawaiian Islands species, but fish at He'eia Boat Harbor, O'ahu, have the color pattern of populations from other areas of the Pacific. These are known to be the descendants of fish released from imported aquarium stock.

Many more introduced freshwater species have become established in Hawaiian waters than nonindigenous marine species (Table 20). The trends in sources and patterns of freshwater fish introductions discussed by Devick (1991) have not changed in the decade since his excellent analysis. Adverse effects on indigenous stream species from introduced species are often part of a suite of impacts resulting from anthropogenic habitat alterations, rather than isolated threats. It is thus usually difficult to ascribe declines of Hawai'i's freshwater species to one cause alone and as with marine species the impacts from introduced species are most likely greatest in the alteration of ecosystem function. The best documented case thus far in which introduced fishes have been directly implicated as the cause of decline in Hawai'i's endemic species is that of *Megalagrion* damselflies, which are no longer found in streams where introduced Poeciliidae exist in numbers (Englund, 1999). Another clearly identifiable direct adverse impact from freshwater species introductions is the incidental introduction and dispersal of nonindigenous diseases and parasites (Devick, 1991; Font & Tate, 1994; Font & Rigby, 2000). Disease introductions are of concern for both freshwater and marine ecosystems, as evidenced by the purposeful release into Kāne'ohe Bay of diseased pomacanthids by an aquarium fish importer in the mid-1990s. The dispersal of diseases through translocations of animals is a growing concern for resource managers throughout the country. In contrast to the damage done by poeciliids to Hawai'i's stream environments, introduced rainbow trout (*Oncorhynchus mykiss*) were found to have little adverse effect on indigenous stream species (Englund & Polhemus, 2001). This benign example is an exception to the generally non-beneficial results of fish introductions into Hawai'i's waters, however.

The State of Hawai'i implemented an education campaign during the 1980s and 1990s in an effort to reduce the number of new nonindigenous species released into the state. At the same time, the State of Hawai'i Department of Agriculture received requests for the approval of importation of almost 2000 species of fish not

previously brought here. From the continued appearance of new fish species in Hawaiian waters through the 1990s it is apparent that the release of nonindigenous species into open waters of the state has slowed but not ceased. The most recent introductions have most likely come from yet another pathway: transport by ship traffic in ballast water or ship-hull fouling.

The impacts from anthropogenic global climate change may have little effect on fish populations in the islands, as evidenced from the resiliency of the populations after the most recent ice-age, eustatic sea-level changes. In this respect, fish populations will probably be much more secure in the islands than will the human population.

These threats to Hawai'i's freshwater fishes are exceptions to the generally good conservation status of fishes in the region. One reason that fish populations of the state are relatively secure from other threats is that a vast refuge protecting them exists in the Northwestern Hawaiian Islands. The Northwestern Hawaiian Islands are U.S. Fish and Wildlife Service wildlife refuges, with the surrounding waters designated as a coral reef ecosystem reserve (Presidential Executive Order 13178). The Northwestern Hawaiian Islands are thus more secure from impacts such as coastal development and species introductions than are the main islands. Fishing is allowed in the Northwestern Hawaiian Islands, but there are management limits that keep fishing pressure there far lower than in the main islands. Among these are a prohibition against longlining within 50 nmi of shore to protect the endangered Hawaiian monk seal and a limited-entry system for bottomfish and lobster fishing vessels within some of the Northwestern Hawaiian Islands to protect the stocks of those resources. As this paper was being written, fisheries management of the coral reef ecosystem reserve was under review with the prospect of changing the reserve to a National Marine Sanctuary.

Two factors are most influential in making the Northwestern Hawaiian Islands effective refuges for fish populations. The absence of permanent human populations on almost all of the islands eliminates the shore-fishing pressures that impact fish populations in the main islands. And the vast distances between the islands naturally inhibits much of the human activity that adversely affects fishes in other parts of the world. These factors protect the Hawaiian Islands populations of almost all fishes except for those in habitats limited to the high islands. These species are of concern for their sustained population health but high-island fish populations are somewhat protected by management regulations and small marine conservation areas in the main Hawaiian Islands (Clark & Gulko, 1999). As long as the Northwestern Hawaiian Islands and other protected areas exist, the prognosis for the sustained conservation of healthy marine fish populations in the Hawaiian region is very good.

## ANNOTATED CHECKLIST OF FISHES

**Phylum Chordata**  
**Subphylum Cephalochordata**  
**Amphioxiformes**

**Epigonichthyidae — Lancelets<sup>1</sup>**

***Epigonichthys lucayanus* (Andrews)**

*Asymmetron lucayanum* Andrews, 1893, p. 213–247, North Bimini, Bahamas.

*Branchiostoma pelagicum* Günther, 1889, p. 43, north of Honolulu, Hawaiian Islands (23°3'N, 156°6'W).

*Branchiostoma pelagicum* Günther, 1889: Günther (1889).

*Amphioxides pelagicus* (Günther, 1889): Jordan & Evermann (1905), Fowler (1928), Bigelow & Perez-Farfante (1948), Wickstead (1971), Boehlert & Mundy (1992).

*Asymmetron lucayanum* Andrews, 1893: Bigelow & Perez-Farfante (1948), Huang & Yang (1979), Nishikawa (1980).

*Epigonichthys lucayanum* (Andrews, 1893): Gibbs & Wickstead (1996), Richardson & McKenzie (1995), Richardson & Eldredge (1997).

*Epigonichthys lucayanus* (Andrews, 1893): Poss & Boschung (1996).

TAXONOMY: Poss & Boschung (1996) noted that *Branchiostoma pelagicum* is the senior name for this species. They stated that they applied to the International Commission for Zoological Nomenclature for plenary suppression of Günther's name, given to a planktonic larval form, in order to preserve the stability of Andrew's more widely recognized name, given to the benthic adult stage. The application for suppression of *B. pelagicum* was in fact not made (S. Poss, pers. comm., 6 Jan. 2000) leaving this taxonomic problem unresolved.

COMMON NAMES: Sharptail lancelet.

HAWAIIAN RECORDS: O'ahu to the Hancock Seamounts at 20–30 m; larvae planktonic at 0–200 m (Günther, 1889; Boehlert & Mundy, 1992; Richardson & Eldredge, 1997).

GENERAL RANGE: Circum-subtropical except the eastern Pacific Ocean. In the Atlantic Ocean from Florida to Brazil eastward to St. Helena and Ascension Islands. In the Indian and Pacific oceans from Zanzibar and the Maldives to northern Australia, the Ryukyus, northeast of Norfolk Island, Samoa, the Caroline Islands, and the Hawaiian Islands. Benthic, burrowing in sand at 2–82 m, but may swarm at the surface at night. Larvae ("*Amphioxides pelagicus*") planktonic from 1–915 m (Bigelow & Perez-Farfante, 1948; Wickstead, 1971; Huang & Yang, 1979; Nishikawa, 1980; Richardson & McKenzie, 1994; Gibbs & Wickstead, 1996; Poss & Boschung, 1996; Richardson & Eldredge, 1997).

***Epigonichthys maldivensis* (Forster Cooper)**

*Heteropleuron maldivense* Forster Cooper, 1903, p. 349–352, Maldive and Laccadive Islands.

*Amphioxides valdiviae* Goldschmidt, 1905: Bigelow & Perez-Farfante (1948), Wickstead (1964, 1980).

*Asymmetron maldivensis* (Forster Cooper, 1903): Wickstead (1964, 1980).

*Asymmetron parvum* (Parker, 1904): Wickstead (1964, 1980).

*Asymmetron maldivense* (Forster Cooper, 1903): Nishikawa (1980).

*Asymmetron agassizii* (Parker, 1904): Wickstead (1980).

*Epigonichthys maldivensis* (Forster Cooper, 1903): Eldredge (1967), Richardson & McKenzie (1995), Poss & Boschung (1996).

TAXONOMY: Poss & Boschung (1996).

COMMON NAMES: Lancelet.

HAWAIIAN RECORDS: O'ahu at 29–37 m (Eldredge, 1967). Larval *E. maldivensis* ("*Amphioxides valdiviae*") have been collected off O'ahu at 1–80 m (B. Mundy, unpublished data).

GENERAL RANGE: Indo-Pacific from East Africa, Zanzibar, Madagascar and the Maldives to the northern Great Barrier Reef, New Caledonia, southern Japan and the Hawaiian Islands. Burrowing in sand at 16–1097 m (Eldredge, 1967; Wickstead, 1980; Nishikawa, 1980; Richardson & McKenzie, 1994; Poss & Boschung, 1996). Larvae are planktonic at 1–80 m (Bigelow & Perez-Farfante, 1948). Older records from the Atlantic Ocean off West Africa, Tenerife, and of the mouth of the Amazon need confirmation (Bigelow & Perez-Farfante, 1948; Wickstead, 1964; Poss & Boschung, 1996).

**Subphylum Vertebrata**  
**Superclass Agnatha**  
**Class Myxini**  
**Myxiniformes — Hagfishes**

**Myxinidae**

***Eptatretus carlhubbsi* McMillan & Wisner**

*Eptatretus carlhubbsi* McMillan & Wisner, 1984, p. 256, Figs. 2, 3(1), 5(1–9), 6, “near Wake Island” at 19°18'N, 166°33.5'E.

*Eptatretus carlhubbsi* McMillan & Wisner, 1984; McMillan & Wisner (1984), Wilson *et al.* (1985).

TAXONOMY: McMillan & Wisner (1984).

COMMON NAMES: Giant hagfish.

HAWAIIAN RECORDS: Moloka'i to Brooks Bank at 481–835 m (McMillan & Wisner, 1984).

GENERAL RANGE: Pacific endemic known from Guam, Horizon Guyot near Wake Island, and the Hawaiian Islands. Benthic at 481–1574 m (McMillan & Wisner, 1984).

**Superclass Gnathostomata**  
**Class Chondrichthyes**  
**Subclass Holocephali**  
**Chimaeriformes**

**Chimaeridae — Shortnose chimaeras, Ratfishes**

[*Chimaera owstoni* Tanaka]

*Chimaera owstoni* Tanaka, 1905, p. 10, Pl. 1 (figs. 2–3), Inatori, Idzu, Sagami Bay, Japan.

*Chimaera owstoni* Tanaka, 1905; Bigelow & Schroeder (1953b), Dolganov (1982), Humphreys *et al.* (1984).

Unidentified *Chimaera* species?: Borets (1986).

TAXONOMY: Bigelow & Schroeder (1953b).

COMMON NAMES: Ratfish.

HAWAIIAN RECORDS: Records from the Koko and Milwaukee Seamounts at 290–630 m (Dolganov, 1982; Humphreys *et al.*, 1984; Borets, 1986) suggest that *C. owstoni* could occur at the Hancock Seamounts.

GENERAL RANGE: Western and central North Pacific endemic known from Sagami Bay, Japan, to the Emperor Seamounts. Engybenthic at 290–630 m (Dolganov, 1982).

***Hydrolagus purpureus* (Gilbert)**

*Chimaera purpureus* Gilbert, 1905, p. 582, Fig. 231, Vicinity of Kaua'i, Hawaiian Islands.

*Chimaera purpurascens* Jordan & Snyder, 1904 [not available as a valid name]: Jordan & Snyder (1904c), Eschmeyer (1998).

*Chimaera purpureus* Gilbert, 1905; Gilbert (1905).

*Chimaera gilberti* Garman, 1911 [an unneeded replacement name for *C. purpurascens* Jordan & Snyder, 1904]: Fowler (1928).

*Hydrolagus purpureus* (Gilbert, 1905): Fowler (1949), Bigelow & Schroeder (1953b), Gosline & Brock (1960), Novikov *et al.* (1981), Tinker (1982), Masuda *et al.* (1984), Wilson *et al.* (1985), Chave & Mundy (1994).

TAXONOMY: Bigelow & Schroeder (1953b).

COMMON NAMES: Ratfish.

HAWAIIAN RECORDS: Lō'ihi and Hawai'i Island to the Hancock and Koko seamounts at 1150–1951 m (Gilbert, 1905; Novikov *et al.*, 1981; Chave & Mundy, 1994).

GENERAL RANGE: Western and central North Pacific endemic known from the Tohoku District, Japan, to the Hawaiian Islands. Engybenthic at 1150–1951 m (Masuda *et al.*, 1984; Chave & Mundy, 1994).



**Rhinochimaeridae*****Rhinochimaera pacifica*** (Mitsukuri)

*Harriotta pacifica* Mitsukuri, 1895, p. 97, Pl. 16, Tokyo fish market specimen from Kurihama near Misaki, Sagami Bay, Japan.

*Rhinochimaera pacifica* (Mitsukuri, 1895): Paxton *et al.* (1989), Last & Stevens (1994), Shao & Hwang (1997), Chave & Malahoff (1998).

TAXONOMY: Last & Stevens (1994).

HAWAIIAN RECORDS: Lānaʻi to Oʻahu at 1000–1136 m (Chave & Malahoff, 1998).

GENERAL RANGE: Known from the Indian and Pacific oceans at disjunct localities from western Australia to Japan, Taiwan, southern Australia, New Zealand, the Hawaiian Islands, and Peru. Paxton *et al.* (1989) listed the North and southeastern Atlantic Ocean as within the range of *R. pacifica* but this may have been an error. Engyobenthic on deep slopes at 400–1290 m (Paxton *et al.*, 1989; Last & Stevens, 1994; Shao & Hwang, 1997; Chave & Malahoff, 1998).

**Subclass Elasmobranchii<sup>2</sup>**  
**Orectolobiformes**

**Rhincodontidae — Whale sharks*****Rhincodon typus*** Smith

*Rhincodon typus* Smith, 1828, p. 2, Table Bay, South Africa [name suppressed by ICZN Opinion 1278].

*Rhincodon typus* Smith, 1829, p. 433, Table Bay, South Africa.

*Rhineodon typus* Smith, 1828 [*lapsus*]: Fowler (1928).

*Rhincodon typus* Smith, 1829: Gosline & Brock (1960), Kato *et al.* (1967), Tinker (1982), Compagno (1984a, 2001), Wolfson (1986), Myers (1989), Taylor (1993), Allen & Robertson (1994), Last & Stevens (1994), Crow & Crites (2002), Hoover (2003).

TAXONOMY: Compagno (2001).

COMMON NAMES: Lele waʻa? (Taylor, 1993), Whale shark (AFS; FAO; Randall *et al.*, 1997a; Hoover, 2003).

HAWAIIAN RECORDS: Hawaiʻi Island to Kauaʻi (northern limit unknown) at the surface to undetermined depths. Undoubtedly occurs at Johnston Atoll although no published records have been found (Gosline & Brock, 1960; Wolfson, 1986; Taylor, 1993; Crow & Crites, 2002).

GENERAL RANGE: Circumglobal, oceanic and coastal, in all tropical and subtropical seas except the Mediterranean. Epipelagic from the surface to 700 m (Compagno, 1984a, 2001; Wolfson, 1986; Myers, 1989; Taylor, 1993; Allen & Robertson, 1994).

**Carcharhiniformes**  
**Scyliorhinoidei**

**Scyliorhinidae — Cat sharks*****Apristurus spongiceps*** (Gilbert)

*Catulus spongiceps* Gilbert, 1905, p. 579, vicinity of “Bird Island” [= Nihoa], Hawaiian Islands.

*Catulus spongiceps* Gilbert, 1905: Gilbert (1905).

*Apristurus spongiceps* (Gilbert, 1905): Fowler (1928), Gosline & Brock (1960), Kato *et al.* (1967), Tinker (1982), Compagno (1984b), Nakaya (1991), Crow & Crites (2002).

*Pentanchus spongiceps* (Gilbert, 1905): Fowler (1949).

*Parapristurus spongiceps* (Gilbert, 1905): Springer (1979).

TAXONOMY: Compagno (1984b), Nakaya (1991).

COMMON NAMES: Spongehead catshark (FAO).

HAWAIIAN RECORDS: One specimen (holotype) from near “Bird Island” [= Nihoa], (but wrongly reported as Laysan Island or near Pearl and Hermes Reef in some sources), collected in a tow with fishing depths of 572–1463 m (Gilbert, 1905; Crow & Crites, 2002).

GENERAL RANGE: Western and central Pacific endemic, but only two specimens known, from the Hawaiian Islands and the Banda Sea off Sulawesi. Benthic between 572–1463 m (Springer, 1979; Compagno, 1984b).

### **Pseudotriakidae — False cat sharks**

#### ***Pseudotriakis microdon* Capello**

*Pseudotriakis microdon* Brito Capello, 1868, p. 316, Pl. 5 (fig. 1), Setubal, Portugal.

*Pseudotriakis acrages* [a misspelling of *Pseudotriakis acrales* Jordan & Snyder, 1904, originating from Garman's (1913) *lapsus* (see Eschmeyer 1998); *Pseudotriakis acrales* is considered to be a junior synonym of *P. microdon*]: Tester (1969), Tinker (1982).

*Pseudotriakis microdon* Brito Capello, 1867: Compagno (1984b), Yano & Musick (1992), Taylor (1993), Chave & Mundy (1994), Crow & Crites (2002).

TAXONOMY: Yano & Musick (1992).

COMMON NAMES: False cat shark (AFS; FAO).

HAWAIIAN RECORDS: Hawai'i Island to O'ahu at 173–500 m (Tester, 1969; Chave & Mundy, 1994; Crow & Crites, 2002).

GENERAL RANGE: Disjunct records in the western and eastern North Atlantic, off Madagascar, Japan, Taiwan, New Zealand, and the Hawaiian Islands. Engyebenthic at 173–1890 m (Compagno, 1984b; Yano & Musick, 1992).

### **Triakidae — Houndsharks**

#### **[*Galeorhinus galeus* (Linnaeus)]**

*Squalus galeus* Linnaeus, 1758, p. 234, Habitat in Oceano Europae.

*Galeus vulgaris* Steindachner, 1900: Steindachner (1900).

*Galeus japonicus* non (Müller & Henle, 1839) [Compagno (1984b) listed *Galeus japonicus* as a junior synonym of *Hemitriakis japanica* (Müller & Henle, 1839), a species not recorded from the Hawaiian Islands]: Jordan & Evermann (1905).

*Galeorhinus zyopterus* Jordan & Gilbert, 1883: Gosline & Brock (1960 text), Kato *et al.* (1967), Tinker (1982).

*Galeorhinus galeus* (Linnaeus, 1758): Steindachner (1900), Fowler (1928), Gosline & Brock (1960, checklist), Compagno (1984b), Taylor (1993), Last & Stevens (1994), Crow & Crites (2002).

TAXONOMY: Compagno (1984a).

COMMON NAMES: Tope (AFS, FAO), School shark.

HAWAIIAN RECORDS: Recorded from Laysan by Steindachner (1900) but his record was probably a misidentification of a species in another family (Compagno, 1984b; Crow & Crites, 2002). The central Pacific locality shown by Last & Stevens (1994) in their distribution map was probably based on Steindachner's false record from the Hawaiian Islands. *Galeorhinus galeus* does not occur in the Hawaiian Islands.

GENERAL RANGE: Circum-temperate at isolated, primarily continental, localities in the western South Atlantic, eastern North and South Atlantic, South Africa in the Indian Ocean, Australia, New Zealand, and the eastern North and South Pacific. Perhaps antitropical. Coastal, engyebenthic or semipelagic at 2–550 m (Compagno, 1984b; Last & Stevens, 1994).

### **Carcharhinidae — Requiem sharks<sup>3</sup>**

#### ***Carcharhinus albimarginatus* (Rüppell)**

*Carcharias albimarginatus* Rüppell, 1837, p. 64, Pl. 18 (fig. 1), Ras Muhammad, Red Sea.

*Carcharhinus albimarginatus* (Rüppell, 1837): Tinker (1982), Garrick (1982), Compagno (1984b), Myers (1989), Allen & Robertson (1994), Taylor (1993), Last & Stevens (1994), Robertson & Allen (2002), Ford *et al.* (2004).

TAXONOMY: Garrick (1982), Compagno (1984b).

COMMON NAMES: Silvertip shark (AFS; FAO; Randall *et al.* 1996).

HAWAIIAN RECORDS: One individual was reliably recorded from O'ahu at ca. 30 m in 2004 (Ford *et al.*,

2004). Tinker (1982) included *C. albimarginatus* in his book with the comment “It is believed to occur in the Hawaiian area although this occurrence has not been well documented”. Neither Garrick (1982), Compagno (1984b) nor Taylor (1993) included the Hawaiian Islands in the range of this species, and Myers (1989) stated that it is absent in the Hawaiian Islands. This suggests that the individual recorded by Ford *et al.* (2004) was probably a waif.

GENERAL RANGE: Indo-Pacific, perhaps also in the Caribbean Sea and Gulf of Mexico, recorded from isolated localities from South Africa and the Red Sea to Indonesia, Japan, northern Australia, Micronesia, the Society Islands, and Baja California to Ecuador. Apparently occurs in the Hawaiian Islands as a waif. Engyobenthic and benthopelagic at 1–800 m (Compagno, 1984b; Last & Stevens, 1994; Robertson & Allen, 2002).

### *Carcharhinus altimus* (Springer)

*Eulamia altima* Springer, 1950, p. 9, off Cosgrove Reef, Key West, Florida.

*Carcharhinus altimus* (Springer, 1950): Tester (1969), Tinker (1982), Garrick (1982), Compagno (1984b), Taylor (1993), Allen & Robertson (1994), Last & Stevens (1994), Crow *et al.* (1996), Crow & Crites (2002).

TAXONOMY: Garrick (1982), Compagno (1984b).

COMMON NAMES: Manō (Taylor, 1993), Bignose shark (AFS; FAO; Randall *et al.* 1996).

HAWAIIAN RECORDS: O‘ahu to Kaua‘i at 27–360 m (Tester, 1969; Crow *et al.*, 1996; Crow & Crites, 2002).

GENERAL RANGE: Circumglobal in all tropical and subtropical seas, but with a discontinuous distribution.

Bottom associated near shelf breaks and drop-offs at 90–810 m although young may occur at 25 m (Compagno, 1984b; Allen & Robertson, 1994; Last & Stevens, 1994; Crow *et al.*, 1996).

### *Carcharhinus amblyrhynchos* (Bleeker)

*Carcharias (Prionodon) amblyrhynchos* Bleeker, 1856a, p. 467, Java Sea near Solombo Islands, Indonesia.

*Carcharias gangeticus* non Müller & Henle, 1839 [a valid *Glyphis* species not found in the Hawaiian Islands]: Steindachner (1900).

*Carcharias nesiotes* Snyder, 1904: Snyder (1904), Jordan & Evermann (1905).

*Carcharhinus nesiotes* (Snyder, 1904): Gosline & Brock (1960), Tinker (1982).

*Carcharhinus menisorrah* non (Müller & Henle, 1839) [a junior synonym of *C. falciformis* (Müller & Henle, 1839), often incorrectly applied to *C. amblyrhynchos* (see Garrick, 1982)]: Tester (1969), Kato *et al.* (1967).

*Carcharhinus amblyrhynchos* (Bleeker, 1856a): Compagno (1984b), Okamoto & Kanenaka (1984), Randall *et al.* (1985a), Uchida & Uchiyama (1986), Myers (1989), Randall *et al.* (1993b), Hoover (1993, 2003), Taylor (1993), Chave & Mundy (1994), Last & Stevens (1994), Randall (1996a), Wetherbee *et al.* (1997), Robertson & Allen (2002), Crow & Crites (2002).

TAXONOMY: Compagno (1984b).

COMMON NAMES: Manō (Hoover, 1993, 2003; Randall, 1996), Gray reef shark (AFS; FAO; Hoover, 1993, 2003; Randall, 1996).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to Kure at 10–275 m (Steindachner, 1900; Snyder, 1904; Tester, 1969; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b; Randall *et al.*, 1993b; Wetherbee *et al.*, 1997; Crow & Crites, 2002).

GENERAL RANGE: Indo-Pacific from Madagascar to China, Lord Howe Island, the Hawaiian Islands, and Pitcairn Island. Coastal-pelagic near the bottom, often near drop-offs, at 1–275 m (Compagno, 1984b; Chave & Mundy, 1994; Wetherbee *et al.*, 1997; Robertson & Allen, 2002).

### *Carcharhinus falciformis* (Müller & Henle)

*Carcharias (Prionodon) falciformis* Müller & Henle, 1839, p. 47, Cuba.

*Eulamia floridanus* (Bigelow, Schroeder & Springer, 1943): Strasburg (1958), Gosline & Brock (1960).

*Carcharhinus menisorrah* non (Müller & Henle, 1839) [See *C. amblyrhynchos*].

*Carcharhinus falciformis* (Müller & Henle, 1839): Kato *et al.* (1967), Tester (1969), Garrick (1982), Tinker (1982), Compagno (1984b), Uchida & Uchiyama (1986), Myers (1989), Taylor (1993), Allen & Robertson (1994), Last & Stevens (1994), Crow *et al.* (1996), Crow & Crites (2002).

TAXONOMY: Compagno (1984b).

COMMON NAMES: Manō (Taylor, 1993), Silky shark (AFS; FAO; Randall *et al.*, 1997a).

HAWAIIAN RECORDS: O‘ahu to Laysan and the Hancock Seamounts at 37 m (Strasburg, 1958; Gosline &

Brock, 1960; Tester, 1969; Compagno, 1984b; Uchida & Uchiyama, 1986; Crow *et al.*, 1996; Crow & Crites, 2002; NMFS, unpubl. data for the Hancock Seamounts).

GENERAL RANGE: Circumglobal in all tropical and subtropical seas except the Mediterranean, straying into temperate waters. Distribution discontinuous. Littoral and epipelagic, near the bottom or in the open sea at 18–500 m (Compagno, 1984b; Allen & Robertson, 1994).

***Carcharhinus galapagensis*** (Snodgrass & Heller)

*Carcharias galapagensis* Snodgrass & Heller, 1905, p. 343, Galapagos Islands.

*Carcharhinus obscurus* non (Lesueur, 1818): Tinker (1982)?, De Crosta *et al.* (1984)? See discussion of *C. obscurus*.

*Carcharhinus galapagensis* (Snodgrass & Heller, 1905): Kato *et al.* (1967), Tester (1969), Garrick (1982), Tinker (1982), Compagno (1984b), Randall *et al.* (1985a), Uchida & Uchiyama (1986), Myers (1989), Randall *et al.* (1993b), Hoover (1993, 2003), Taylor (1993), Last & Stevens (1994), Randall (1996a), Wetherbee *et al.* (1996), Crow & Crites (2002 text but not photograph).

TAXONOMY: Garrick (1982), Compagno (1984b).

COMMON NAMES: Manō (Hoover, 1993, 2003; Randall, 1996), Insular shark (AFS), Galapagos shark (FAO; Hoover, 1993, 2003; Randall, 1996).

HAWAIIAN RECORDS: Hawai'i Island to Midway and the Hancock Seamounts, perhaps also Johnston Atoll, at 1–286 m (Tester, 1969; Randall *et al.*, 1985b; Uchida & Uchiyama, 1986; Randall *et al.*, 1993b; Wetherbee *et al.*, 1996; Crow & Crites, 2002; NMFS, unpubl. data for the Hancock Seamounts).

GENERAL RANGE: Circumglobal in the tropical and subtropical Indian, Pacific, and Atlantic oceans. Distribution disjunct and generally associated with oceanic islands. Often bottom associated but sometimes pelagic at 1–286 m (Compagno, 1984b; Last & Stevens, 1994).

***Carcharhinus limbatus*** (Müller & Henle)

*Carcharias (Prionodon) limbatus* Müller & Henle, 1839, p. 49, [Pl. 19 (teeth)], Martinique Island, West Indies.

*Carcharias phorcys* Jordan & Evermann, 1903: Jordan & Evermann (1903a, 1905).

*Eulamia sorrah* non (Müller & Henle, 1839) [a valid species that does not occur in the Hawaiian Islands]: Fowler (1928, in part).

*Eulamia limbatus* (Müller & Henle, 1839): Fowler (1928).

*Eulamia phorcys* (Jordan & Evermann, 1903): Gosline & Brock (1960).

*Carcharhinus limbatus* (Müller & Henle, 1839): Kato *et al.* (1967), Tester (1969), Garrick (1982), Tinker (1982), De Crosta *et al.* (1984), Compagno (1984b), Myers (1989), Taylor (1993), Allen & Robertson (1994), Crow *et al.* (1996), Crow & Crites (2002).

TAXONOMY: Garrick (1982), Compagno (1984b).

COMMON NAMES: Manō pā'ele (Taylor, 1993), Blacktip shark (AFS; FAO; Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Hawai'i Island to Midway at 13–64 m (Jordan & Evermann, 1903a, 1905; Tester, 1969; DeCrosta *et al.*, 1984; Crow *et al.*, 1996; Crow & Crites, 2002).

GENERAL RANGE: Circumglobal in all tropical and subtropical seas but distribution disjunct. Bottom associated or pelagic at 1–64 m; usually at <31 m (Compagno, 1984b; Allen & Robertson, 1994; Last & Stevens, 1994; Crow *et al.*, 1996).

***Carcharhinus longimanus*** (Poey)

*Squalus longimanus* Poey, 1861, p. 338, Pl. 19 (figs. 9–10), Cuba.

*Carcharias insularum* Snyder, 1904: Snyder (1904), Jordan & Evermann (1905).

*Pterolamiops longimanus* (Poey, 1861): Gosline & Brock (1960), Tinker (1982).

*Carcharhinus longimanus* (Poey, 1861): Strasburg (1958), Kato *et al.* (1967), Garrick (1982), Compagno (1984b), Myers (1989), Boggs (1992), Taylor (1993), Allen & Robertson (1994), Last & Stevens (1994), Crow & Crites (2002).

TAXONOMY: Garrick (1982), Compagno (1984b).

COMMON NAMES: Manō (Taylor, 1993), Oceanic whitetip shark (AFS; FAO; Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Johnston Atoll, Cross Seamount, and Hawai'i Island to O'ahu at 1–230 m. Probably throughout the archipelago but seen most often at Hawai'i Island (Snyder, 1904; Strasburg, 1958; Garrick, 1982; Compagno, 1984b; Boggs, 1992; Crow & Crites, 2002).

GENERAL RANGE: Primarily oceanic in all tropical and subtropical seas except Mediterranean, straying into temperate areas. Epipelagic at 1–230 m, usually over water depths of >184 m (Compagno, 1984b; Boggs, 1992; Allen & Robertson, 1994; Last & Stevens, 1994).

***Carcharhinus melanopterus*** (Quoy & Gaimard)

*Carcharias melanopterus* Quoy & Gaimard, 1824, p. 194, Pl. 43 (figs. 1–2), Waigeo, Indonesia.  
*Carcharias melanopterus* Quoy & Gaimard, 1824: Steindachner (1900), Snyder (1904), Jordan & Evermann (1905).

*Eulamia melanopterus* (Quoy & Gaimard, 1824): Fowler (1928).

*Eulamia commersonii* (Blainville, 1816) [a *nomen nudum*]: Fowler (1928).

*Eulamia lamia* (Blainville, 1825) [Eschmeyer (1998) does not give the status of this name]: Fowler (1949).

*Carcharhinus melanopterus* (Quoy & Gaimard, 1824): Gosline & Brock (1960), Kato *et al.* (1967), Tester (1969), Garrick (1982), Tinker (1982), Compagno (1984b), Myers (1989), Taylor (1993), Last & Stevens (1994), Randall (1996a), Crow & Crites (2002).

TAXONOMY: Garrick (1982), Compagno (1984b).

COMMON NAMES: Manō pā‘ele (Randall, 1996), Blackfin reef shark (AFS), Blacktip reef shark (FAO; Randall, 1996).

HAWAIIAN RECORDS: Hawai‘i Island to O‘ahu at 1 m to unknown depths (Steindachner, 1900; Jordan & Evermann, 1905; Garrick, 1982; Taylor, 1993; Crow & Crites, 2002).

GENERAL RANGE: Indo-Pacific from Red Sea and South Africa to southeastern Australia and southern Japan, east to the Hawaiian Islands and Tuamotu Archipelago; the omission of the last two localities in Last & Stevens’ (1994) distribution map for this species is an error. Also eastern Mediterranean Sea, where it is a Lessepsian immigrant. Associated with coral reefs at shallow depths (Compagno, 1984b; Last & Stevens, 1994).

[*Carcharhinus munsing* (Bleeker)]

*Carcharias (Prionodon) munsing* Bleeker, 1849b, p. 16, Madura Straits near Kammal & Surabaya, Java, Indonesia.

TAXONOMY: Garrick (1982).

HAWAIIAN RECORDS: Fowler (1928) listed this species as occurring in Hawai‘i. Garrick (1982) stated that the species is unidentifiable, declaring the name a *nomen dubium*.

GENERAL RANGE: Not applicable (see above).

[*Carcharhinus obscurus* (Lesueur)]

*Squalus obscurus* Lesueur, 1818, p. 223, Pl. 9, unknown locality on the East Coast of North America.

*Carcharhinus obscurus* non (Lesueur, 1818): Tinker (1982), De Crosta *et al.* (1984).

TAXONOMY: Garrick (1982), Compagno (1984b), Last & Stevens (1994).

COMMON NAMES: Dusky shark (AFS; FAO), Black whaler (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Tinker (1982) and DeCrosta *et al.* (1984) listed this species as occurring in the Hawaiian Islands, but Garrick (1982) and Compagno (1984b) did not record the species from the region. Tinker’s record may have referred to the speculation of Kato *et al.* (1967) that *C. obscurus* is “possibly present at the Hawaiian Islands”. This in turn may have resulted from confusion of *C. obscurus* with *C. galapagensis*, a species of similar appearance at least as juveniles. De Crosta *et al.* (1984) listed both species, recording *C. obscurus* from French Frigate Shoals but the latter identification was probably based on second hand information from fishermen. Shark fishermen familiar with both species have also stated that both occur in their catches in the Hawaiian Islands (C. Boggs, pers. comm., 1999) but the identifications could have been of unusual *C. galapagensis* or even of *C. falciformis*. The dusky shark probably does not occur in the Archipelago (J. Crow, pers. comm.).

GENERAL RANGE: Almost circumtropical and subtropical, but distribution disjunct; known from both sides of the Atlantic, off South Africa, Madagascar, and western Australia in the Indian Ocean, and Japan, Taiwan, the Philippines, Indo-China, Australia, New Caledonia, Baja California, the Galapagos, and Chile in the Pacific. Engybenthic, benthopelagic, and pelagic in coastal waters from 1–400 m (Compagno, 1984b; Last & Stevens, 1994).

***Carcharhinus plumbeus*** (Nardo)

*Squalus plumbeus* Nardo, 1827, p. 26, Adriatic Sea.

*Carcharhinus milberti* (Müller & Henle, 1839): Kato *et al.* (1967), Tester (1969), Clarke (1972), Struhsaker (1973a), Tinker (1982), De Crosta *et al.* (1984).

*Carcharhinus plumbeus* (Nardo, 1827): Garrick (1982), Compagno (1984b), Uchida & Uchiyama (1986), Taylor (1993), Last & Stevens (1994), Randall (1996a), Robertson & Allen (2002), Crow & Crites (2002), Hoover (2003).

TAXONOMY: Garrick (1982), Compagno (1984b).

COMMON NAMES: Manō (Randall, 1996), Sandbar shark (AFS; FAO; Randall, 1996; Hoover, 2003).

HAWAIIAN RECORDS: Hawai'i Island to Necker at 20–278 m (Kato *et al.*, 1967; Tester, 1969; Uchida & Uchiyama, 1986; Crow & Crites, 2002).

GENERAL RANGE: Distribution disjunct in tropical and subtropical areas of the Atlantic, Indian, and western Pacific oceans. In the central Pacific, this species occurs only in the Hawaiian Islands and the Marquesas. Records from the eastern tropical Pacific are questionable. Coastal-pelagic, but usually bottom associated, at 1–280 m (Compagno, 1984b; Last & Stevens, 1994; Robertson & Allen, 2002).

***Galeocerdo cuvier*** (Peron & Lesueur)

*Squalus cuvier* Péron & Lesueur *in* Lesueur, 1822, p. 351, northwest coast of Australia.

*Galeocerdo tigrinus* Müller & Henle, 1839: Jordan & Snyder (1904a), Jordan & Evermann (1905).

*Galeocerdo arcticus* Faber, 1829: Fowler (1928).

*Galeocerdo cuvieri* (Péron & Lesueur *in* Lesueur, 1822) [an unjustified emendation of the name]: Gosline & Brock (1960), Kato *et al.* (1967), Uchida & Uchiyama (1986), Tinker (1982).

*Galeocerdo cuvier* (Péron & Lesueur *in* Lesueur, 1822): Tester (1969), Compagno (1984b), Randall *et al.* (1985a), Myers (1989), Randall (1992a), Randall *et al.* (1993b), Taylor (1993), Wetherbee *et al.* (1994), Allen & Robertson (1994), Randall (1996a), Crow & Crites (2002), Hoover (2003).

TAXONOMY: Compagno (1984b).

COMMON NAMES: Niuhi (Hoover, 1993; Taylor, 1993), Tiger shark (AFS; FAO; Hoover, 1993, 2003; Randall, 1996).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to the Hancock Seamounts at 1–371 m (Jordan & Snyder, 1904b; Jordan & Evermann, 1905; Tester, 1969; Randall *et al.*, 1985b, 1993b; Wetherbee *et al.*, 1994; Crow & Crites, 2002; NMFS, unpubl. data for the Hancock Seamounts).

GENERAL RANGE: Circumglobal in tropical to subtropical seas except the Mediterranean, frequently straying into temperate waters. Often bottom-associated but sometimes pelagic at 1–371 m (Compagno, 1984b; Randall, 1992a; Wetherbee *et al.*, 1994; Allen & Robertson, 1994).

***Prionace glauca*** (Linnaeus)

*Squalus glaucus* Linnaeus, 1758, p. 235, Habitat in Oceano Europaeo.

*Glyphis glaucus* (Linnaeus, 1758): Fowler (1928, 1949).

*Prionace glauca* (Linnaeus, 1758): Snyder (1904), Jordan & Evermann (1905), Strasburg (1958), Gosline & Brock (1960), Kato *et al.* (1967), Novikov *et al.* (1981), Tinker (1982), Compagno (1984b), Humphreys *et al.* (1984), Boggs (1992), Taylor (1993), Last & Stevens (1994), Crow *et al.* (1996), Crow & Crites (2002).

TAXONOMY: Compagno (1984b).

COMMON NAMES: Blue shark (AFS, FAO).

HAWAIIAN RECORDS: Throughout entire region from Hawai'i Island and the Hancock Seamounts, probably at Johnston Atoll, at 1–230 m (Snyder, 1904; Strasburg, 1958; Humphreys *et al.*, 1984; Boggs, 1992; Crow *et al.*, 1996; Crow & Crites, 2002).

GENERAL RANGE: Circumglobal in all tropical through temperate seas; the most widely distributed shark. Oceanic and epipelagic with occasional occurrences in littoral areas at 1–350 m (Compagno, 1984b; Last & Stevens, 1994).

***Sphyrna lewini*** (Griffith & Smith)

*Zygaena lewini* Griffith & Smith, 1834, p. 640, Pl. 50, south coast of Australia.

*Sphyrna tudes?* non (Valenciennes, 1822) [a valid species not found in the Hawaiian Islands]: Lay & Bennett (1839), Fowler (1928).

*Sphyrna oceanica* (Garman, 1913): Fowler (1928).

*Sphyrna lewini* (Griffith & Smith, 1834): Gosline & Brock (1960), Kato *et al.* (1967), Tester (1969), Clarke (1971), Tinker (1982), De Crosta *et al.* (1984), Compagno (1984b), Myers (1989, 1999), Pyle (1991), Hoover (1993, 2003), Taylor (1993), Last & Stevens (1994), Crow *et al.* (1996), Randall (1996a), Crow & Crites (2002).

TAXONOMY: Compagno (1984b).

COMMON NAMES: Manō-kihikihi (Hoover, 1993, 2003; Randall, 1996), Scalloped hammerhead (AFS; FAO; Hoover, 1993, 2003; Randall, 1996).

HAWAIIAN RECORDS: Hawai‘i Island to French Frigate at 1–275 m (Lay & Bennett, 1839; Fowler, 1928; Tester, 1969; Clarke, 1971; DeCrosta *et al.*, 1984; Pyle, 1991; Crow & Crites, 2002).

GENERAL RANGE: Circumglobal in all warm-temperate through tropical seas except perhaps Mediterranean; disjunct records in the central Pacific. Coastal, pelagic, and semi-oceanic, often bottom-associated, at 1–275 m (Compagno, 1984b; Myers, 1999).

### *Sphyrna mokarran* (Rüppell)

*Zygaena mokarran* Rüppell, 1837, p. 66, Pl. 17 (fig. 3), Massawa, Eritrea, Red Sea.

*Sphyrna mokarran* (Rüppell, 1837): Compagno (1984b), Pyle (1991), Last & Stevens (1994).

TAXONOMY: Compagno (1984b).

COMMON NAMES: Great hammerhead (AFS; FAO).

HAWAIIAN RECORDS: Pyle (1991) recorded this species from Hawai‘i Island to O‘ahu. The occurrence of *S. mokarran* in Hawai‘i has not been verified by collected specimens, but several reliable observations and at least one underwater photograph confirm its occasional presence in the Hawaiian Islands (R. Pyle, pers. comm., Mar. 2005).

GENERAL RANGE: Circumglobal in all tropical and subtropical seas, but known only from French Polynesia and occasionally from the Hawaiian Islands on the central Pacific tectonic plate. Coastal, pelagic, and semi-oceanic, often bottom and reef associated at 1–80 m (Compagno, 1984; Last & Stevens, 1994).

### *Sphyrna zygaena* (Linnaeus)

*Squalus zygaena* Linnaeus, 1758, p. 234, Habitat in Europa, America.

*Sphyrna zygaena* (Linnaeus, 1758): Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1934, 1949), Tester (1969), Tinker (1982), Compagno (1984b), Taylor (1993), Last & Stevens (1994), Crow *et al.* (1996), Crow & Crites (2002).

*Zygaena malleus* Valenciennes, 1822: Günther (1880), Wetmore (1890).

TAXONOMY: Compagno (1984b).

COMMON NAMES: Manō-kihikihi (Taylor, 1993), Smooth hammerhead (AFS; FAO).

HAWAIIAN RECORDS: Maui to Ni‘ihau at 33–139 m (Günther, 1880; Jordan & Evermann, 1905; Tester, 1969; Crow *et al.*, 1996; Crow & Crites, 2002). Two species of *Sphyrna* are definitely recorded from the Hawaiian Islands, despite Randall’s (1996a) statement that *S. lewini* is the only species known with certainty to occur here.

GENERAL RANGE: Distribution disjunct, circumglobal in all subtropical seas, perhaps anti-tropical. Known only from the Hawaiian Islands on the Pacific tectonic plate. Coastal, pelagic, and semi-oceanic, but often bottom associated, at 1–139 m (Compagno, 1984b; Crow *et al.*, 1996).

### *Triaenodon obesus* (Rüppell)

*Carcharias obesus* Rüppell, 1837, p. 64, Pl. 18 (fig. 2), Jidda, Saudi Arabia, Red Sea.

*Triaenodon obesus* (Rüppell, 1837): Fowler (1928, 1949), Gosline & Brock (1960), Kato *et al.* (1967), Randall (1977, 1996a), Tinker (1982), Compagno (1984b, 1988), Randall *et al.* (1985a, 1993b), Uchida & Uchiyama (1986), Myers (1989), Taylor (1993), Hoover (1993, 2003), Allen & Robertson (1994), Last & Stevens (1994), Robertson & Allen (2002), Crow & Crites (2002).

TAXONOMY: Compagno (1984b, 1988). This species is sometimes placed in the Hemigaleidae (Compagno, 1988; Allen & Robertson, 1994).

COMMON NAMES: Manō-lālā-kea (Hoover, 1993, 2003), Manō lālākeā (Randall, 1996), Lālākea (Taylor, 1993), Manō lālākea (Crow & Crites, 2002), Whitetip reef shark (AFS; FAO; Hoover, 1993, 2003; Randall, 1996).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure (more abundant in Northwestern Hawaiian Islands than main islands) at 11–122 m (Fowler, 1928; Randall, 1977; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Crow & Crites, 2002).

GENERAL RANGE: Indo-transPacific from South Africa and the Red Sea through Pakistan, India, western Australia to Central America. In the Pacific, from Queensland, Australia north to the Ryukyu Islands, to the Hawaiian Islands and the Pitcairn group, east to the offshore islands of the Americas, and El Salvador to northern Peru. Reef associated at 1–330 m, most often at 8–40 m (Compagno, 1984b; Allen & Robertson, 1994; Last & Stevens, 1994; Robertson & Allen, 2002).

## Lamniformes

### Lamnaoidei

#### Odontaspidae — Sand tigers

[*Carcharias taurus* Rafinesque]

*Carcharias taurus* Rafinesque, 1810, p. 10, Pl. 14 (fig. 1), Sicily.

*Eugomphodus taurus* (Rafinesque, 1810): Tinker (1982), Compagno (1984a).

*Odontaspis owstoni* (Garman, 1913): Borets (1986).

*Carcharias taurus* Rafinesque, 1810: Paxton *et al.* (1989), Last & Stevens (1994), Compagno (2001).

TAXONOMY: Compagno (2001).

COMMON NAMES: Sand tiger (AFS), Sandtiger shark (FAO), Grey nurse shark (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: A report of *C. owstoni*, a synonym of *C. taurus*, from Pedestal Seamount just north of the Hancock Seamounts at 260 m (Borets, 1986) probably refers to *Odontaspis ferox* or *O. noronhai*, as might Tinker's (1982) inclusion of this species among Hawaiian fishes (see Compagno's, 2001, discussion of *O. ferox*). *Carcharias taurus* is unknown from the central Pacific Ocean (Compagno, 1984a, 2001).

GENERAL RANGE: Antitropical through the subtropical and warm-temperate waters of the Atlantic, Indian, and western Pacific oceans; in the Pacific known from Japan to southern Australia, but not from the Pacific Plate or eastern Pacific. Engy-benthic at 1–191 m (Compagno, 1984a, 2001; Last & Stevens, 1994).

*Odontaspis ferox* (Risso)

*Squalus ferox* Risso, 1810, p. 38, Nice, France.

*Odontaspis ferox* (Risso, 1810): Clarke (1972), Randall (1976a), Tinker (1982), Compagno (1984a, 2001), Paxton *et al.* (1989), Taylor (1993), Allen & Robertson (1994), Last & Stevens (1994), Bonfil (1995), Robertson & Allen (2002), Crow & Crites (2002).

TAXONOMY: Compagno (2001).

COMMON NAMES: Ragged-tooth shark (AFS), Smalltooth sand tiger (FAO), Sand tiger shark.

HAWAIIAN RECORDS: O'ahu and Lisianski at 185–310 m; perhaps at the Hancock Seamounts at 260 m (see *Carcharias taurus*; Clarke, 1972; Randall, 1976a; Crow & Crites, 2002).

GENERAL RANGE: Discontinuously distributed in the Gulf of Mexico, eastern North Atlantic, Mediterranean, South Africa, Madagascar, central Indian Ocean, Japan, western and southeastern Australia, New Zealand, the Hawaiian Islands, Malpelo Island, and southern California to the tip of Baja California. Benthopelagic, near bottom at 13–420 m (Compagno, 1984b, 2001; Allen & Robertson, 1994; Last & Stevens, 1994; Bonfil, 1995; Robertson & Allen, 2002).

*Odontaspis noronhai* (Maul)

*Carcharias noronhai* Maul, 1955, p. 3, Figs. 1–4, Off Câmara de Lobos, Madeira.

*Odontaspis noronhai* (Maul, 1955): Compagno (1984a, 2001), Humphreys *et al.* (1989), Crow & Crites (2002).

TAXONOMY: Compagno (2001).

COMMON NAMES: Bigeye sand tiger (AFS; FAO).

HAWAIIAN RECORDS: Southwest of Hawai'i Island at ca. 450 m (Humphreys *et al.*, 1989a).

GENERAL RANGE: Known only from off Madeira, Brazil, the Gulf of Mexico, the Indian Ocean, South



China Sea, the Marshall Islands, and the Hawaiian Islands. Pelagic and perhaps slope-associated at 60–1000 m (Humphreys *et al.*, 1989a; Compagno, 2001).

### Mitsukurinidae — Goblin sharks

[*Mitsukurina owstoni* Jordan]

*Mitsukurina owstoni* Jordan, 1898, p. 200, Pls. 11–12, Misaki, Sagami Sea, near Yokohama, Japan.

*Mitsukurina owstoni* Jordan, 1898: Compagno (1984a, 2001), Springer *in* Quéro *et al.* (1990), Last & Stevens (1994).

TAXONOMY: Compagno (1984a, 2001).

COMMON NAMES: Goblin shark (AFS; FAO).

HAWAIIAN RECORDS: Not recorded from within the 200-nmi EEZ, but a specimen from the Colahan Seamount suggests that this species will be found within Hawaiian waters (R. Humphreys & T. Kazama, unpubl. data, 1985).

GENERAL RANGE: Known from disjunct localities in the eastern and western North Atlantic, eastern South Atlantic and Indian Ocean off South Africa, and in the Pacific at Japan, Australia, New Zealand, the northern Hawaiian Ridge, and southern California. Emybenthic or benthic at 95–1300 m (Compagno, 1984a, 2001; Springer *in* Quéro *et al.*, 1990; Last & Stevens, 1994).

### Pseudocarchariidae — Crocodile sharks

*Pseudocarcharias kamoharai* (Matsubara)

*Carcharias kamoharai* Matsubara, 1936, p. 380, Kôti fish market, Japan.

*Odontaspis kamoharai* (Matsubara, 1936): Tinker (1982).

*Pseudocarcharias kamoharai* (Matsubara, 1936): Compagno (1984a, 2001), Eschmeyer (1990), Taylor (1993), Last & Stevens (1994), Crow & Crites (2002).

TAXONOMY: Compagno (1984a, 2001). Pseudocarchariidae is sometimes included in Odontaspidae (Eschmeyer, 1990).

COMMON NAMES: Crocodile shark (AFS; FAO).

HAWAIIAN RECORDS: Probably throughout Hawaiian Ridge and at Johnston Atoll, but recorded only from the main Hawaiian Islands (Compagno, 1984a; NMFS, unpubl. data).

GENERAL RANGE: Probably circumglobal in the tropical and subtropical Indian, Pacific, and Atlantic oceans, but distribution discontinuous. Epi- and mesopelagic, oceanic with occasional near-bottom occurrences, at 0–590 m (Compagno, 1984b, 2001; Last & Stevens, 1994).

### Megachasmidae — Megamouth sharks

*Megachasma pelagios* Taylor, Compagno, & Struhsaker

*Megachasma pelagios* Taylor, Compagno & Struhsaker, 1983, p. 96, Figs. 2–5, about 42 km northeast of Kahuku Point, O'ahu, Hawaiian Islands.

Undescribed species of shark: Randall (1980a), Tinker (1982).

*Megachasma pelagios* Taylor, Compagno & Struhsaker, 1983: Taylor *et al.* (1983), Compagno (1984a, 1990, 2001), Berra & Hutchins (1990), Suzumoto (1991), Taylor (1993), Last & Stevens (1994), Clark & Castro (1995), Séret (1995), Nelson *et al.* (1997), Crow & Crites (2002).

TAXONOMY: Compagno (1990, 2001).

COMMON NAMES: Megamouth shark (AFS; FAO).

HAWAIIAN RECORDS: O'ahu at 165 m (Randall, 1981a; Taylor *et al.*, 1983).

GENERAL RANGE: Tropical and warm-temperate in the Atlantic, Indian, and Pacific oceans. Known from only 20 specimens as of 2001; from each side of the Atlantic Ocean off Brazil and Senegal, western Australia, Sulawesi, the Philippines, Japan, the Hawaiian Islands, and California. Epi- and mesopelagic at 5–600 m (Berra & Hutchins, 1990; Suzumoto, 1991; Last & Stevens, 1994; Clark & Castro, 1995; Séret, 1995; Nelson *et al.*, 1997; Compagno, 2001; Crow & Crites, 2002).

**Alopiidae — Thresher sharks*****Alopias pelagicus* Nakamura**

- Alopias pelagicus* Nakamura, 1935, p. 3, 5, Pl. 1 (fig. 2), Pl. 3 (figs. 5–6), market at Suô, east coast of Taiwan.  
*Alopias vulpes* non (Gmelin, 1789) [a junior synonym of *Alopias vulpinus* (Bonnaterre, 1788), a species that probably also occurs in the Hawaiian Islands]: Jordan & Evermann (1905).  
*Alopias pelagicus* Nakamura, 1935: Compagno (1984a, 2001), Myers (1989), Taylor (1993), Last & Stevens (1994), Robertson & Allen (2002), Crow & Crites (2002).

TAXONOMY: Compagno (1984a).

COMMON NAMES: Manō hi‘ukā (Crow & Crites, 2002), Manō laukāhi‘u (Crow & Crites, 2002), Manō ‘ula?, Pelagic thresher (AFS; FAO), Small tooth thresher shark (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Recorded from O‘ahu and other, unspecified localities in the Hawaiian Islands. Probably occurs at Johnston Atoll but no records exist (Jordan & Evermann, 1905; Compagno, 1984a, 2001; Taylor, 1993; Crow & Crites, 2002).

GENERAL RANGE: Indo-transPacific from South Africa and the Red Sea through northern Australia, New Caledonia, Taiwan, southern Japan, Micronesia, and eastward to the Galapagos Islands, and the mouth of the Gulf of California to Ecuador but known from disjunct localities. Oceanic, epipelagic at 1–152 m (Compagno, 1984a, 2001; Last & Stevens, 1994; Robertson & Allen, 2002).

***Alopias superciliosus* (Lowe)**

- Alopecias superciliosus* Lowe, 1841, p. 39, off Madeira.  
*Alopias superciliosus* (Lowe, 1841): Gruber & Compagno (1981), Compagno (1984a, 2001), Taylor (1993), Last & Stevens (1994), Crow & Crites (2002).

TAXONOMY: Compagno (1984a, 2001).

COMMON NAMES: Manō hi‘ukā (Crow & Crites, 2002), Manō laukāhi‘u (Crow & Crites, 2002), Manō ‘ula?, Bigeye thresher (AFS; FAO).

HAWAIIAN RECORDS: Although Compagno (1984a, 2001) showed this species as occurring in the main Hawaiian Islands in his distribution maps, in his texts he stated that it occurs “North and south of the Hawaiian Islands”. Gruber & Compagno (1981) did not record this species from the archipelago, although they showed a record from the south of Hawai‘i. Taylor (1993) stated that “These threshers are a significant element in the long-line catch around Hawai‘i” and Crow & Crites (2002) also said “In Hawai‘i, this shark is generally caught on fishing lines below 650 feet, and an increase in bigeye tuna fishing has resulted in more bigeye thresher shark captures.” Based on its circumglobal distribution, *Alopias superciliosus* probably also occurs at Johnston Atoll.

GENERAL RANGE: Circumglobal in all tropical and subtropical seas except Red Sea, straying into temperate areas. Coastal and oceanic, pelagic and near bottom at 1–>500 m (Compagno, 1984a, 2001; Last & Stevens, 1994).

***Alopias vulpinus* (Bonnaterre)**

- Squalus vulpinus* Bonnaterre, 1788, p. 9, Pl. 85 (fig. 349), Mediterranean Sea.  
*Alopias vulpinus* (Bonnaterre, 1788): Fowler (1928), Gosline & Brock (1960), Kato *et al.* (1967), Tinker (1982), Compagno (1984a, 2001), Taylor (1993), Chave & Mundy (1994), Last & Stevens (1994), Robertson & Allen (2002).

TAXONOMY: Compagno (1984a, 2001).

COMMON NAMES: Manō ‘ula or Laukāhi‘u?, Thresher shark (AFS; FAO).

HAWAIIAN RECORDS: Johnston Atoll and O‘ahu at 320 m (Fowler, 1928; Chave & Mundy, 1994) but most published records from Hawaiian waters are likely mistaken identifications of *A. pelagicus* Nakamura, 1935, or *A. superciliosus* (Lowe, 1841) (see Crowe & Crites, 2002). Compagno (2001) specifically included “Hawaiian Islands” in the distribution of *A. vulpinus*. Unpublished records documented by photographs from the NMFS longline observer program verify that *A. vulpinus* occurs at the northern and southern ends of the 200-nmi EEZ. *Alopias vulpinus* probably occurs throughout the region including the Hancock Seamounts (Compagno, 1984a, 2001) but is likely rare here. *Alopias vulpinus* is less common in subtropical and tropical waters than *A. pelagicus* or *A. supercil-*

*iosus* (G. Crowe, pers. comm., 1998). The *Alopias* sp. listed by Humphreys *et al.* (1984) from the Hancock Seamounts and Randall *et al.* (1985b) from Johnston Atoll could be any of the three *Alopias* species listed here.

GENERAL RANGE: Circumglobal in all tropical to temperate seas except the Red Sea, but more common in temperate waters. Verified records are from disjunct localities. Oceanic and coastal although most abundant near land, pelagic at 1–366 m (Compagno, 1984a, 2001; Last & Stevens, 1994; Robertson & Allen, 2002).

### Cetorhinidae — Basking sharks<sup>4</sup>

#### *Cetorhinus maximus* (Gunner)

*Squalus maximus* Gunnerus, 1765, p. 33, Pl. 2, Trondheim, Norway.

*Cetorhinus maximus* (Gunnerus, 1765): Tinker (1982), Compagno (1984a, 2001), Taylor (1993), Last & Stevens (1994), Crow & Crites (2002).

TAXONOMY: Compagno (1984a, 2001).

COMMON NAMES: Basking shark (AFS; FAO).

HAWAIIAN RECORDS: Maui, from a specimen stranded on a beach at Hana in 1983 (Taylor, 1993; Crow & Crites, 2002). Tinker (1982) listed this species from Hawai‘i without locality data. Compagno’s (2001) map showing a broad distribution within the Hawaiian Islands is in error.

GENERAL RANGE: Antitropical along continental shelves and continental islands at the margins of the Arctic, Atlantic, and Pacific oceans, but also occasionally open-ocean. Coastal-pelagic at 1 m to unknown depths, probably epipelagic but overwintering in deeper water (Compagno, 1984a, 2001; Last & Stevens, 1994).

### Lamnidae — Mackerel sharks<sup>4</sup>

#### *Carcharodon carcharias* (Linnaeus)

*Squalus carcharias* Linnaeus, 1758, p. 235, Habitat in Oceano Europaeo.

*Carcharodon carcharias* (Linnaeus, 1758): Jordan & Evermann (1905), Fowler (1928), Gosline & Brock (1960), Kato *et al.* (1967), Tester (1969), Tinker (1982), Compagno (1984a, 2001), Taylor (1985, 1993), Crow *et al.* (1996), Randall (1996a), Crow & Crites (2002), Hoover (2003).

TAXONOMY: Compagno (1984a, 2001).

COMMON NAMES: Manō-niuhi or Niuhi (Gosline & Brock, 1960; Crow & Crites, 2002), White shark (AFS), Great white shark (FAO; Hoover, 2003).

HAWAIIAN RECORDS: Hawai‘i Island to O‘ahu and perhaps Laysan at 1 to 48 m (Jordan & Evermann, 1905; Compagno, 1984a; Taylor, 1985, 1993; Crow *et al.*, 1996; Crow & Crites, 2002). *Carcharias vulgare* (Richardson, 1836) recorded by Wetmore (1890) is a synonym of *C. carcharias*, but it cannot be determined if Wetmore’s record is actually of this species or one of the more common *Carcharhinus* species.

GENERAL RANGE: Antitropical in all seas, less common in warm waters than in temperate regions. Coastal and pelagic at 1–1280 m, capable of migration across oceanic regions (Compagno, 1984a, 2001).

#### *Isurus oxyrinchus* Rafinesque

*Isurus oxyrinchus* Rafinesque, 1810, p. 12, Pl. 13 (fig. 1), Sicily, Italy.

*Isuropsis glauca* (Müller & Henle, 1839): Jordan & Evermann (1905).

*Isurus glaucus* (Müller & Henle, 1839): Fowler (1928), Strasburg (1958), Tester (1969).

*Isurus oxyrinchus* Rafinesque, 1810: Gosline & Brock (1960), Kato *et al.* (1967), Tinker (1982), Compagno (1984a, 2001), Paxton *et al.* (1989), Eschmeyer (1990), Taylor (1993), Allen & Robertson (1994), Crow *et al.* (1996), Crow & Crites (2002).

TAXONOMY: Compagno (2001).

COMMON NAMES: Shortfin mako (AFS; FAO).

HAWAIIAN RECORDS: Maui to the Hancock Seamounts, probably throughout the archipelago and Johnston Atoll at 35–219 m (Jordan & Evermann, 1905; Strasburg, 1958; Tester, 1969; Compagno, 1984a, 2001; Crow *et al.*, 1996; Crow & Crites, 2002).

GENERAL RANGE: Circumglobal in all seas from temperate through tropical areas. Coastal and oceanic, epipelagic at 1–500 m (Compagno, 1984a, 2001; Allen & Robertson, 1994).

***Isurus paucus*** Guitart Manday

*Isurus paucus* Guitart Manday, 1966, p. 3, Figs. 1, 2a, 3a,c, Cuba.

*Isurus paucus* Guitart Manday, 1966: Kato *et al.* (1967 as “probably present near Hawaii”), Tinker (1982), Compagno (1984a, 2001), Taylor (1993), Crow & Crites (2002).

TAXONOMY: Compagno (1984a, 2001).

COMMON NAMES: Longfin mako (AFS; FAO).

HAWAIIAN RECORDS: Listed from the “area south of Johnston and Hawaiian Islands” and “north of the Hawaiian Islands” (Compagno, 2001); the Hancock Seamounts and Johnston Atoll are within the range of this species but no records exist (Tinker, 1982; Compagno, 1984a, 2001; Crow & Crites, 2002). Taylor (1993) stated that longfin mako “are not common in Hawai’i”.

GENERAL RANGE: Known from disjunct localities in the tropical through warm-temperate Indian, Pacific, and Atlantic oceans. Oceanic and epipelagic, depth range unknown but judging by eye size and coloration probably deeper-dwelling than *I. oxyrinchus* (Compagno, 1984a).

**Hexanchiformes****Chlamydoselachidae — Frill sharks****[*Chlamydoselachus anguineus* Garman]**

*Chlamydoselachus anguineus* Garman, 1884, p. 52, Fig. 47, Japanese seas.

*Chlamydoselachus anguineus* Garman, 1884: Tinker (1982), Compagno (1984a), Borets (1986), Last & Stevens (1994), Crow & Crites (2002).

TAXONOMY: Compagno (1984a).

COMMON NAMES: Frill shark (AFS), Frilled shark (FAO).

HAWAIIAN RECORDS: Tinker (1982) listed this species as “... probably worldwide in tropical seas and in warmer temperate waters” but did not mention a Hawaiian specimen. Compagno (1984a) did not record this species from the region. There are no confirmed records of *Chlamydoselachus* from within the Hawaiian 200-nmi EEZ, but it has been collected at Milwaukee and Colahan Seamounts at 240–270 m just north of the Hawaiian Ridge (Borets, 1986; Crow & Crites, 2002). These records probably form the basis of the otherwise uncorroborated Northwestern Hawaiian Islands distribution charted by Last & Stevens (1994).

GENERAL RANGE: Circumtemperate, but known from disjunct localities in the eastern North Atlantic, off both sides of southern Africa, Japan, the Emperor Seamounts, Australia, New Zealand, Chile, and California. Benthic at 120–1280 m, with one pelagic record from California from 20 m over a depth of >1500 m (Compagno, 1984a; Last & Stevens, 1994).

**Hexanchidae — Cow sharks*****Hexanchus griseus*** (Bonnaterre)

*Squalus griseus* Bonnaterre, 1788, p. 9, Mediterranean Sea.

*Hexanchus griseus* (Bonnaterre, 1788): Kato *et al.* (1967), Tester (1969), Tinker (1982), Humphreys *et al.* (1984), Compagno (1984a), Borets (1986), Taylor (1993), Chave & Mundy (1994), Last & Stevens (1994), Crow *et al.* (1996), Crow & Crites (2002).

TAXONOMY: Compagno (1984a).

COMMON NAMES: Sixgill shark (AFS), Bluntnose sixgill shark (FAO, Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Hawai’i Island to the Hancock Seamounts and north to Kinmei Seamount at 110–1400 m, usually at >330 m (Kato *et al.* 1967, Tester 1969, Humphreys *et al.* 1984, Chave & Mundy 1994, Crow *et al.* 1996; Crow & Crites, 2002).

GENERAL RANGE: Circumtemperate and antitropical in all seas except the Red Sea and Gulf of California. Near bottom, occasionally pelagic, at 1–2500 m, adults usually below 91 m. The depth distribution is related to growth and temperature, with the most shallow records being of juveniles and from colder, poleward regions (Compagno, 1984a; Last & Stevens, 1994; Crow *et al.*, 1996).

**Squaliformes<sup>5</sup>****Echinorhinidae — Bramble sharks****[*Echinorhinus brucus* (Bonnaterre)]**

*Squalus brucus* Bonnaterre, 1788, p. 11, North Atlantic.

*Echinorhinus brucus* Bonnaterre, 1788: Gosline & Brock (1960), Tinker (1982), Compagno (1984a).

TAXONOMY: Compagno (1984a).

COMMON NAMES: Bramble shark (AFS; FAO).

HAWAIIAN RECORDS: Tinker (1982) listed this species in addition to *E. cookei*, probably on the basis of Gosline & Brock's (1960) use of the name. Compagno (1984a) did not record the species from the area. Records of this species from the Hawaiian Islands are misidentifications of *E. cookei* Pietschmann, 1928.

GENERAL RANGE: Tropical through temperate waters of the Atlantic, Indian, and western Pacific oceans; in the Pacific known from Japan to New Zealand with a possible record from Kiribati, but otherwise unknown from islands of the Pacific Plate. Eurybenthic at 18–900 m (Compagno, 1984a).

***Echinorhinus cookei* Pietschmann**

*Echinorhinus cookei* Pietschmann, 1928, p. 297, Kaua'i, Hawaiian Islands [original type now disintegrated; neotype designated from Palliser Bay, Cook Strait, New Zealand].

*Echinorhinus brucus* non (Bonnaterre, 1788) [a valid species that does not occur in the Hawaiian Islands]: Gosline & Brock (1960), Tinker (1982).

*Echinorhinus cookei* Pietschmann, 1928: Pietschmann (1928, 1930), Fowler (1934, 1949), Kato *et al.* (1967), Tester (1969), Tinker (1982), Humphreys *et al.* (1984), Compagno (1984a), Borets (1986), Taylor (1993), Chave & Mundy (1994), Last & Stevens (1994), Crow *et al.* (1996), Robertson & Allen (2002), Crow & Crites (2002).

TAXONOMY: Compagno (1984a).

COMMON NAMES: Prickly shark (AFS, FAO).

HAWAIIAN RECORDS: Cross Seamount and Hawai'i Island to Milwaukee Seamount at 177–420 m, usually >294 m (Pietschmann, 1928; Gosline & Brock, 1960; Tester, 1969; Humphreys *et al.*, 1984; Chave & Mundy, 1994; Crow *et al.*, 1996; Crow & Crites, 2002).

GENERAL RANGE: Trans-Pacific endemic known only from Taiwan, Japan, southern Australia, New Zealand, Belau, the Hawaiian Islands, Malpelo Island, California to Baja California, the Gulf of California, Costa Rica to Peru, and Chile. Eurybenthic at 11–650, usually at >69 m (Compagno, 1984a; Last & Stevens, 1994; Crow *et al.*, 1996; Robertson & Allen, 2002).

**Dalatiidae — Deep-sea dogfish sharks<sup>6</sup>*****Centroscyllium nigrum* Garman**

*Centroscyllium nigrum* Garman, 1899, p. 28, Pls. 1 (fig. 2), 4–5, 69 (fig. 1), eastern Pacific at 7°09'30"N, 81°08'30"W.

*Centroscyllium ruscosum* Gilbert, 1905: Gilbert (1905).

*Centroscyllium granulosum* non (Günther, 1880) [= *Etmopterus granulosus* (Günther, 1880), a valid species not found in the Hawaiian Islands]: Kato *et al.* (1967), Tinker (1982).

*Centroscyllium nigrum* Garman, 1899: Fowler (1928, 1949), Gosline & Brock (1960), Clarke (1972), Tinker (1982), Compagno (1984a), Humphreys *et al.* (1984), Taylor (1993), Long (1994), Crow & Crites (2002).

TAXONOMY: Compagno (1984a). Shirai & Nakaya (1990) have implied that *C. ruscosum* should be recognized as a valid species distinct from *C. nigrum*.

COMMON NAMES: Combtooth dogfish (AFS; FAO).

HAWAIIAN RECORDS: O'ahu to the Hancock Seamounts at 764–920 m (Gilbert, 1905; Clarke, 1972; Humphreys *et al.*, 1984; Crow & Crites, 2002).

GENERAL RANGE: The Hawaiian Islands and isolated localities in the eastern Pacific including southern California, Panama, Cocos Islands, Columbia, Ecuador, Chile, and the Galapagos. Benthopelagic at 269–1143 m (Compagno, 1984a; Long, 1994).

***Dalatias licha*** (Bonnaterre)

*Squalus licha* Bonnaterre, 1788, p. 12, "La Cap Breton".

*Dalatiás lica* (Bonnaterre, 1788) [*lapsus* in spelling of species name]: Struhsaker (1973a).

*Dalatiás licha* (Bonnaterre, 1788): Tinker (1982), Compagno (1984a), Humphreys *et al.* (1984), Borets (1986), Taylor (1993), Last & Stevens (1994), Crow & Crites (2002).

TAXONOMY: Compagno (1984a).

COMMON NAMES: Kitefin shark (AFS; FAO), Seal shark.

HAWAIIAN RECORDS: Maui to Milwaukee Seamount at 260–350 m (Struhsaker, 1973a; Compagno, 1984a; Humphreys *et al.*, 1984; Borets, 1986; Crow & Crites, 2002).

GENERAL RANGE: Circumtemperate; disjunct and perhaps antitropical in the temperate and subtropical Atlantic, Pacific, and Indian oceans: Georges Bank, Gulf of Mexico, Eastern North Atlantic, Mediterranean Sea, Gulf of Guinea, western Indian Ocean, Japan, eastern and southern Australia, New Zealand, and the Hawaiian Islands. Usually near bottom but often pelagic at 37–1800 m (Compagno, 1984a).

***Etmopterus bigelowi*** Shirai & Tachikawa

*Etmopterus bigelowi* Shirai & Tachikawa, 1993, p. 487, Figs. 1b-d, 2b, 5b, Off Angola at 11°37'S, 5°13'W.

*Etmopterus pusillus* non (Lowe, 1839) [in part]: Humphreys *et al.* (1984), Borets (1986).

*Etmopterus bigelowi* Shirai & Tachikawa, 1993: Shirai & Tachikawa (1993), Crow & Crites (2002).

TAXONOMY: Shirai & Tachikawa (1993).

COMMON NAMES: Blurred smooth lantern shark (Crow & Crites, 2002).

HAWAIIAN RECORDS: The Emperor Seamounts through the Hancock Seamounts at about 390 m (Shirai & Tachikawa, 1993; Crow & Crites, 2002).

GENERAL RANGE: Tropical and subtropical in Atlantic, Indian, and Pacific oceans. In Pacific, known only from off Okinawa, southeastern Australia, the Emperor Seamounts, northern Hawaiian Ridge, and the Nazca/Sala y Gomez Ridge. Benthopelagic at 163–1000 m (Shirai & Tachikawa, 1993).

***Etmopterus lucifer*** Jordan & Snyder

*Etmopterus lucifer* Jordan & Snyder, 1902, p. 79, Fig. 1, Misaki, Japan.

*Etmopterus lucifer* Jordan & Snyder, 1902: Kato *et al.* (1967), Tinker (1982), Compagno (1984a), Borets (1986), Yamakawa *et al.* (1986), Last & Stevens (1994), Crow & Crites (2002).

TAXONOMY: Compagno (1984a). This nominal species may be a species complex; the taxonomy of this form and related species is in need of review (Last & Stevens, 1994).

COMMON NAMES: Blackbelly lantern shark (AFS; FAO).

HAWAIIAN RECORDS: Reported from the main Hawaiian Islands to Koko Seamount at 270–400 m (Borets, 1986; Crow & Crites, 2002; NMFS, unpubl. data). *Etmopterus lucifer* is routinely identified from the main Hawaiian Islands through the Hancock Seamounts but the genus, including species distributions, needs critical reevaluation (Yamakawa *et al.*, 1986). Kato *et al.* (1967) included *E. villosus* from Hawai'i in their discussion of *E. lucifer* without implying that the two were synonymous; *E. lucifer* was only mentioned as an example of the genus. Compagno (1984a) and Last & Stevens (1994) did not record *E. lucifer* from the Emperor Seamounts or Hawaiian Ridge and the occurrence of this species in the region needs confirmation.

GENERAL RANGE: Southern Atlantic and Indian oceans to the western Pacific from Japan to New Zealand; Nazca and Sala y Gomez ridges in the eastern South Pacific. Records from the Hawaiian Islands are unconfirmed. Perhaps antitropical. Benthopelagic at 183–823 m (Compagno, 1984a).

***Etmopterus pusillus*** (Lowe)

*Acanthidium pusillum* Lowe, 1839, p. 91, off Madeira.

*Etmopterus pusillus* (Lowe, 1839): Humphreys *et al.* (1984), Uchida & Uchiyama (1986), Borets (1986), Compagno (1984a), Shirai & Tachikawa (1993), Last & Stevens (1994), Wetherbee & Kajiura (2000), Crow & Crites (2002).

TAXONOMY: Shirai & Tachikawa (1993).

COMMON NAMES: Smooth lanternshark (FAO), Slender lantern shark.

HAWAIIAN RECORDS: Midway to the Hancock and southern Emperor Seamounts at 263–400 m (Humphreys *et al.*, 1984; Uchida & Uchiyama, 1986; Borets, 1986; Shirai & Tachikawa, 1993; Wetherbee & Kajiura, 2000; Crow & Crites, 2002).

GENERAL RANGE: Circumtemperate in the Atlantic, Indian, and Pacific oceans. In western Pacific from Japan to New Zealand, known only from the Emperor Seamounts and Hawaiian Ridge on the central Pacific Plate. Benthopelagic at 200–1000 m, possibly to 1998 m (Compagno, 1984a; Shirai & Tachikawa, 1993; Last & Stevens, 1994).

***Etmopterus villosus* Gilbert**

*Etmopterus villosus* Gilbert, 1905, p. 580, Pl. 66, off southern coast of Moloka'i, Hawaiian Islands.

*Etmopterus villosus* Gilbert, 1905: Gilbert (1905), Fowler (1928, 1949), Gosline & Brock (1960), Kato *et al.* (1967), Tinker (1982), Humphreys *et al.* (1984), Compagno (1984a), Uchida & Uchiyama (1986), Yamakawa *et al.* (1986), Chave & Jones (1991), Taylor (1993), Crow & Crites (2002).

TAXONOMY: Compagno (1984a), Yamakawa *et al.* (1986).

COMMON NAMES: Hawaiian lanternshark (FAO).

HAWAIIAN RECORDS: Recorded from Hawai'i Island to the Hancock Seamounts at 280–1610 m (Gilbert, 1905; Uchida & Uchiyama, 1986; Chave & Jones, 1991; Crow & Crites, 2002) but records other than those of Gilbert (1905) need verification by the identification of collected specimens because of the difficulty in distinguishing species of *Etmopterus*.

GENERAL RANGE: Hawaiian endemic. Benthopelagic at 280–1610 m (Compagno, 1984a; Uchida & Uchiyama, 1986; Chave & Jones, 1991).

***Euprotomicrus bispinatus* (Quoy & Gaimard)**

*Scymnus bispinatus* Quoy & Gaimard, 1824, p. 197, Pl. 44 (figs. 1–2), Mauritius.

*Euprotomicrus bispinatus* (Quoy & Gaimard, 1824): Fowler (1928), Gosline & Brock (1960), Hubbs *et al.* (1967), Kato *et al.* (1967), Tinker (1982), Compagno (1984a), Taylor (1993), Last & Stevens (1994), Crow & Crites (2002).

TAXONOMY: Compagno (1984a).

COMMON NAMES: Pygmy shark (AFS; FAO).

HAWAIIAN RECORDS: Hawai'i Island through Midway, perhaps Johnston Atoll and the Hancock Seamounts; probably throughout the area, in epipelagic waters (Fowler, 1928; Hubbs *et al.*, 1967; Compagno, 1984a; Crow & Crites, 2002).

GENERAL RANGE: Circumtemperate in the south Atlantic and southern Indian oceans, antitropical in Pacific. Epi-, meso-, and perhaps bathypelagic at 1–>400 and perhaps >1800 m (Compagno, 1984a; Last & Stevens, 1994). The depth range of 1800–9900 m given by Taylor (1993) is unverified; the lower part of this range is deeper than the greatest depth of the oceans.

***Isistius brasiliensis* (Quoy & Gaimard)**

*Scymnus brasiliensis* Quoy & Gaimard, 1824, p. 198, Cape Verde Islands.

*Isistius brasiliensis* (Quoy & Gaimard, 1824): Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Strasburg (1963), Kato *et al.* (1967), Clarke & Wagner (1976), Tinker (1982), Compagno (1984a), Humphreys *et al.* (1984), Taylor (1993), Last & Stevens (1994), Crow & Crites (2002).

TAXONOMY: Compagno (1984a).

COMMON NAMES: Collared dogfish (AFS), Cookiecutter shark (FAO).

HAWAIIAN RECORDS: Hawai'i Island to the Hancock Seamounts at 1–302 m (Fowler, 1928; Gosline & Brock, 1960; Strasburg, 1963; Clarke & Wagner, 1976; Humphreys *et al.*, 1984; Crow & Crites, 2002).

GENERAL RANGE: Circumsubtropical in the Atlantic, Indian and Pacific oceans, often near oceanic islands. Epi- to bathypelagic at 1–3500 m, with diurnal migrations from >1000 m during the day toward the surface at night (Compagno, 1984a; Last & Stevens, 1994).

[***Somniosus pacificus* Bigelow & Schroeder**]

*Somniosus pacificus* Bigelow & Schroeder, 1944, p. 35, Sagami Sea, Japan.

*Somniosus pacificus* Bigelow & Schroeder, 1944: Tinker (1982), Compagno (1984a), Wilson *et al.* (1985), Last & Stevens (1994).

TAXONOMY: Compagno (1984a).

COMMON NAMES: Pacific sleeper shark (AFS; FAO).

HAWAIIAN RECORDS: Tinker (1982) included this species but did not state that it has been found in Hawai'i. A large shark tentatively identified as *S. pacificus* was photographed at Horizon Guyot (19°20'N, 169°00'W; Wilson *et al.*, 1985).

GENERAL RANGE: Antitropical in the boreal through temperate Pacific Ocean, Bering Sea, and southern Arctic Ocean above the Bering Strait; along continental margins from 70°N to 20°N off Baja California and at 40–50°S off Tasmania and southern New Zealand. Unconfirmed records from the southern Indian and Atlantic oceans. Epibenthic at 1–2000 m, occurring in progressively deeper water away from the poles (Compagno, 1984a; Last & Stevens, 1994).

### *Trigonognathus kabeyai* Mochizuki & Ohe

*Trigonognathus kabeyai* Mochizuki & Ohe, 1990, p. 385, Figs. 1–5, off Shionomisaki, Japan.

*Trigonognathus kabeyai* Mochizuki & Ohe, 1990: Mochizuki & Ohe (1990), Wetherbee & Kajiura (2000), Crow & Crites (2002).

TAXONOMY: Mochizuki & Ohe (1990), Wetherbee & Kajiura (2000).

COMMON NAMES: Viper shark (Wetherbee & Kajiura, 2000), Triangle-jaw lantern-shark, Viper dogfish (Crow & Crites, 2002).

HAWAIIAN RECORDS: Southeast Hancock Seamount, collected with a bottom trawl at 270 m (Wetherbee & Kajiura, 2000; Crow & Crites, 2002).

GENERAL RANGE: A western-central North Pacific endemic known only from Japan and the northern Hawaiian Ridge. Probably epibenthic at 270–360 m (Mochizuki & Ohe, 1990; Wetherbee & Kajiura, 2000).

### *Zameus squamulosus* (Günther)

*Centrophorus squamulosus* Günther, 1877b, p. 433, off Inoshima, Japan.

*Scymnodon squamulosus* (Günther, 1877b): Compagno (1984a), Wetherbee & Crow (1996), Crow & Crites (2002).

*Zameus squamulosus* (Günther, 1877b): Taniuchi & Garrick (1986), Shirai (1992, 1996), Last & Stevens (1994).

TAXONOMY: Taniuchi & Garrick (1986), Last & Stevens (1994). The generic placement of this species is controversial; Wetherbee & Crow (1996) argued for retention of the species in *Scymnodon* but other authors (Shirai, 1992; Last & Stevens, 1994; Shirai, 1996) have followed Taniuchi & Garrick (1986) in placing *Z. squamulosus* in a monotypic genus.

COMMON NAMES: Velvet dogfish (FAO).

HAWAIIAN RECORDS: Northeast of Kaua'i at 27–35 m. Another specimen was collected at ca. 28°24'N, 157°54'W at 157 m, outside of the 200-nmi EEZ (Wetherbee & Crow, 1996; Crow & Crites, 2002).

GENERAL RANGE: Gulf of Mexico, tropical and south Atlantic, South Africa, Australia, southern Japan, Kyushu-Palau Ridge, Okinawa Trough, South China Sea, New Zealand, the Hawaiian Islands, and Chile. Pelagic and bathypelagic at 27–1500 or 2000 m, with most captures at 400–900 m (Compagno, 1984a; Taniuchi & Garrick, 1986; Last & Stevens, 1994; Wetherbee & Crow, 1996).

## Centrophoridae — Gulper sharks

### *Centrophorus* cf. *granulosus* (Bloch & Schneider)

*Squalus granulosus* Bloch & Schneider, 1801, p. 135, no type locality given.

*Centrophorus* cf. *granulosus* (Bloch & Schneider, 1801): Chave & Mundy (1994).

*Centrophorus atromarginatus* Garman, 1913: Masuda *et al.* (1984).

*Centrophorus granulosus* (Bloch & Schneider, 1801): Compagno (1984a), Last & Stevens (1994), Crow & Crites (2002).

TAXONOMY: Compagno (1984a). The specimen photographed off O'ahu matches the description of *C. atromarginatus* in Masuda *et al.* (1984) and keys to *C. granulosus* in Compagno (1984a). *Centrophorus atromarginatus* was considered questionably to be a junior synonym of *C. granulosus* by Compagno (1984a).

COMMON NAMES: Gulper shark (AFS, FAO).



HAWAIIAN RECORDS: Tentatively identified from O'ahu at 500 m (Chave & Mundy, 1994; Crow & Crites, 2002).

GENERAL RANGE: Perhaps circumsubtropical except for the eastern Pacific, with disjunct records from the Gulf of Mexico, Mediterranean Sea, Atlantic, Indian, and western Pacific oceans. Known only from southern Japan, Papua New Guinea, northeastern Australia, and perhaps the Hawaiian Islands in the Pacific. Benthopelagic at 100–1200 m (Compagno, 1984a; Last & Stevens, 1994).

***Centrophorus tessellatus* Garman**

*Centrophorus tessellatus* Garman, 1906, p. 205, east of Japan, off Honshu Island.

*Centrophorus tessellatus* Garman, 1906: Clarke (1972), Randall (1976a), Tinker (1982), Compagno (1984a), Taylor (1993), Adam *et al.* (1998), Crow & Crites (2002).

TAXONOMY: Compagno (1984a).

COMMON NAMES: Mosaic gulper shark (FAO).

HAWAIIAN RECORDS: O'ahu at 260–370 m (Clarke, 1972; Crow & Crites, 2002).

GENERAL RANGE: Perhaps Indo-Pacific but known only from the Maldives, southern Japan and the Hawaiian Islands. Benthopelagic at 260–728 m (Compagno, 1984a; Adam *et al.*, 1998).

**Squalidae — Dogfish sharks**

[*Cirrhigaleus asper* (Merrett)]

*Squalus asper* Merrett, 1973, p. 94, Fig. 1; Pl. 1b, off Aldabra, Indian Ocean.

*Squalus asper* Merrett, 1973: Compagno (1984a), Taylor (1993).

*Cirrhigaleus asper* (Merrett, 1973): Shirai (1992).

TAXONOMY: Shirai (1992).

COMMON NAMES: Roughskin dogfish (AFS), Roughskin spurdog (FAO).

HAWAIIAN RECORDS: Compagno (1984a) gave the first Hawaiian record of this species without specifying the location or depth. Taylor (1993) included *C. asper* in his book on Hawaiian sharks but it is likely that this inclusion was based on Compagno (1984a). The presence of *C. asper* in the Hawaiian Archipelago needs confirmation.

GENERAL RANGE: Known only from the Gulf of Mexico and western Indian Ocean with a questionable listing from the Hawaiian Islands. Benthopelagic at 214–600 m (Compagno, 1984a; Taylor, 1993).

***Squalus mitsukurii* Jordan & Snyder**

*Squalus mitsukurii* Jordan & Snyder *in* Jordan & Fowler, 1903b, p. 629, Fig. 3, Misaki, Japan.

*Squalus suckleyi* non (Girard, 1855) [a junior synonym of *Squalus acanthias* Linnaeus, 1758, a species that is not found in the Hawaiian Islands]: Fowler (1928, 1931, 1949).

*Squalus blainville* non (Risso, 1827) [a valid species not found in the Hawaiian Islands]: Kato *et al.* (1967), Clarke (1972), Struhsaker (1973a), Iwai (1976), Novikov *et al.* (1981), Tinker (1982)?, Borets (1986).

*Squalus fernandinus* non Molina, 1782 [a junior synonym of *Squalus acanthias* Linnaeus, 1758, a species that is not found in the Hawaiian Islands]: Gosline & Brock (1960), Tinker (1982)?

*Squalus mitsukurii* Jordan & Snyder *in* Jordan & Fowler, 1903b: Snyder (1904), Gilbert (1905), Jordan & Evermann (1905), Compagno (1984a), Uchida & Uchiyama (1986), Muñoz-Chàpuli & Ramos (1989), Taylor (1993), Wilson & Seki (1994), Chave & Mundy (1994), Last & Stevens (1994), Crow & Crites (2002).

TAXONOMY: *Squalus blainville* is a valid species that does not occur in the Pacific. *Squalus fernandinus* and *S. suckleyi*, synonyms of *S. acanthias*, are other names that have been misapplied to specimens from Hawaiian waters (Compagno, 1984a). Central North Pacific records of these species are of *S. mitsukurii* and perhaps other species; the taxonomy of this group is confused (see Muñoz-Chàpuli & Ramos, 1989; Last & Stevens, 1994). Tinker (1982) recognized two species of *Squalus* from Hawaiian waters, but neither of the names that he used can be associated with confidence to either of the squalid species which have been reported from here.

COMMON NAMES: Manō, Shortspine spurdog (FAO), Greeneye spurdog.

HAWAIIAN RECORDS: Hawai'i Island to the Hancock and Milwaukeee Seamounts at 29–518 m (Snyder, 1904; Gilbert, 1905; Jordan & Evermann, 1905; Clarke, 1972; Struhsaker, 1973a; Novikov *et al.*,

1981; Uchida & Uchiyama, 1986; Borets, 1986; Wilson & Seki, 1994; Chave & Mundy, 1994; Crow & Crites, 2002). *Squalus* species recorded at Midway, Ladd Seamount, and the Hancock Seamounts from 116–256 m were not identified to species. (Humphreys *et al.*, 1984; Uchida & Uchiyama, 1986) but were probably *S. mitsukurii* although the possibility that they were *Cirrhigaleus asper* cannot be dismissed.

GENERAL RANGE: Western North Pacific from northern Japan to Vietnam and east to the Hawaiian Islands. Perhaps circumglobal in the tropical through temperate Atlantic, Indian, and Pacific oceans. The distribution of *S. mitsukurii* is uncertain because of confusion about the identification of this and similar species. Benthic-pelagic at 29–600 m, perhaps from 4–740 m (Compagno, 1984a; Chave & Mundy, 1994; Last & Stevens, 1994).

## Rajiformes<sup>7</sup> Torpedinoidei

### Torpedinidae — Electric rays

#### *Torpedo* sp.

Torpedinidae: Tinker (1982).

*Torpedo* sp.: Struhsaker (1973a), Chave & Mundy (1994), Chave & Malahoff (1998), Crow & Crites (2002).

TAXONOMY: Struhsaker (1973a) first reported *Torpedo* sp. from specimens collected at 476 m off Maui and 265–274 m in the Kalohi Channel between Moloka‘i and Lāna‘i. The fate of these specimens is unknown, except for an embryo(s) at the Bishop Museum (Crow & Crites, 2002). It has not been determined if this is a species that has been described from elsewhere or if it is an undescribed species.

COMMON NAMES: Electric ray, Torpedo (FAO).

HAWAIIAN RECORDS: Hawai‘i Island to O‘ahu. Benthic at 265–476 m (Struhsaker, 1973a; Chave & Mundy, 1994; Chave & Malahoff, 1998; Crow & Crites, 2002; R. Moffitt, pers. comm., 1999).

GENERAL RANGE: Unknown.

## Myliobatoidei

### Plesiobatidae — Deepwater stingrays<sup>8</sup>

#### *Plesiobatis daviesi* (Wallace)

*Urotrygon daviesi* Wallace, 1967, p. 8, Figs. 3–4, Mozambique Channel, off mouth of Limpopo River, South Africa.

*Urotrygon daviesi* Wallace, 1967: Struhsaker (1973a), Clarke (1972), Randall (1976a), Masuda *et al.* (1984), Compagno *in* Smith & Heemstra (1986), Myers & Donaldson (1996).

*Plesiobatis daviesi* (Wallace, 1967): Nishida (1990), Chave & Mundy (1994), Last & Stevens (1994), Crow & Crites (2002).

TAXONOMY: Nishida (1990). Last & Stevens (1994) reinstated this species in the Urolophidae.

COMMON NAMES: Deepwater stingray, Giant stingaree (FAO).

HAWAIIAN RECORDS: Hawai‘i Island to French Frigate at 185–780 m (Struhsaker, 1973a; Randall, 1976a; Chave & Mundy, 1994; Crow & Crites, 2002; NMFS data Sept. 2001).

GENERAL RANGE: South Africa and Mozambique to the Kyushu-Palau Ridge, southern China, western and eastern Australia, the Mariana Islands and the Hawaiian Islands. Benthic at 44–780 m (Struhsaker, 1973a; Masuda *et al.*, 1984; Compagno *in* Smith & Heemstra, 1986; Last & Stevens, 1994; Myers & Donaldson, 1996).

## Hexatrygonidae — Sixgill rays

#### *Hexatrygon* sp.

Family nov.: Struhsaker (1973a).

*Hexatrygon bickelli* Heemstra & Smith, 1980: Smith & Heemstra *in* Smith & Heemstra (1986), Nelson (1994), Crow & Crites (2002).

*Hexatrygon longirostra* (Chu & Meng in Chu, Meng, Hu & Li, 1981): Shen (1986a, 1986b), Chave & Mundy (1994).

TAXONOMY: Validity of the five nominal species in the family is uncertain (Last & Stevens, 1994; Stehmann & Shcherbachev, 1995).

COMMON NAMES: Sixgill stingray (FAO).

HAWAIIAN RECORDS: Hawai'i Island to Maui at 622–950 m (Struhsaker, 1973a; Chave & Mundy, 1994; Crow & Crites, 2002).

GENERAL RANGE: Unknown pending species identification; *H. bickelli* is known from South Africa, *H. longirostra* and three other nominal species from the South China Sea, East China Sea, and Taiwan. The genus is also known from Indonesia, western and eastern Australia. Benthic at 362–1120 m (Struhsaker, 1973a; Smith & Heemstra in Smith & Heemstra, 1986; Shen, 1986a, b; Chave & Mundy, 1994; Last & Stevens, 1994; Stehmann & Shcherbachev, 1995).

## Dasyatidae — Stingrays

### *Dasyatis dipterura* (Jordan & Gilbert)

*Dasybatis dipterurus* Jordan & Gilbert, 1880a, p. 31, San Diego Bay, California.

*Dasyatis hawaiiensis* Jenkins, 1903: Jenkins (1903), Jordan & Evermann (1905).

*Dasyatis hawaiiensis* Jenkins, 1903 [*lapsus* in spelling of species name]: Gosline & Brock (1960), Tinker (1982), Uchida & Uchiyama (1986).

*Dasyatis brevis* (Garman, 1880): Fowler (1928, 1931, 1949), Nishida & Nakaya (1990), Chave & Mundy (1994), Allen & Robertson (1994), Randall (1996a).

*Dasyatis dipterura* (Jordan & Gilbert, 1880a): Eschmeyer (1998), Robertson & Allen (2002), Crow & Crites (2002), Hoover (2003).

TAXONOMY: Nishida & Nakaya (1990) argued that *Dasyatis dipterura*, *D. brevis*, and *D. hawaiiensis* are the same species and used *D. brevis* as its valid name. Eschmeyer (1998), in his entry for *D. dipterura*, noted that the description of *D. dipterura* was published more than four months before the description of *D. brevis* and therefore has priority as the senior synonym.

COMMON NAMES: Hihimanu (Hoover, 1993, 2003), Lupe (Hoover, 1993, 2003), Diamond stingray (AFS; Hoover, 2003), Hawaiian stingray (Hoover, 1993).

HAWAIIAN RECORDS: Reported from O'ahu (Jenkins, 1903; Fowler, 1928). It is likely that the records of Uchida & Uchiyama (1986) from Necker and Laysan at 311–355 m, and of Chave & Mundy (1994) from 52–150 m were of other species (J.E. Randall, pers. comm., Mar. 2005). The type of *D. hawaiiensis* and only known archived specimen from the Hawaiian Islands was a juvenile only 17 inches long (6.5 inch disk length) (see Crow & Crites, 2002). The occurrence of *D. dipterura* in the Hawaiian Islands needs verification with identified adult specimens that should be placed in archival collections.

GENERAL RANGE: Eastern Pacific from California to Peru, the Galapagos Islands, and from the Hawaiian Islands. Benthic at 10–355 m (Uchida & Uchiyama, 1986; Nishida & Nakaya, 1990; Chave & Mundy, 1994; Allen & Robertson, 1994; Robertson & Allen, 2002).

### *Dasyatis lata* (Garman)

*Trygon lata* Garman, 1880, p. 170, Hawaiian Islands.

*Dasyatis sciera* Jenkins, 1903: Jenkins (1903), Jordan & Evermann (1905).

*Dasyatis latus* (Garman, 1880): Garman (1880), Fowler (1928, 1949), Gosline & Brock (1960), Struhsaker (1973a), Tinker (1982), Uchida & Uchiyama (1986), Nishida & Nakaya (1990), Chave & Mundy (1994), Randall (1996a), Crow & Crites (2002).

*Dasyatis lata* (Garman, 1880): Jordan & Evermann (1905), Hoover (2003).

TAXONOMY: Nishida & Nakaya (1990).

COMMON NAMES: Hihimanu (Hoover, 1993, 2003), Lupe (Hoover, 1993, 2003; Randall, 1996a), Brown stingray (Hoover, 1993, 2003), Broad stingray (Randall, 1996a; Hoover, 2003).

HAWAIIAN RECORDS: Moloka'i to Laysan at 40–357 m (Garman, 1880; Jenkins, 1903; Jordan & Evermann, 1905; Struhsaker, 1973a; Chave & Mundy, 1994; Crow & Crites, 2002).

GENERAL RANGE: The Hawaiian Islands and Taiwan. Benthic at 40–357 m (Uchida & Uchiyama, 1986; Nishida & Nakaya, 1990; Chave & Mundy, 1994).

[*Dasyatis matsubarai* Miyosi]

*Dasyatis matsubarai* Miyosi, 1939, p. 96, Fig. 3, Off Hyuga Nada, east coast of Miyazaki Prefecture, Japan.  
*Dasyatis matsubarai* Miyosi, 1939: Humphreys *et al.* (1984), Nishida & Nakaya (1990).

TAXONOMY: Nishida & Nakaya (1990).

HAWAIIAN RECORDS: Recorded from the Hancock Seamounts (Humphreys *et al.* 1984) but this needs verification.

GENERAL RANGE: Japan to the Emperor Seamounts and perhaps the northern Hawaiian Ridge. Benthic at unrecorded depths (Humphreys *et al.*, 1984; Nishida & Nakaya, 1990).

***Pteroplatytrygon violacea* (Bonaparte)**

*Trygon violacea* Bonaparte, 1832, fasc. 1, punt. 6, pl. 7, Italy.

*Dasyatis violacea* (Bonaparte, 1832): McEachran & Capapé *in* Whitehead *et al.* (1984), Compagno *in* Smith & Heemstra (1986), Nishida & Nakaya (1990), Boggs (1992), Last & Stevens (1994), Randall (1996a), Mollett (2002).

“*Dasyatis* or *Pteroplatytrygon violacea*” (Bonaparte, 1832): Compagno (1996).

*Pteroplatytrygon violacea* (Bonaparte, 1832): Last & Compagno (1999), Robertson & Allen (2002), Crow & Crites (2002).

TAXONOMY: Nishida & Nakaya (1990). Last & Compagno (1999) place this species in the monotypic genus *Pteroplatytrygon*.

COMMON NAMES: Pelagic stingray (AFS; FAO).

HAWAIIAN RECORDS: Probably throughout the region. Specimens have been taken near the Hancock Seamounts and approximately 100 nmi southwest of Hawai‘i Island (Boggs, 1992; Mollett, 2002; Crow & Crites, 2002; R. Humphreys, unpubl. data). The Bishop Museum has specimens collected in and near Hawaiian waters (J.E. Randall, pers. comm., January 1991; Compagno, 1996).

GENERAL RANGE: Circumglobal in all tropical through temperate seas but not yet documented from the western or central Indian Ocean. Pelagic at 1–381 m, usually at 1–100 m (McEachran & Capapé *in* Whitehead *et al.*, 1984; Compagno *in* Smith & Heemstra, 1986; Mollett, 2002).

**Myliobatididae — Eagle rays<sup>9</sup>*****Aetobatus narinari* (Euphrasen)**

*Raja narinari* Euphrasen, 1790, p. 217, Pl. 10, Brazil or St. Bartholomieu, West Indies.

*Stoasodon narinari* (Euphrasen, 1790): Jordan & Evermann (1905).

*Aetobatus narinari* (Euphrasen, 1790): Steindachner (1900), Jenkins (1903), Snyder (1904), Fowler (1928, 1931, 1934, 1949), Bigelow & Schroeder (1953a), Gosline & Brock (1960), Tinker (1982), Okamoto & Kanenaka (1984), Randall *et al.* (1985a, 1993b), Myers (1989), Eschmeyer (1990), Hoover (1993, 2003), Allen & Robertson (1994), Last & Stevens (1994), Randall (1996a), Crow & Crites (2002).

TAXONOMY: Bigelow & Schroeder (1953a). There is an unresolved nomenclatural problem for this species. Eschmeyer (1990) noted that *Raja aquila* Linnaeus, 1758, is the type of *Aetobatis*, but this species is now placed in *Myliobatis* (for examples see McEachran & Séret *in* Quéro *et al.*, 1990; Eschmeyer, 1998). Eschmeyer (1990) stated that both genera were established in 1816, but the type of *Aetobatus* was designated in 1822, earlier than the 1828 designation of the type of *Myliobatis*. The nomenclatural status of *Aetobatis narinari* thus needs to be determined.

COMMON NAMES: Hailepō (Hoover, 1993, 2003), Hihīmanu (Randall, 1996; Crow & Crites, 2002), Lupe (Crow & Crites, 2002), Spotted eagle ray (AFS; FAO; Hoover, 1993, 2003; Randall, 1996).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to Kure and the Hancock Seamounts at ca. 7 m (Steindachner, 1900; Jordan & Evermann, 1905; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Hoover, 1993; Crow & Crites, 2002; NMFS, unpubl. data for the Hancock Seamounts).

GENERAL RANGE: Circumglobal in all tropical and subtropical seas, straying into temperate areas. Benthopelagic, usually found near land, at 1–60 m (Bigelow & Schroeder, 1953a; Allen & Robertson, 1994; Last & Stevens, 1994).

***Manta birostris*** (Walbaum)

*Raja birostris* Walbaum, 1792, p. 535, no type locality given [Eschmeyer (1998) commented that the apparent non-binomial presentation of the name by Walbaum was due to a typographical error; Eschmeyer (1998) stated that the species is valid as *Manta birostris* (Donndorff, 1798) even though no entry for Donndorff's description was given in Eschmeyer's catalog; this discrepancy was clarified in the updated website for Eschmeyer's (1998) catalog as of November 2001 (<http://www.calacademy.org/research/ichthyology/catalog/fishcatmain.asp>), where the authorship of the name is unequivocally given as Walbaum].

*Manta birostris* (Walbaum, 1792): Fowler (1928), Tinker (1982), Compagno *in* Smith & Heemstra (1986), Allen & Robertson (1994), Last & Stevens (1994), Randall (1996a), Compagno & Last (1999), Crow & Crites (2002), Hoover (2003).

*Manta alfredi* (Krefft, 1868): Bigelow & Schroeder (1953a), Tinker (1982), Randall *et al.* (1993b).

*Manta* sp.: Randall *et al.* (1985a).

TAXONOMY: *Manta* is in need of revision. Compagno *in* Smith & Heemstra (1986) suggested that there might only be one species. The correct names for Hawaiian *Manta* cannot be given until this is resolved. *Manta alfredi* is the name most frequently seen in reports of Hawaiian manta rays, but *Manta birostris* is the older name. Myers (1989), Paxton *et al.* (1989), Compagno & Last (1999) and T. Clark, pers. comm., April 2004) stated that *M. birostris* might be a senior synonym of *M. alfredi*.

COMMON NAMES: Hāhālua (Hoover, 1993, 2003), Hahalua (Randall, 1996a), Manta (AFS; Randall, 1996a), Giant manta (FAO), Manta ray (Hoover, 1993, 2003; Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at 1–120 m (Fowler, 1928; Tinker, 1982; Randall *et al.*, 1985b, 1993b; Crow & Crites, 2002).

GENERAL RANGE: Unknown because of uncertainties in taxonomy. Perhaps circumglobal in tropical through warm-temperate waters. Pelagic from surface to at least 120 m (Bigelow & Schroeder, 1953a; Randall *et al.*, 1985b; Allen & Robertson, 1994; Last & Stevens, 1994).

***Mobula japonica*** (Müller & Henle)

*Cephaloptera japonica* Müller & Henle, 1841, p. 185, Japan.

*Mobula japonica* (Müller & Henle, 1841) [*lapsus*; a commonly seen misspelling for *Mobula japonica*]: Jordan & Evermann (1905) [perhaps misidentified *Manta* specimens], Fowler (1928), Gosline & Brock (1960), Tinker (1982), Crow & Crites (2002).

*Mobula japonica* (Müller & Henle, 1841): Notarbartolo-di-Sciara (1987), Last & Stevens (1994).

TAXONOMY: Notarbartolo-di-Sciara (1987). The often seen misspelling of the species name as *japonica* is logical but incorrect.

COMMON NAMES: Hihīmanu, Spinetail mobula (AFS; FAO), Spinetail devil ray (Crow & Crites, 2002), Japanese devilray.

HAWAIIAN RECORDS: Maui to O'ahu (Jordan & Evermann, 1905; Fowler, 1928; Crow & Crites, 2002). The specimens observed at Maui had a brown color more characteristic of *M. tarapacana* Philippi than of *M. japonica* and were likely the former species (J.E. Randall, pers. comm., June 2003).

GENERAL RANGE: Probably circumtropical and subtropical in Gulf of California, Pacific, Atlantic, and Indian oceans (Notarbartolo-di-Sciara, 1987; Last & Stevens, 1994). Pelagic, depths unrecorded.

**Class Actinopterygii****Division Teleostei****Osteoglossiiformes****Osteoglossidae — Bonytongues, Osteoglossids****[*Osteoglossum bicirrhosum* (Cuvier)]**

*Ischnosoma bicirrhosum* Cuvier, 1829, p. 328, Brazil [see Eschmeyer (1990, 1998) for the explanation of the complicated nomenclatural history of this species and these genera; the status of these names was fixed by Opinion 1621 of the ICZN].

*Osteoglossum* species: Devick (1991), Fuller *et al.* (1999).

TAXONOMY: Kanazawa (1966).

COMMON NAMES: Arawana (AFS), arowana, aruana, arowhana, silver aruana, green arowana.

HAWAIIAN RECORDS: An *Osteoglossum* species was reported from an O'ahu freshwater reservoir in 1988–89 but did not become established (Devick, 1991; Fuller *et al.*, 1999). No specimen was collected and the species was not identified. *Osteoglossum bicirrhosum* is more frequently imported than *O. ferreirai* Kanazawa and is likely to be the species introduced in Hawai'i.

GENERAL RANGE: Freshwaters of the Rapununi, Amazon and Rio Negro Basins, South America at the surface (Kanazawa, 1966).

## Elopiformes Elopoidei

### Elopidae — Tenpounders, Ladyfishes

#### *Elops hawaiiensis* Regan

*Elops hawaiiensis* Regan, 1909a, p. 39, Hawaiian Islands.

*Elops saurus* non Linnaeus, 1766 [in part?; a valid species that does not occur in the Hawaiian Islands]: Steindachner (1900), Fowler (1900), Jenkins (1903), Jordan & Evermann (1905), Fowler (1949).

*Elops hawaiiensis* Regan, 1909a: Regan (1909), Fowler (1928, 1931), Gosline & Brock (1960), Whitehead (1962), Fraser (1973), Tinker (1982), Hoover (1993, 2003), Randall (1996a).

TAXONOMY: The genus is in need of revision (Whitehead, 1962; Fraser, 1973; Springer, 1982).

COMMON NAMES: Awa-awa (Hoover, 1993), Awa'aua (Randall, 1996; Hoover, 2003), Hawaiian ladyfish (FAO; Hoover, 1993), Hawaiian tenpounder (Randall, 1996; Hoover, 2003), Tenpounder (DLNR; Hoover, 2003).

HAWAIIAN RECORDS: O'ahu at 1–3 m (Steindachner, 1900; Jordan & Evermann, 1905; Regan, 1909a; Hoover, 1993).

GENERAL RANGE: Japan, the Philippines, Australia, and the Hawaiian Islands (Whitehead, 1962). Benthopelagic in shallow, coastal waters.

#### *Elops machnata* (Forsskål)

*Argentina machnata* Forsskål, 1775, p. 68, Jidda, Saudi Arabia, Red Sea.

*Elops saurus* non Linnaeus, 1766 [in part?; a valid species that does not occur in the Hawaiian Islands]: Jordan & Evermann (1905), Fowler (1949).

*Elops machnata* (Forsskål, 1775): Fowler (1934), Whitehead (1962), Fraser (1973).

TAXONOMY: The genus is in need of revision (Whitehead, 1962; Fraser, 1973; Springer, 1982).

COMMON NAMES: Awa-awa, (Springer, 1982; AFS).

HAWAIIAN RECORDS: Fowler (1934a) recorded *Elops machnata* from the Hawaiian Islands, but most subsequent authors have listed only *E. hawaiiensis* from the region. Whitehead (1962) listed Hawaiian specimens of both species among the study material used for review of the genus. O'ahu at 1–3 m.

GENERAL RANGE: Indian and Pacific oceans from South Africa to India, possibly in the Hawaiian Islands (Whitehead, 1962; Fraser, 1973). Benthopelagic in shallow, coastal waters.

## Albuliformes Albuloidei

### Albulidae — Bonefishes

#### *Albula forsteri* Valenciennes

*Albula forsteri* Valenciennes in Cuvier & Valenciennes, 1847, p. 354, Tahiti.

*Albula vulpes* non (Linnaeus, 1758) [in part; a valid species that does not occur in the Hawaiian Islands]: Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Tinker (1982), Okamoto & Kanenaka (1984)?

*Albula concorhynchus* non Bloch & Schneider, 1801: Günther (1880) [although this could just as well have been *A. glossodonta* (Forsskål, 1775), per comments below].

*Albula neoguinaica* Valenciennes in Cuvier & Valenciennes, 1847: Shaklee & Tamaru (1981), Myers (1989),

Paxton *et al.* (1989), Hoover (1994), Allen & Robertson (1994), Colborn *et al.* (2001).  
*Albula argentea* (Forster & Schneider in Bloch & Schneider, 1801): Randall (1995c, 1996a), Hoover (2003).  
*Albula forsteri* Valenciennes in Cuvier & Valenciennes, 1847: Randall & Bauchot (1999).

**TAXONOMY:** See Randall & Bauchot (1999) for a discussion of the convoluted nomenclature of this species. Eastern Pacific *Albula* previously identified as *A. vulpes*, or *A. neoguinaica* (e. g., in Allen & Robertson, 1994) are two eastern Pacific endemic species that do not occur in the Hawaiian Islands (Colborn *et al.*, 2001), one of which may take the name *A. esuncula* (Garman, 1899) (see Robertson & Allen, 2002).

**COMMON NAMES:** Ō'io (Hoover, 1993, 2003), Pua 'o'io (finger length juveniles; Hoover, 2003), 'amo'omo'o (forearm length individuals; Hoover, 2003), Pacific bonefish (Randall *et al.*, 1997a).

**HAWAIIAN RECORDS:** Hawai'i Island to Kaua'i (possibly French Frigate) in shallow, coastal areas at ca. 2 m (Shaklee & Tamaru, 1981; Okamoto & Kanenaka, 1984; Hoover, 1994).

**GENERAL RANGE:** Western and eastern Australia to Fiji, the Hawaiian Islands, and French Polynesia, perhaps Micronesia. Benthopelagic in shallow, coastal areas (Myers, 1986; Paxton *et al.*, 1989; Colborn *et al.*, 2001).

### *Albula glossodonta* (Forsskål)

*Argentina glossodonta* Forsskål, 1775, p. 68, Jidda, Saudi Arabia or Luhaiya, Yemen, Red Sea.

*Butirinus glossodonta* (Forsskål, 1775): Lay & Bennett (1839) [identification tentative, with authorship of species wrongly attributed to Cuvier].

*Albula vulpes* non (Linnaeus, 1758) [in part; a valid species that does not occur in the Hawaiian Islands]: Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Tinker (1982), Okamoto & Kanenaka (1984)?

*Albula glossodonta* (Forsskål, 1775): Steindachner (1900), Shaklee & Tamaru (1981), Randall *et al.* (1985a), Myers (1989), Paxton *et al.* (1989), Hoover (1994, 2003), Randall (1996a), Randall & Bauchot (1999), Colborn *et al.* (2001).

**TAXONOMY:** Shaklee & Tamaru (1981), Randall & Bauchot (1999), Colborn *et al.* (2001). It will not be possible to know the identities of specimens listed in the literature prior to Shaklee & Tamaru (1981) until museum specimens are examined.

**COMMON NAMES:** Ō'io (Hoover, 1993, 2003; Randall, 1996), Pua 'o'io (finger length juveniles; Hoover, 2003), 'amo'omo'o (forearm length individuals; Hoover, 2003), Smallmouth bonefish (Randall, 1996).

**HAWAIIAN RECORDS:** Johnston Atoll and Hawai'i Island to Kaua'i (possibly, French Frigate) in shallow, coastal areas at ca. 2 m (Lay & Bennett, 1839?; Okamoto & Kanenaka, 1984; Shaklee & Tamaru, 1981; Randall *et al.*, 1985b; Hoover, 1994).

**GENERAL RANGE:** Red Sea and Indian Ocean to Japan and Lord Howe Island, east to the Hawaiian Islands and the Tuamotu Islands. Benthopelagic in shallow, coastal areas (Myers, 1989; Paxton *et al.*, 1989; Colborn *et al.*, 2001).

## Notacanthoidei<sup>10</sup>

### Halosauridae — Halosaurs

#### *Aldrovandia affinis* (Günther)

*Halosaurus affinis* Günther, 1877b, p. 444, south of Japan at 34°N, 138°E.

*Halosauropsis proboscidea* Gilbert, 1905: Gilbert (1905) text, Fowler (1928), Gosline & Brock (1960), Tinker (1982).

*Aldrovandia proboscidea* (Gilbert, 1905): Gilbert (1905) plate 76.

*Aldrovandia affinis* (Günther, 1877b): McDowell (1973), Filatova (1985), Wilson *et al.* (1985).

**TAXONOMY:** McDowell (1973).

**HAWAIIAN RECORDS:** Moloka'i to Kaua'i at 801–871 m (Gilbert, 1905).

**GENERAL RANGE:** Circumglobal in tropical through temperate seas except Mediterranean, associated with islands and continental slopes. Engyobenthic at 800–2615 m; a few records at 383–618 m (Filatova, 1985).

***Aldrovandia phalacra*** (Vaillant)

*Halosaurus phalacrus* Vaillant, 1888, p. 185, Pl. 15 (fig. 3), 16 (figs. 1–1c), Morocco, Sudan, and Azores, 37°35'N, 29°26'W [lectotype designated in Eschmeyer (1998)].

*Halosauropsis kauaiensis* Gilbert, 1905: Gilbert (1905) text, Fowler (1928), Gosline & Brock (1960).

*Aldrovandia kauaiensis* (Gilbert, 1905): Gilbert (1905) plate 74, Struhsaker (1973a), Tinker (1982).

*Halosauropsis verticalis* Gilbert, 1905: Gilbert (1905) text, Fowler (1928), Gosline & Brock (1960).

*Aldrovandia verticalis* (Gilbert, 1905): Gilbert (1905) plate 75, Tinker (1982).

*Aldrovandia phalacra* (Vaillant, 1888): McDowell (1973), Wilson *et al.* (1985), Filatova (1985), Chave & Mundy (1994).

TAXONOMY: McDowell (1973).

HAWAIIAN RECORDS: Hawai'i Island to French Frigate at 572–1680 m (Gilbert, 1905; Chave & Mundy, 1994).

GENERAL RANGE: Tropical and subtropical Atlantic, Indian, and Pacific oceans. Engybenitic at 530–2321 m, associated with islands and continental slopes (McDowell, 1973; Wilson *et al.*, 1985; Filatova, 1985).

**Notacanthidae — Spiny eels*****Notacanthus abbotti*** Fowler

*Notacanthus abbotti* Fowler, 1934b, p. 267, Fig. 28, Camp Overton Light, northern Mindanao, Philippines, 8° 16'00"N, 124°03'50"E.

TAXONOMY: McDowall (1973).

HAWAIIAN RECORDS: Unpublished record from the Hancock Seamounts (B. Mundy, unpubl. data, 1995).

GENERAL RANGE: Western and central North Pacific endemic known from the Philippines, Japan, and the northern Hawaiian Ridge. Engybenitic at 329–774 m (McDowell, 1973; Peden, 1976; Lea & Rosenblatt, 1987; Smith, 1994).

***Notacanthus chemnitzii*** Bloch

*Notacanthus chemnitzii* Bloch, 1788, p. 278, Pl. 1, North Sea.

*Notacanthus* sp.: Chave & Mundy (1994).

TAXONOMY: McDowall (1973).

COMMON NAMES: Spiny eel (AFS).

HAWAIIAN RECORDS: Hawai'i Island to Maui at 768–940 m (Chave & Mundy, 1994).

GENERAL RANGE: Probably cosmopolitan; known from the Arctic Ocean, subarctic through subtropical Atlantic, Gulf of Mexico, Japan, Oregon, California, and Chile; engybenitic at 238–1554 m with single records at 128 and 3286 m (McDowell, 1973; Peden, 1976; Lea & Rosenblatt, 1987; Smith, 1994). Notacanthids are known only from the Hawaiian Islands on the Pacific tectonic plate.

**Anguilliformes****Anguilloidei****Anguillidae — Freshwater eels****[*Anguilla marmorata* Quoy & Gaimard]**

*Anguilla marmorata* Quoy & Gaimard, 1824, p. 241, pl. 51 (fig. 2), Waigeo [Waigiou], Indonesia.

*Anguilla marmorata* Quoy & Gaimard, 1824: James (2003), Wright (2003).

TAXONOMY: Smith (1999).

COMMON NAMES: Marbled eel (AFS), Giant mottled eel (FAO).

HAWAIIAN RECORDS: A single specimen was collected in shallow water of a stream pool adjacent to the ocean near Kaupō, Maui, in June, 2002. No other records of this species exist from Hawai'i. The species is not indigenous and was likely introduced, although the possibility that the Maui specimen was a waif cannot be entirely excluded (A. Suzumoto, pers. comm., 19 July 2002; James, 2003; Wright, 2003).



GENERAL RANGE: Indo-Pacific from South Africa and to southern Japan, Indonesia, the Marianas, New Caledonia, and French Polynesia. Benthic, catadromous with pre-reproductive adults in brackish or freshwater habitats near or with connections to the ocean (Smith, 1999).

### Moringuidae — Spaghetti eels

#### *Moringua ferruginea* Bliss

*Moringua ferruginea* Bliss, 1883, p. 57, Mauritius.

*Moringua hawaiiensis* Snyder, 1904: Snyder (1904), Jordan & Evermann (1905).

*Aphthalmichthys javanicus* non Kaup, 1856 [a valid species that probably does not occur in the Hawaiian Islands]: Fowler (1928, in part).

*Rataboura javanica* non (Kaup, 1856) [see above]: Fowler (1949, in part).

*Moringua macrochir* non Bleeker, 1855 [probably a valid species not found in the central Pacific (Castle 1968)]: Gosline & Brock (1960), Tinker (1982 text), Uchida & Uchiyama (1986).

*Moringua ferruginea* Bliss, 1883: Castle (1968), Tinker (1982 appendix), Randall *et al.* (1985a, 1990a), Myers (1989).

TAXONOMY: A revision of this genus is greatly needed. Recent discussions of the family cite Castle (1968) as the authority for identifications of *Moringua* species, but that paper only determined identities for western Indian Ocean species and extrapolation of Castle's conclusions to the central Pacific are inappropriate. Smith (1994) commented that *M. hawaiiensis* is probably a valid species and J.E. Randall (pers. comm., Mar. 2005) also identifies Hawaiian *Moringua* as *M. hawaiiensis*. Two mature male *Moringua* specimens dipnetted at the sea surface at Lāna'i appear to be a species different from *M. hawaiiensis* or *ferruginea* based on head and body proportions, but the taxonomic confusion for this genus prevents a further identification to be made. The number and identities of *Moringua* species in the Hawaiian Islands need further investigation in the context of a revision of all Indo-Pacific species.

COMMON NAMES: Rusty spaghetti eel (Myers, 1999), Slender worm eel (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Johnston Atoll and O'ahu to Gardner Pinnacles at 1–33 m with one specimen taken from the stomach of a grouper caught at 140 m (Snyder, 1904; Randall *et al.*, 1985b; Uchida & Uchiyama, 1986; J.E. Randall, pers. comm., Mar. 2005).

GENERAL RANGE: Unknown. J.E. Randall (pers. comm., Mar. 2005) gives the range for *M. hawaiiensis* as the Hawaiian Islands, Johnston Atoll, “and probably Easter Island and other islands of Polynesia.” Most recent discussions of *Moringua ferruginea* give its range as Indo-Pacific from East Africa to the Ryukyus, Micronesia, the Hawaiian Islands, and Easter Island. Benthic at 1–40 m, perhaps to 140 m, burrowing in sand but swarms at surface during spawning (Uchida & Uchiyama, 1986; Myers, 1989; Randall *et al.*, 1990a; J.E. Randall, pers. comm., Mar. 2005).

### Muraenoidei

#### Chlopsidae — False morays<sup>11</sup>

#### *Chilorhinus platyrhynchus* (Norman)

*Brachyconger platyrhynchus* Norman, 1922, p. 218, Fig., New Britain Island, Bismarck Archipelago.

*Chilorhinus brocki* Gosline, 1951: Gosline (1951a), Tinker (1982).

*Chilorhinus platyrhynchus* (Norman, 1922): Böhlke (1956), Gosline & Brock (1960), Gosline (1965), Böhlke & Smith (1968), Tinker (1982).

TAXONOMY: Böhlke & Smith (1968).

HAWAIIAN RECORDS: O'ahu from “shallow water” to >30 m (Gosline, 1951a, 1965).

GENERAL RANGE: Indo-Pacific from the western Indian Ocean to New Guinea and the Hawaiian Islands. Benthic from shallow water to >30 m (Gosline 1951a, 1965; Böhlke, 1956; Böhlke & Smith, 1968).

#### *Kaupichthys hyoprroides* (Strömman)

*Leptocephalus hyoprroides* Strömman, 1896, p. 39, Pl. 4 (figs. 5–6), central North Atlantic north of the Bahamas at 27°N, 73°W.

*Kaupichthys diodontus* Schultz, 1943: Gosline (1950), Böhlke (1956), Gosline & Brock (1960), Tinker (1982).  
*Kaupichthys hyoprroides* (Strömman, 1896): Böhlke & Smith (1968), Randall *et al.* (1985a, 1990a), Myers (1989), Smith (1989).

TAXONOMY: Böhlke & Smith (1968). Smith (1994) commented that there is a possibility that *K. diodontus* is a valid Indo-Pacific species distinct from the Atlantic *K. hyoprroides*.

COMMON NAMES: False moray (FAO).

HAWAIIAN RECORDS: O'ahu in "shallow water" and Johnston (Gosline, 1950a; Randall *et al.*, 1985b).

GENERAL RANGE: Circumtropical, except for the eastern Pacific, from the tropical west Atlantic and South Africa to the Ryukyus, Australia, Micronesia, the Hawaiian Islands, and French Polynesia. Benthic, living within coral reefs at 1–95 m (Böhlke, 1956; Myers, 1989; Smith, 1989a; Randall *et al.*, 1990a).

### *Xenococonger fryeri* Regan

*Xenococonger fryeri* Regan, 1912, p. 301, Assumption Island, Indian Ocean.

*Xenococonger fryeri* Regan, 1912: Böhlke (1956), Randall *et al.* (1993a).

TAXONOMY: Randall *et al.* (1993a).

COMMON NAMES: Fryer's false moray (Myers, 1999).

HAWAIIAN RECORDS: Hawai'i Island from an anchialine (brackish) pond at 1–2 m (Randall *et al.*, 1993a).

GENERAL RANGE: Indo-Pacific from isolated collections in Aldabra, the Seychelles, New Caledonia, Palau, Fiji, and the Hawaiian Islands. Benthic within rock crevices at 1–5 m (Böhlke, 1956; Randall *et al.*, 1993a).

### [Chlopsidae]

COMMENTS: Larvae of two other species of chlopsids have been collected in Hawai'i; one is tentatively identified as *Robinsia* sp. (R. Lavenberg, pers. comm.). Chlopsid larvae have been collected at the Hancock Seamounts, but have not been identified (B. Mundy, unpubl. data).

## Muraenidae — Moray eels

### *Anarchias allardicei* Jordan & Starcks

*Anarchias allardicei* Jordan & Starcks in Jordan & Seale, 1906, p. 204, Fig. 9, Pago Pago, American Samoa.

*Anarchias allardicei* Jordan & Starcks in Jordan & Seale, 1906: Gosline & Brock (1960), Gosline (1965), Tinker (1982), Randall *et al.* (1985a), Myers (1989), Böhlke *et al.* (1989), Winterbottom *et al.* (1989).

TAXONOMY: Böhlke *et al.* (1989), Winterbottom *et al.* (1989), Böhlke & Randall (2000).

COMMON NAMES: Allardice's moray (Myers, 1999).

HAWAIIAN RECORDS: Perhaps Johnston Atoll, but not the Hawaiian archipelago, at unspecified depths (Randall *et al.*, 1985b). Specimens from O'ahu previously identified as *A. allardicei* are likely an undescribed species, based on a single specimen in the University of Hawai'i collection according to Böhlke & Randall (2000). They did not comment on the identification of specimens from Johnston Atoll previously recorded as *A. allardicei*. For the purpose of this checklist the identification by Randall *et al.* (1985b) is accepted as valid pending clarification of this question.

GENERAL RANGE: Indo-Pacific from the Chagos Archipelago to Australia, Micronesia, perhaps Johnston Atoll, and the Society Islands. Benthic, living well within crevices (Myers, 1989; Winterbottom *et al.*, 1989).

### *Anarchias cantonensis* (Schultz)

*Uropterygius cantonensis* Schultz, 1943, p. 27, Pl. 4; Fig. 3a, lagoon of Canton Island, Phoenix Islands.

*Anarchias cantonensis* (Schultz, 1943): Randall *et al.* (1985a), Böhlke *et al.* (1989), Myers (1989).

TAXONOMY: Böhlke *et al.* (1989). Böhlke & Randall (2000) stated that Hawaiian specimens previously identified as *A. cantonensis* are an undescribed species but they did not comment on the identities of specimens reported as *A. cantonensis* from Johnston Atoll. The identification of these as *A. cantonensis* by Randall *et al.* (1985b) is accepted for the purposes of this checklist pending clarification of this question.

COMMON NAMES: Canton Island moray (Myers, 1999).

HAWAIIAN RECORDS: Perhaps Johnston Atoll, but not the Hawaiian Islands, at unspecified depths (Randall *et al.*, 1985b; Böhlke & Randall, 2000).

GENERAL RANGE: Central Pacific endemic from Micronesia to Johnston Atoll and Rapa. Benthic in crevices at unspecified depths (Myers, 1989).

### *Anarchias leucurus* (Snyder)

*Uropterygius leucurus* Snyder, 1904, p. 521, Pl. 6 (fig. 12), Auau Channel between Maui and Lānaʻi, Hawaiian Islands.

*Uropterygius leucurus* Snyder, 1904: Snyder (1904), Gilbert (1905), Jordan & Evermann (1905), Fowler (1949). *Uropterygius concolor* non Rüppell, 1838 [a valid species not found in the Hawaiian Islands]: Fowler (1928, in part).

*Anarchias leucurus* (Snyder, 1904): Gosline & Brock (1960), Gosline (1965), Tinker (1982), Randall & McCosker (1975), Böhlke *et al.* (1989), Böhlke & Randall (2000).

TAXONOMY: Randall & McCosker (1975), Böhlke *et al.* (1989), Böhlke & Randall (2000).

COMMON NAMES: Snyder's moray (Böhlke & Randall, 2000).

HAWAIIAN RECORDS: Johnston Atoll and Hawaiʻi Island to Oʻahu at 1–51 m (Snyder, 1904; Gilbert, 1905; Gosline, 1965; Randall & McCosker, 1975; Böhlke & Randall, 2000). Randall *et al.* (1985b) stated that specimens from Johnston Atoll reported as *A. leucurus* were *A. seychellensis* but Böhlke & Randall (2000) recorded both species from there.

GENERAL RANGE: Central Pacific endemic known only from Johnston Atoll, the Hawaiian Islands, and the Marquesas. Benthic at 1–51 m (Gilbert, 1905; Randall & McCosker, 1975; Böhlke & Randall, 2000).

### *Anarchias seychellensis* Smith

*Anarchias seychellensis* Smith, 1962, p. 429, Pl. 53 (fig. F), Assumption Island, Indian Ocean.

*Anarchias seychellensis* Smith, 1962: Randall & McCosker (1975), Randall (1976a), Tinker (1982 appendix), Randall *et al.* (1985a, 1993a, 1993b, 1997a), Myers (1989), Böhlke *et al.* (1989), Böhlke & Randall (2000).

TAXONOMY: Böhlke *et al.* (1989), Böhlke & Randall (2000). Hatooka (pers. comm., cited by Randall *et al.* 1993b) suggested that *Anarchias seychellensis* may be a junior synonym of *A. leucurus* but Böhlke & Randall (2000) recognized both species as valid.

COMMON NAMES: Seychelles moray (Myers, 1999; Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Johnston Atoll and Oʻahu to Midway at unspecified depths (Randall & McCosker, 1975; Randall *et al.*, 1985b; Randall *et al.*, 1993b; Böhlke & Randall, 2000).

GENERAL RANGE: Indo-Pacific from South Africa to the Ogasawara Islands, Micronesia, the Hawaiian Islands, French Polynesia, and Easter Island. Benthic, usually in coral crevices or rubble in shallow water to 22 m along exposed shores (Myers, 1989; Randall *et al.*, 1993a, 1997b; Böhlke & Randall, 2000).

### *Anarchias* sp.

*Anarchias allardicei* non Jordan & Starks in Jordan & Seale, 1906: Gosline & Brock (1960), Gosline (1965), Tinker (1982).

*Anarchias cantonensis* non (Schultz, 1943): Gosline & Brock (1960), Tinker (1982).

Two undescribed *Anarchias* species: Böhlke & Randall (2000).

TAXONOMY: Specimens from Oʻahu and elsewhere in the Hawaiian Islands previously identified as *A. allardicei* and *A. cantonensis* may be an undescribed species, based on a specimen in the University of Hawaiʻi collection and other specimens. These were identified as two undescribed forms by Böhlke & Randall (2000), who stated that the two species were to be described by E. Holm and D.G. Smith. According to D.G. Smith (pers. comm., April 2003), there is but a single undescribed species in this material, not two. Böhlke & Randall (2000) did not clarify the identities of specimens collected at Johnston Atoll identified by *A. cantonensis* by Randall *et al.* (1985b).

HAWAIIAN RECORDS: Oʻahu and elsewhere in the Hawaiian Islands at unspecified depths (Gosline & Brock, 1960; Gosline, 1965; Böhlke & Randall, 2000).

GENERAL RANGE: Unknown, perhaps a Hawaiian endemic (Böhlke & Randall, 2000). Probably benthic within reefs.

*[Channomuraena vittata* (Richardson)]

*Ichthyophis vittatus* Richardson, 1845b, pl. 53 (figs. 7–9), no type locality given, brought from China (Eschmeyer, 1998).

*Channomuraena vittata* (Richardson, 1845b): Myers (1989), Böhlke *et al.* (1989).

TAXONOMY: Böhlke *et al.* (1989).

COMMON NAMES: Banded moray (AFS), Long-jawed moray (Myers, 1999).

HAWAIIAN RECORDS: Myers (1989) included Hawai‘i in the range of this species. Böhlke *et al.* (1989) did not mention Hawai‘i as within its range and Böhlke & Randall (2000) stated directly “*Channomuraena* is not known from Hawaiian waters.” Myers (1989) mention of the Hawaiian Islands as within the range of *C. vittata* was an error, undoubtedly unintentional.

GENERAL RANGE: Tropical Atlantic and Pacific oceans; in the Pacific recorded from Micronesia and the Line Islands, perhaps off China. Benthic in crevices of outer reef slopes at 1–37 m (Myers, 1989; Böhlke *et al.*, 1989).

*Echidna leucotaenia* Schultz

*Echidna leucotaenia* Schultz, 1943, p. 22, Pl. 3, Enderbury Island, Phoenix Islands.

*Echidna leucotaenia* Schultz, 1943: Gosline & Brock (1960), Tinker (1982), Randall *et al.* (1985a), Myers (1989), Böhlke *et al.* (1989), Böhlke & Randall (2000).

TAXONOMY: Böhlke *et al.* (1989), Böhlke & Randall (2000).

COMMON NAMES: Whiteface moray (Myers, 1999).

HAWAIIAN RECORDS: Johnston Atoll. Not found in the Hawaiian Islands (Randall *et al.*, 1985b; Böhlke & Randall, 2000).

GENERAL RANGE: Indo-Pacific from East Africa to Micronesia, Johnston Atoll, and the Tuamotu Islands. Benthic in rubble on the lee sides of exposed reefs in shallow water (Myers, 1989).

*Echidna nebulosa* (Ahl)

*Muraena nebulosa* Ahl, 1789, p. 7, Pl. 1 (right fig.), “East Indies”.

*Echidna nebulosa* (Ahl, 1789): Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1931, 1949), Gosline & Brock (1960), Tinker (1982), Randall (1985a, 1996a), Uchida & Uchiyama (1986), Myers (1989), Böhlke *et al.* (1989), Randall *et al.* (1993b), Hoover (1993, 2003), Allen & Robertson (1994), Böhlke & Randall (2000).

TAXONOMY: Böhlke & Randall (2000).

COMMON NAMES: Pūhi-kāpā (Hoover, 1993), Pūhi-kāpā (Hoover, 2003), Pūhi kāpā (Randall, 1996), Snowflake moray (AFS; Randall, 1996; Hoover, 2003), Snowflake eel (Hoover, 1993), Starry moray (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to Midway at 1–48 m (Jenkins, 1903; Jordan & Evermann, 1905; Uchida & Uchiyama, 1986; Randall *et al.*, 1993b; Hoover, 1993; Böhlke & Randall, 2000).

GENERAL RANGE: Indo-transPacific from East Africa and the Red Sea to Lord Howe Island, the Ogasawara Islands, Micronesia, the Hawaiian Islands, the Society Islands, and the eastern Pacific from the Gulf of California to Baja California, Panama, and Colombia. Benthic in or on shallow reef flats at 1–48 m, may occur above water on low tides (Randall, 1985a; Myers, 1989; Hoover, 1993; Allen & Robertson, 1994; Böhlke & Randall, 2000).

*Echidna polyzona* (Richardson)

*Muraena polyzona* Richardson, 1845c, p. 112, Pl. 55 (figs. 11–14), no type locality given.

*Poecilophis tritor* Vaillant & Sauvage, 1875: Vaillant & Sauvage (1875).

*Echidna zonata* Fowler, 1900: Fowler (1900), Jordan & Evermann (1905).

*Echidna leihala* Jenkins, 1903: Jenkins (1903), Jordan & Evermann (1905).

*Echidna obscura* Jenkins, 1903: Jenkins (1903), Jordan & Evermann (1905).

*Echidna psalion* Jenkins, 1903: Jenkins (1903), Jordan & Evermann (1905).

*Echidna vincta* Jenkins, 1903: Jenkins (1903), Snyder (1904).

*Echidna zonophaea* Jordan & Evermann, 1903: Jordan & Evermann (1903a, 1905).

*Echidna sauvagei* Fowler, 1912: Fowler (1912).

*Leihala tritor* (Vaillant & Sauvage, 1875): E.K. Jordan (1925).

*Echidna polyzona* (Richardson, 1845c): Fowler (1900, 1928, 1931, 1949), Gosline & Brock (1960), Tinker

(1982), Randall *et al.* (1985a), Myers (1989), Böhlke *et al.* (1989), Randall *et al.* (1993a).

TAXONOMY: Böhlke & Randall (2000).

COMMON NAMES: Ringed moray (Randall *et al.*, 1997a), Barred moray (Myers, 1999).

HAWAIIAN RECORDS: Johnston Atoll and O'ahu to Laysan at 1–3 m (Vaillant & Sauvage, 1875; Jordan & Evermann, 1905; Gosline & Brock, 1960; Randall *et al.*, 1985b; Böhlke & Randall, 2000).

GENERAL RANGE: Indo-Pacific from East Africa and the Red Sea to the Ryukyus, Australia, Micronesia, the Hawaiian Islands, and the Tuamotu Islands. Benthic among rocks and coral at 1–15 m but usually >4 m (Gosline & Brock, 1960; Myers, 1989; Randall *et al.*, 1993a; Böhlke & Randall, 2000).

### *Echidna unicolor* Schultz

*Echidna unicolor* Schultz in Schultz *et al.*, 1953, p. 106, Figs. 21d, 22, Eniwetok Island, Rongelap Atoll, Marshall Islands.

*Echidna* sp.: Myers (1989) according to R. Myers (pers. comm.).

*Echidna unicolor*: Randall *et al.* (1985a), Böhlke *et al.* (1989), Böhlke & Randall (2000).

TAXONOMY: Böhlke *et al.* (1989), Böhlke & Randall (2000).

COMMON NAMES: Unicolor moray (Myers, 1999).

HAWAIIAN RECORDS: Johnston Atoll. Not found in Hawaiian Islands (Randall *et al.*, 1985b; Böhlke & Randall, 2000).

GENERAL RANGE: Indo-Pacific from East Africa to Micronesia, Johnston Atoll, and the Society Islands. Benthic at unrecorded depths (Myers, 1989).

### *Enchelycore pardalis* (Temminck & Schlegel)

*Muraena pardalis* Temminck & Schlegel, 1846, p. 268, Pl. 119, Nagasaki, Japan.

*Muraena kauila* Jenkins, 1903: Jenkins (1903).

*Muraena lampra* Jenkins, 1903: Jenkins (1903).

*Muraena kailuae* Jordan & Evermann, 1903: Jordan & Evermann (1903a, 1905), Jordan & Snyder (1904a), Snyder (1904), Jordan & Dickerson (1908).

*Muraenophis pardalis* (Temminck & Schlegel, 1846): Fowler (1928, 1931, 1949).

*Muraena pardalis* Temminck & Schlegel, 1846: Gosline & Brock (1960), Tinker (1982).

*Enchelycore pardalis* (Temminck & Schlegel, 1846): Böhlke *et al.* (1989), Winterbottom *et al.* (1989), Kosaki *et al.* (1991), Randall *et al.* (1993b, 1997a), Hoover (1993, 2003), Randall (1996a), Böhlke & Randall (2000).

TAXONOMY: Böhlke *et al.* (1989), Böhlke & Randall (2000).

COMMON NAMES: Pūhi-oa (Gosline & Brock, 1960), Puhi kauhila (Gosline & Brock, 1960), Pūhi-kauila (Hoover, 1993), Puhi kauila (Randall, 1996), Puhi-kauila (Hoover, 2003), Dragon moray (Hoover, 1993, 2003; Randall, 1996), Leopard moray (Hoover, 1993, 2003).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway, more abundant in Northwestern Hawaiian Islands than main islands, at 9–35 m (Jordan & Evermann, 1903a; Kosaki *et al.*, 1991; Randall *et al.*, 1993b; Hoover, 1993; Böhlke & Randall, 2000).

GENERAL RANGE: Indo-Pacific but known only from isolated localities including Zanzibar, the Chagos Archipelago, Cocos-Keeling Island, New Caledonia, South Korea, Japan, the Ogasawara Islands, the Phoenix Islands, the Line Islands, the Hawai'i Islands, and the Society Islands. Benthic in crevices of rubble and coral at 1–35 m (Winterbottom *et al.*, 1989; Kosaki *et al.*, 1991; Randall *et al.*, 1997b; Böhlke & Randall, 2000).

### *Enchelynassa canina* (Quoy & Gaimard)

*Muraena canina* Quoy & Gaimard, 1824, p. 247, Waigeo, Indonesia, and Rawak Island, Bismarck Archipelago.

*Enchelynassa bleekeri* Kaup, 1855: Jordan & Snyder (1904a), Jordan & Evermann (1905).

*Gymnothorax vinolentus* Jordan & Evermann, 1903: Jordan & Evermann (1903a).

*Enchelynassa vinolentus* (Jordan & Evermann, 1903): Jordan & Evermann (1905).

*Lycodontis undulata* non (Lacépède, 1803) [a valid species that also occurs in the Hawaiian Islands]: Fowler (1928, in part).

*Enchelynassa canina* (Quoy & Gaimard, 1824): Fowler (1928), Gosline & Brock (1960), Tinker (1982), Myers (1989), Randall *et al.* (1993b), Hoover (1994, 2003), Allen & Robertson (1994), Randall (1996a), Böhlke & Randall (2000), Robertson & Allen (2002).

TAXONOMY: Böhlke & Randall (2000).

COMMON NAMES: Pūhi kauila (Hoover, 1993), Pūhi kauila (Randall, 1996a; Hoover, 2003), Longfang moray, Viper moray (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Hawai'i Island to Midway at 15 m (Jordan & Snyder, 1904b; Jordan & Evermann, 1905; Randall *et al.*, 1993b; Hoover, 1994; Böhlke & Randall, 2000).

GENERAL RANGE: Indo-transPacific from Mauritius to Christmas Island, Australia, Micronesia, the Hawaiian Islands, Tonga, the Marquesas, the Tuamotus, and east to Clipperton Island and western Panama. Benthic in exposed reefs, usually at 1–30 m (Myers, 1989; Randall *et al.*, 1993b; Allen & Robertson, 1994; Böhlke & Randall, 2000; Robertson & Allen, 2002).

***Gymnomuraena zebra*** (Shaw)

*Gymnothorax zebra* Shaw in Shaw & Nodder, 1797, p. 4 [unnumbered], Pl. 322, Sumatra, Indonesia.

*Echidna zebra* (Shaw in Shaw & Nodder, 1797): Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1931), Gosline & Brock (1960), Tinker (1982).

*Arndha zebra* (Shaw in Shaw & Nodder, 1797): Fowler (1949).

*Gymnomuraena zebra* (Shaw in Shaw & Nodder, 1797): Hobson (1974), Randall (1985a, 1986, 1996a), Randall *et al.* (1985a, 1993b, 1997a), Böhlke *et al.* (1989), Myers (1989), Hoover (1993, 2003), Allen & Robertson (1994), Böhlke & Randall (2000), Robertson & Allen (2002).

TAXONOMY: Böhlke & Randall (2000).

COMMON NAMES: Pūhi (Hoover, 1993), Pūhi (Randall, 1996a; Hoover, 2003), Zebra moray (AFS; Hoover, 1993, 2003; Randall, 1996).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at 3–15 m (Snyder, 1904; Jordan & Evermann, 1905; Randall *et al.*, 1985b, 1993b; Hoover, 1993; Böhlke & Randall, 2000).

GENERAL RANGE: Indo-transPacific from Zanzibar and the Red Sea to Indonesia, the Ryukyus, the Ogasawara Islands, Micronesia, the Hawaiian Islands, the Society Islands, the offshore islands of the Americas, and the continental eastern Pacific from the mouth of the Gulf of California to Ecuador. Benthic within seaward reefs from 1–39 m, usually at <4 m (Myers, 1989; Randall, 1985a; Allen & Robertson, 1994; Randall *et al.*, 1997b; Böhlke & Randall, 2000; Robertson & Allen, 2002).

***Gymnothorax albimarginatus*** (Temminck & Schlegel)

*Muraena albimarginata* Temminck & Schlegel, 1846, p. 267, Pl. 118, Japan.

*Lycodontis hepatica* non (Rüppell, 1830) [a valid species that does not occur in the Hawaiian Islands]: Fowler (1928).

*Gymnothorax hepaticus* non (Rüppell, 1830) [a valid species that does not occur in the Hawaiian Islands]: Gosline & Brock (1960), Tinker (1982), Uchida & Uchiyama (1986), Myers (1989).

*Gymnothorax albimarginatus* (Temminck & Schlegel, 1846): Hatooka in Masuda *et al.* (1984), Hoover (1993, 2003), Randall *et al.* (1993b), Randall & Golani (1995), Randall (1996a), Böhlke (1997), Böhlke & Randall (2000).

TAXONOMY: Randall *et al.* (1993b), Böhlke (1997), Böhlke & Randall (2000). *Gymnothorax albimarginatus* is a valid Pacific species distinct from *G. hepaticus* of the Indian Ocean and Red Sea (Randall & Golani, 1995; Böhlke, 1997).

COMMON NAMES: Whitemargin moray (Hoover, 1993, 2003; Randall, 1996).

HAWAIIAN RECORDS: O'ahu to Kure at 6–180 m (Fowler, 1928; Uchida & Uchiyama, 1986; Hoover, 1993; Randall *et al.*, 1993b; Böhlke, 1997; Böhlke & Randall, 2000).

GENERAL RANGE: Pacific endemic known from Japan, Indonesia, and Taiwan through Micronesia to the Hawaiian and Society Islands. Benthic in reef crevices at 6–180 m but usually >35 m (Uchida & Uchiyama, 1986; Myers, 1989 [Pacific records only]; Hatooka in Masuda *et al.*, 1984; Hoover, 1993; Böhlke, 1997; Böhlke & Randall, 2000).

***Gymnothorax atollii*** (Pietschmann)

*Heteromyrus atollii* Pietschmann, 1935, p. 93, Pearl and Hermes Reef, Hawaiian Islands.

*Heteromyrus atollii* Pietschmann, 1935: Pietschmann (1935).

*Gymnothorax gracilicauda* non Jenkins, 1903 [a valid species that also occurs in the Hawaiian Islands]: Gosline & Brock (1960, in part).

*Gymnothorax pindae* non Smith, 1962 [a valid species that also occurs in the Hawaiian Islands]: Randall *et al.* (1993b).

*Gymnothorax atollii* (Pietschmann, 1935): Böhlke & Randall (2000), Böhlke (2000), Böhlke & McCosker (2001).

TAXONOMY: Böhlke & Randall (2000), Böhlke (2000), Böhlke & McCosker (2001).

COMMON NAMES: Atoll moray (Böhlke & Randall, 2000).

HAWAIIAN RECORDS: Pearl and Hermes to Midway at 8 m (Pietschmann, 1935; Randall *et al.*, 1993b; Böhlke & Randall, 2000; Böhlke, 2000).

GENERAL RANGE: Probably Indo-Pacific but known only from the Red Sea, southern Japan, Lord Howe Island, and the Hawaiian Islands. Benthic in reefs at ca. 8 m (Böhlke & Randall, 2000; Böhlke, 2000; Böhlke & McCosker, 2001).

### *Gymnothorax berndti* Snyder

*Gymnothorax berndti* Snyder, 1904, p. 518, Pl. 4 (fig. 8), Honolulu Market, Honolulu, O'ahu, Hawaiian Islands.

*Lycodontis richardsonii* non (Bleeker, 1852) [a valid species not found in the Hawaiian Islands]: Fowler (1928, in part).

*Lycodontis richardsonii richardsonii* non (Bleeker, 1852) [a valid species not found in the Hawaiian Islands]: Fowler (1949)?

*Gymnothorax berndti* Snyder, 1904: Snyder (1904), Jordan & Evermann (1905), Gosline & Brock (1960), Struhsaker (1973a), Clarke (1972), Tinker (1982), Humphreys *et al.* (1984), Randall *et al.* (1985a, 1997a), Uchida & Uchiyama (1986), Myers (1989), Hatooka & Randall (1992), Chave & Mundy (1994), Böhlke & Randall (2000).

TAXONOMY: Hatooka & Randall (1992), Böhlke & Randall (2000).

COMMON NAMES: Berndt's moray (Böhlke & Randall, 2000).

HAWAIIAN RECORDS: Throughout the Hawaiian Archipelago from Johnston Atoll to Ladd Seamount at 128–303 m (Snyder, 1904; Humphreys *et al.*, 1984; Randall *et al.*, 1985b; Uchida & Uchiyama, 1986; Chave & Mundy, 1994; Böhlke & Randall, 2000).

GENERAL RANGE: Indo-Pacific, but disjunct; known only from Mauritius, Reunion, the Maldives, Taiwan, the Ryukyus, the Ogasawara Islands, Micronesia, the Tonga Ridge, and the Hawaiian Islands. Benthic at 100–303 m (Myers, 1989; Hatooka & Randall, 1992; Chave & Mundy, 1994; Randall *et al.*, 1997b; Böhlke & Randall, 2000).

### *Gymnothorax buroensis* (Bleeker)

*Muraena buroensis* Bleeker, 1857b, p. 79, Kajeli, Buru Island, Moluccas Islands, Indonesia.

*Gymnothorax buroensis* (Bleeker, 1857b): Gosline & Brock (1960), McCosker & Rosenblatt (1975), Tinker (1982), Randall *et al.* (1985a, 1990a), Myers (1989), Allen & Robertson (1994), Böhlke & Randall (2000).

TAXONOMY: Böhlke & Randall (2000).

COMMON NAMES: Latticetail moray (Randall *et al.*, 1997a), Buro moray (Myers, 1999).

HAWAIIAN RECORDS: Johnston Atoll and Moloka'i at ca. 13 m (Randall *et al.*, 1985b; Böhlke & Randall, 2000). This species was also recorded from O'ahu from a single specimen collected on a barge that had come from Guam (Gosline & Brock, 1960). Böhlke & Randall (2000) stated that they included this species in the Hawaiian fauna "marginally". *Gymnothorax buroensis* may not have reproducing populations in Hawaiian waters, although such a population exists at Johnston Atoll. The specimen found at Moloka'i may have been a waif. References to the occurrence of this species in Hawaiian waters prior to that from Moloka'i by Böhlke & Randall (2000) probably refer back to the specimen introduced from Guam that was recorded by Gosline & Brock (1960).

GENERAL RANGE: Indo-transPacific from East Africa and the Red Sea to the Ryukyus, Australia, Micronesia, the Tuamotu Archipelago, and the eastern Pacific from the Galapagos Islands to Costa Rica and Panama. Benthic in crevices of reefs at <2–25 m, usually at <10 m (Myers, 1989; Randall *et al.*, 1990a; Allen & Robertson, 1994; Randall & Golani, 1995; Böhlke & Randall, 2000).

### *Gymnothorax chilospilus* Bleeker

*Gymnothorax chilospilus* Bleeker, 1864a, p. 52, Sumatra, Ambon, Ceram or Buro in Indonesia.

*Gymnothorax chilospilus* Bleeker, 1864a: Böhlke & Randall (2000).

TAXONOMY: Böhlke & Randall (2000).

COMMON NAMES: Lipspot moray (Randall *et al.*, 1997a; Böhlke & Randall, 2000).

HAWAIIAN RECORDS: Hawai'i Island to O'ahu at unspecified depths (Böhlke & Randall 2000).

GENERAL RANGE: Indo-Pacific from East Africa to Indonesia, Australia, the Philippines, the Hawaiian Islands, and the Society Islands. Benthic in reefs at <16 m (Böhlke & Randall, 2000).

***Gymnothorax elegans* Bliss**

*Gymnothorax elegans* Bliss, 1883, p. 60, Mauritius.

*Gymnothorax goldsboroughi* Jordan & Evermann, 1903: Jordan & Evermann (1903a, 1905), Snyder (1904), Tinker (1982).

*Gymnothorax meleagris* non (Shaw in Shaw & Nodder, 1795) [a valid species also found in the Hawaiian Islands]: Gosline & Brock (1960), but only the listing in appendix B of *G. goldsboroughi* as a synonym of *G. meleagris*.

*Gymnothorax elegans* Bliss, 1883: Myers (1989), Randall *et al.* (1993a, 1997a), Randall & Golani (1995).

TAXONOMY: Randall *et al.* (1993a), Böhlke & Randall (2000).

COMMON NAMES: Elegant moray (Böhlke & Randall, 2000).

HAWAIIAN RECORDS: Maui to the Northampton Seamount at 92–400 m (Jordan & Evermann, 1903a; Randall *et al.*, 1993a; Böhlke & Randall, 2000; B. Mundy, pers. observ., Sept. 2002).

GENERAL RANGE: Indo-Pacific, known only from Mozambique, the Red Sea, Mauritius, Réunion, the Maldives, the Ryukyus, the Ogasawara Islands, the Marianas, Samoa, the Hawaiian Islands, and the Society Islands. Benthic at 92–400 m (Myers, 1989; Randall *et al.*, 1993a; Randall & Golani, 1995; Böhlke & Randall, 2000).

***Gymnothorax eurostus* (Abbott)**

*Thyrsoidea eurosta* Abbott, 1860, p. 478, Hawaiian Islands.

*Thyrsoidea eurosta* Abbott, 1861: Abbott (1861).

*Lycodontis eurosta* (Abbott, 1861): Fowler (1900).

*Lycodontis parvibranchialis* Fowler, 1900: Fowler (1900).

*Muraena laysana* Steindachner, 1900: Steindachner (1900).

*Gymnothorax ercodes* Jenkins, 1903: Jenkins (1903), Jordan & Evermann (1905).

*Gymnothorax laysanus* (Steindachner, 1900): Steindachner (1900), Jordan & Snyder (1904a), Jordan & Evermann (1905), Fowler (1912).

*Lycodontis meleagris ercodes* (Jenkins, 1903): Fowler (1949).

*Gymnothorax meleagris* non (Shaw in Shaw & Nodder, 1795) [a valid species that also occurs in the Hawaiian Islands]: Hatooka (2002).

*Gymnothorax eurostus* (Abbott, 1861): Jordan & Evermann (1905), Gosline & Brock (1960), Hobson (1974), Randall & McCosker (1975), Randall (1976a, 1985a, 1996a), Tinker (1982), Randall *et al.* (1985a, 1993a, 1993b, 1997a), Uchida & Uchiyama (1986), Hoover (1993, 2003), Böhlke & Randall (2000), Robertson & Allen (2002), Böhlke & Smith (2002).

TAXONOMY: Böhlke & Randall (2000) suggested that for specimens from Midway with characteristics intermediate between *G. eurostus* and *G. buroensis* “the existence of hybrid individuals could be considered.” Hatooka’s (2002) use of *Gymnothorax meleagris* for this species is considered incorrect here, but needs more investigation (J.E. Randall & D. Smith, pers. comm., Dec. 2002; Böhlke & Smith, 2002).

COMMON NAMES: Pūhi (Hoover, 1993), Puhī (Randall, 1996a; Hoover, 2003), Stout moray (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to Kure at 3–174 m (Abbott, 1861; Jenkins, 1903; Jordan & Evermann, 1905; Gosline & Brock, 1960; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Böhlke & Randall, 2000).

GENERAL RANGE: Antitropical in Indo-Pacific. Japan, the Ogasawara Islands and Taiwan to Marcus Island, and the Hawaiian Islands in the northern hemisphere (a record from Cocos Island near Costa Rica was based upon a misidentified *G. buroensis*). Mozambique to New Caledonia, Lord Howe Island eastward to Easter Island in Southern Hemisphere. Benthic in crevices at 1–174 m (Randall & McCosker, 1975; Randall, 1985a; Uchida & Uchiyama, 1986; Randall *et al.*, 1993a, 1997b; Böhlke & Randall, 2000; Robertson & Allen, 2002).

***Gymnothorax flavimarginatus* (Rüppell)**

*Muraena flavimarginata* Rüppell, 1830, p. 119, Pl. 30 (fig. 3), Red Sea.

*Muraena flavimarginata* Rüppell, 1830: Günther (1880), Steindachner (1900).

*Lycodontis flavimarginata* (Rüppell, 1830): Fowler (1928, 1931, 1949).

*Gymnothorax thalassopterus* Jenkins, 1903: Jenkins (1903), Jordan & Snyder (1904a), Snyder (1904).

*Gymnothorax flavimarginatus* (Rüppell, 1830): Jordan & Evermann (1905), Gosline & Brock (1960), Hobson



(1974), Tinker (1982), Okamoto & Kanenaka (1984), Randall (1985a, 1996a), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Uchida & Uchiyama (1986), Myers (1989), Hoover (1993), Allen & Robertson (1994), Böhlke & Randall (2000).

TAXONOMY: Böhlke & Randall (2000).

COMMON NAMES: Pūhi-paka (Hoover, 1993), Pūhi paka (Randall, 1996a), Pūhi-paka, Pūhi (Hoover, 2003), Yellowmargin moray (AFS; Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure at 9–51 m (Günther, 1880; Jordan & Evermann, 1905; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Hoover, 1993; Böhlke & Randall, 2000).

GENERAL RANGE: Indo-transPacific from South Africa and the Red Sea to the Ryukyus, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, French Polynesia, and in the eastern Pacific from Clipperton, the Galapagos, Isle del Cocos and Costa Rica to Panama. Benthic in crevices from 1–150 m (Myers, 1989; Randall, 1985a; Randall *et al.*, 1990a, 1997b; Allen & Robertson, 1994; Böhlke & Randall, 2000).

### *Gymnothorax fuscomaculatus* (Schultz)

*Rabula fuscomaculata* Schultz in Schultz *et al.*, 1953, p. 147, Fig. 30, Latoback Island, Rogerik Atoll, Marshall Islands.

*Rabula fuscomaculata* Schultz in Schultz *et al.*, 1953: Schultz in Schultz *et al.* (1953), Gosline & Brock (1960), Tinker (1982).

*Gymnothorax fuscomaculata* (Schultz in Schultz *et al.*, 1953): Paxton *et al.* (1989).

*Gymnothorax fuscomaculatus* (Schultz in Schultz *et al.*, 1953): Randall *et al.* (1985a, 1990a), Myers (1989), Böhlke & Randall (2000).

TAXONOMY: Böhlke & Randall (2000).

COMMON NAMES: Freckled moray (Randall *et al.*, 1997a), Brown-spotted moray (Myers, 1999).

HAWAIIAN RECORDS: Johnston Atoll and O'ahu at 3 m (Schultz in Schultz *et al.*, 1953; Randall *et al.*, 1985b; Böhlke & Randall, 2000).

GENERAL RANGE: Indo-Pacific from East Africa to the Coral Sea, Micronesia, Fiji, the Hawaiian Islands, and the Pitcairn Group. Rare. Benthic in crevices of shallow, outer reefs at 1–22 m (Myers, 1989; Paxton *et al.*, 1989; Randall *et al.*, 1990a; Böhlke & Randall, 2000).

### *Gymnothorax gracilicauda* Jenkins

*Gymnothorax gracilicauda* Jenkins, 1903, p. 426, Fig. 6, Honolulu, O'ahu, Hawaiian Islands.

*Lycodontis undulata* non (Lacépède, 1803) [a valid species that also occurs in the Hawaiian Islands]: Fowler (1928, in part).

*Lycodontis gracilicaudus* (Jenkins, 1903): Fowler (1949).

*Gymnothorax gracilicaudus* Jenkins, 1903: Gosline & Brock (1960), Tinker (1982), Randall *et al.* (1985a, 1990a), Myers (1989), Böhlke & Randall (2000).

*Gymnothorax gracilicauda* Jenkins, 1903: Jenkins (1903), Jordan & Evermann (1905).

TAXONOMY: Randall *et al.* (1985b), Böhlke & Randall (2000).

COMMON NAMES: Slendertail moray (Randall *et al.*, 1997a), Graceful-tailed moray (Myers, 1999).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to O'ahu at ca. 6 m (Jenkins, 1903; Jordan & Evermann, 1905; Gosline & Brock, 1960; Randall *et al.*, 1985b; Böhlke & Randall, 2000).

GENERAL RANGE: Pacific endemic from Australia to Taiwan, Micronesia, the Hawaiian Islands, the Line Islands, and the Pitcairn Group. Benthic in reefs at 6–20 m (Gosline & Brock, 1960; Myers, 1989; Randall *et al.*, 1990a; Böhlke & Randall, 2000).

### *Gymnothorax javanicus* (Bleeker)

*Muraena javanica* Bleeker, 1859, p. 347, Ptjitan, Java, Indonesia.

*Lycodontis javanicus* (Bleeker, 1859): Brock in Randall (1980c).

*Gymnothorax melanospilos* non (Bleeker, 1855) [a junior synonym of *G. isingteena* (Richardson, 1845), a species that does not occur in the Hawaiian Islands]: Hatooka (2002).

*Gymnothorax javanicus* (Bleeker, 1859): Tinker (1982 appendix), Randall *et al.* (1985a, 1990a, 1997a), Myers (1989), Randall (1996a), Böhlke & Randall (2000), Hoover (2003).

TAXONOMY: Böhlke & Randall (2000). Hatooka's (2002) use of *Gymnothorax melanospilos* for this species is incorrect (J.E. Randall & D. Smith, pers. comm., Dec. 2002; Böhlke & Smith, 2002).

COMMON NAMES: Puhi (Randall, 1996a), Giant moray (AFS; Randall, 1996a; Hoover, 2003).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Laysan at unspecified depths (Brock *in* Randall, 1981a; Randall *et al.*, 1985b; Böhlke & Randall, 2000).

GENERAL RANGE: Indo-Pacific from Madagascar and the Red Sea to Indonesia, the Ryukyus, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, French Polynesia, Oeno Atoll in the Pitcairn group, and Cocos Island in the eastern Pacific. Benthic in reefs at 1–46 m (Myers, 1989; Randall *et al.*, 1990a, 1997b; Böhlke & Randall, 2000).

### *Gymnothorax kidako* (Temminck & Schlegel)

*Muraena kidako* Temminck & Schlegel, 1846, p. 266, Pl. 117, Nagasaki, Japan.

*Lycodontis undulata* non (Lacépède, 1803) [a valid species that also occurs in the Hawaiian Islands]; Fowler (1928, in part).

*Gymnothorax* sp.: Tinker (1982, Appendix — photograph on bottom of p. 527).

*Gymnothorax mucifer* Snyder, 1904: Snyder (1904), Jordan & Evermann (1905), Gosline & Brock (1960), Tinker (1982), Böhlke & Randall (1995), Randall *et al.* (1997a).

*Gymnothorax kidako* Temminck & Schlegel, 1846: Böhlke & Randall (2000).

TAXONOMY: The Hawaiian Islands population of *G. kidako* has traditionally been identified as *G. mucifer* (e.g., by Smith, 1994; Böhlke & Randall, 1995) but Böhlke & Randall (2000) synonymized these species.

COMMON NAMES: Kidako's moray (Böhlke & Randall, 2000).

HAWAIIAN RECORDS: Hawai'i Island to Necker at unspecified depths (Snyder, 1904; Böhlke & Randall, 1995; Böhlke & Randall, 2000).

GENERAL RANGE: Western and central Pacific endemic known from Japan, Taiwan, the Ogasawara Islands, the Hawaiian Islands, and the Society Islands. Benthic in reefs at 2–350 m (Randall *et al.*, 1997b; Böhlke & Randall, 2000).

### *Gymnothorax kontodontos* Böhlke

*Gymnothorax kontodontos* Böhlke, 2000, p. 411, Fig. 8, Fanning Island, Line Islands.

*Siderea* sp.: Kosaki *et al.* (1991).

*Gymnothorax kontodontos* Böhlke, 2000: Böhlke (2000).

TAXONOMY: Böhlke (2000). Böhlke & Randall (2000) synonymized *Siderea* with *Gymnothorax*.

COMMON NAMES: Short-tooth moray (Böhlke, 2000).

HAWAIIAN RECORDS: Johnston Atoll at 10–15 m, but not in the Hawaiian Islands (Kosaki *et al.*, 1991; Böhlke, 2000).

GENERAL RANGE: Indo-Pacific from the Comoro Islands and Chagos Archipelago to the Coral Sea, New Guinea, the Line Islands, and Johnston Atoll. Benthic in reefs at 6–27 m (Kosaki *et al.*, 1991; Böhlke, 2000).

### *Gymnothorax margaritophorus* Bleeker

*Gymnothorax margaritophorus* Bleeker, 1864a, p. 53, Ambon Island, Moluccas Islands, Indonesia.

*Gymnothorax margaritophorus* Bleeker, 1864a: Myers (1989), Paxton *et al.* (1989), Kosaki *et al.* (1991), Randall *et al.* (1997a), Böhlke & Randall (2000).

TAXONOMY: Paxton *et al.* (1989), Böhlke & Randall (2000).

COMMON NAMES: Blackpearl moray (Randall *et al.*, 1997a), Blotch-necked moray (Myers, 1999).

HAWAIIAN RECORDS: Johnston Atoll, unknown from the Hawaiian Islands (Kosaki *et al.*, 1991; Böhlke & Randall, 2000).

GENERAL RANGE: Indo-Pacific from South Africa to the Ryukyus, the Ogasawara Islands, Australia, Johnston Atoll, Micronesia, and the Society Islands. Benthic, deep within crevices of outer reef slopes to at least 20 m (Myers, 1989; Kosaki *et al.*, 1991; Randall *et al.*, 1997b).

### *Gymnothorax melatremus* Schultz

*Gymnothorax melatremus* Schultz *in* Schultz *et al.*, 1953, p. 120, Figs. 23d, 25, Boby Island, Bikini Atoll, Marshall Islands.

*Gymnothorax melatremus* Schultz in Schultz *et al.*, 1953; Gosline & Brock (1960), Gosline (1965), Tinker (1982), Castle & McCosker in Smith & Heemstra (1986), Myers (1989), Randall *et al.* (1990a, 1997a), Severns & Fiene-Severns (1993), Hoover (1993, 2003), Randall (1996a), Böhlke & Randall (2000).

TAXONOMY: Böhlke & Randall (2000).

COMMON NAMES: Pūhi (Hoover, 1993), Pūhi (Randall, 1996a; Hoover, 2003), Dwarf moray (Hoover, 1993, 2003; Randall, 1996a), Dirty yellow moray.

HAWAIIAN RECORDS: Hawai‘i Island to Midway to at least 18 m (Gosline, 1965; Severns & Fiene-Severns, 1993; Hoover, 1993; Böhlke & Randall, 2000). Gosline & Brock (1960) included this species but did not actually record it from the Hawaiian Islands except by implication. The first Hawaiian record of *G. melatremus* from a specific locality is from O‘ahu by Gosline (1965).

GENERAL RANGE: Indo-Pacific from East Africa to Indonesia, Australia, the Ogasawara Islands, Micronesia, the Hawaiian Islands, French Polynesia, and the Pitcairn Group. Benthic, usually well within crevices of coral reefs at 1–58 m (Myers, 1989; Randall *et al.*, 1990a, 1997b; Böhlke & Randall, 2000). Castle & McCosker in Smith & Heemstra (1986) erroneously stated that this species is only known from South Africa and Bikini Atoll.

### *Gymnothorax meleagris* (Shaw)

*Muraena meleagris* Shaw in Shaw & Nodder, 1795, pl. 220, “Southern Ocean”.

*Gymnothorax leucostictus* Jenkins, 1903 [based on a juvenile specimen]: Jenkins (1903), Jordan & Evermann (1905).

*Lycodontis meleagris* (Shaw in Shaw & Nodder, 1795): Fowler (1928, 1931, 1934, 1949).

*Lycodontis leucostictus* (Jenkins, 1903): Fowler (1949), Jordan & Evermann (1905).

*Gymnothorax* sp.: Tinker (1982, Appendix — photograph on p. 528 is of a large individual in which the spots have merged into a reticulate pattern).

*Gymnothorax chlorostigma* (Kaup, 1856): Hatooka (2002).

*Gymnothorax meleagris* (Shaw in Shaw & Nodder, 1795): Snyder (1904), Jordan & Evermann (1905), Gosline & Brock (1960), Hobson (1974), Tinker (1982), Randall (1985a, 1996a), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Uchida & Uchiyama (1986), Myers (1989), Hoover (1993, 2003), Humann (1993), Böhlke & Randall (2000), Robertson & Allen (2002).

TAXONOMY: Böhlke & Randall (2000). Hatooka’s (2002) use of *Gymnothorax chlorostigma* for this species is considered incorrect here, but needs more investigation (J.E. Randall & D.G. Smith pers. comm., Dec. 2002; Böhlke & Smith, 2002).

COMMON NAMES: Pūhi-‘ōni‘o (Hoover, 1993), Pūhi ‘ōni‘o (Randall, 1996a; Hoover, 2003), Pūhi (Hoover, 2003), Guineafowl moray (AFS), Whitemouth moray (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to Midway at 1–51 m (Snyder, 1904; Hobson, 1974; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Hoover, 1993; Böhlke & Randall, 2000).

GENERAL RANGE: Indo-transPacific from South Africa and the Seychelles to Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, the Society Islands, and Cocos Island and the Galapagos Islands in the eastern Pacific. Benthic in crevices of coral rich areas at 1–51 m (Myers, 1989; Randall *et al.*, 1990a, 1997b; Humann, 1993; Böhlke & Randall, 2000; Robertson & Allen, 2002).

### *Gymnothorax nudivomer* (Günther)

*Muraena nudivomer* Günther in Playfair & Günther, 1867, p. 127, Pl. 18, Zanzibar.

*Gymnothorax xanthostomus* Snyder, 1904: Snyder (1904), Jordan & Evermann (1905), Tinker (1982).

*Lycodontis picta* non (Ahl, 1789) [a valid species that also occurs in the Hawaiian Islands]: Fowler (1928, in part).

*Lycodontis nudivomer* (Günther in Playfair & Günther, 1867): Fowler (1928), Randall *et al.* (1981).

*Gymnothorax meleagris* non (Shaw in Shaw & Nodder, 1795) [a valid species that also occurs in the Hawaiian Islands]: Gosline & Brock (1960), but only the inclusion of *G. xanthostomus* as a synonym of *G. meleagris*.

*Gymnothorax nudivomer* (Günther in Playfair & Günther, 1867): Clarke (1972), Randall (1985a, 1996a), Randall *et al.* (1985a, 1990a, 1993a), Uchida & Uchiyama (1986), Myers (1989), Hoover (1993, 2003), Chave & Mundy (1994), Böhlke & Randall (2000).

TAXONOMY: Randall *et al.* (1981), Böhlke & Randall (2000).

COMMON NAMES: Pūhi, Puhī (Randall, 1996a), Puhī (Hoover, 2003), Yellowmouth moray (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Salmon Bank at 30–271 m (Snyder, 1904; Randall *et al.*, 1981, 1985a; Uchida & Uchiyama, 1986; Chave & Mundy, 1994; Böhlke & Randall, 2000).

GENERAL RANGE: Indo-Pacific from East Africa and the Red Sea to the Ryukyus, Australia, Micronesia, the Hawaiian Islands, and the Marquesan Islands. Benthic in crevices at 2–271 m. Found in shallow water in the Red Sea and Persian Gulf but otherwise known primarily from >40 m (Randall *et al.*, 1981, 1990a; Myers, 1989; Chave & Mundy, 1994; Böhlke & Randall, 2000).

### *Gymnothorax nuttingi* Snyder

*Gymnothorax nuttingi* Snyder, 1904, p. 518, Pl. 4 (fig. 7), Honolulu Market, O'ahu, Hawaiian Islands.

*Lycodontis picta* non (Ahl, 1789) [a valid species that also occurs in the Hawaiian Islands]: Fowler (1928, in part).

*Gymnothorax meleagris* non (Shaw in Shaw & Nodder, 1795) [a valid species that also occurs in the Hawaiian Islands]: Gosline & Brock (1960), but only the inclusion of *G. nuttingi* as a synonym of *G. meleagris*.

*Gymnothorax nuttingi* Snyder, 1904: Snyder (1904), Jordan & Evermann (1905), Clarke (1972), Tinker (1982 appendix), Randall (1985a), Randall *et al.* (1985a), Chave & Mundy (1994), Böhlke & Randall (2000).

TAXONOMY: Randall *et al.* (1985b), Böhlke & Randall (2000).

COMMON NAMES: Nutting's moray (Böhlke & Randall, 2000).

HAWAIIAN RECORDS: Probably throughout the Hawaiian Archipelago but precise records from Johnston Atoll and O'ahu to Maro Reef at 110–338 (Snyder, 1904; Randall *et al.*, 1985b; Chave & Mundy, 1994; Böhlke & Randall, 2000).

GENERAL RANGE: Hawaiian endemic. Benthic in crevices at 110–338 m (Chave & Mundy, 1994; Böhlke & Randall, 2000).

### *Gymnothorax pictus* (Ahl)

*Muraena picta* Ahl, 1789, p. 8, Pl. 2 (right fig.), "East Indies".

*Gymnothorax hilonis* Jordan & Evermann, 1903: Jordan & Evermann (1903a, 1905), Gosline & Brock (1960), Tinker (1982), Smith (1994).

*Lycodontis picta* (Ahl, 1789) [in part]: Fowler (1928).

*Lycodontis richardsonii* non (Bleeker, 1852) [a valid species not found in the Hawaiian Islands]: Fowler (1928, in part).

*Lycodontis richardsonii hilonis* (Jordan & Evermann, 1903): Fowler (1949).

*Sidera picta* (Ahl, 1789): Fowler (1949), Randall *et al.* (1985a, 1990a), Eschmeyer (1990), Allen & Robertson (1994).

*Sidera picta* (Ahl, 1789) [lapsus]: Myers (1989).

*Gymnothorax pictus* (Ahl, 1789): Snyder (1904), Jordan & Evermann (1905), Fowler (1912), Gosline & Brock (1960), Tinker (1982), Böhlke & Randall (2000), Robertson & Allen (2002).

TAXONOMY: Böhlke & Randall (2000).

COMMON NAMES: Pūhi-kap'a, Peppered moray (Randall *et al.*, 1996; Myers, 1999).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to O'ahu in shallow water including the intertidal zone and anchialine ponds (Snyder, 1904; Jordan & Evermann, 1905; Randall *et al.*, 1985b; Böhlke & Randall, 2000).

GENERAL RANGE: Indo-transPacific from East Africa to Indonesia, Australia, the Ryukyus, Micronesia, the Hawaiian Islands, the Society Islands, the offshore islands of the Americas, and the continental eastern tropical Pacific from Costa Rica to western Panama. Benthic on shallow reef flats, forages in the intertidal zone and occasionally above water on reef flats exposed at low tide (Myers, 1989; Randall *et al.*, 1990a; Allen & Robertson, 1994; Böhlke & Randall, 2000; Robertson & Allen, 2002).

### *Gymnothorax pindae* Smith

*Gymnothorax pindae* Smith, 1962, p. 430, Pl. 55 (fig. D), Pinda, Mozambique.

*Gymnothorax moluccensis* non (Bleeker, 1965) [a valid species not found in the Hawaiian Islands]: Gosline & Brock (1960), Tinker (1982).

*Gymnothorax pindae* Smith, 1962: Randall *et al.* (1985a, 1993a), Böhlke & Randall (2000), Böhlke (2000).

TAXONOMY: Böhlke & Randall (2000), Böhlke (2000).

COMMON NAMES: Pinda moray (Böhlke & Randall, 2000).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island at unspecified depths (Gosline & Brock, 1960; Randall *et al.*, 1985b, 1993a; Böhlke & Randall, 2000; Böhlke, 2000).

GENERAL RANGE: Indo-Pacific from East Africa and the Red Sea to Indonesia, southern Japan, Australia, Micronesia, the Hawaiian Islands, French Polynesia, and the Pitcairn Group. Benthic in reef crevices to 40 m (Hatooka, 1988; Myers, 1989; Randall *et al.*, 1993a; Randall & Golani, 1995; Böhlke & Randall, 2000; Böhlke, 2000).

***Gymnothorax polyspondylus* Böhlke & Randall**

*Gymnothorax polyspondylus* Böhlke & Randall, 2000, p. 251, Figs. 10–11, off O'ahu, Hawaiian Islands.

*Gymnothorax* sp.: Böhlke (1997).

*Gymnothorax polyspondylus* Böhlke & Randall, 2000: Böhlke & Randall (2000).

TAXONOMY: Böhlke & Randall (2000).

COMMON NAMES: Manyvertebrae moray (Böhlke & Randall, 2000).

HAWAIIAN RECORDS: Known only from O'ahu at 200 m (Böhlke, 1997; Böhlke & Randall, 2000).

GENERAL RANGE: Hawaiian endemic. Benthic at 200 m (Böhlke, 1997; Böhlke & Randall, 2000).

***Gymnothorax prismodon* Böhlke & Randall**

*Gymnothorax prismodon* Böhlke & Randall, 2000, p. 253, Figs. 12–14, O'ahu, Hawaiian Islands.

*Gymnothorax prismodon* Böhlke & Randall, 2000: Böhlke & Randall (2000).

TAXONOMY: Böhlke & Randall (2000).

COMMON NAMES: Sawtooth moray (Böhlke & Randall, 2000).

HAWAIIAN RECORDS: O'ahu at 38–44 m (Böhlke & Randall, 2000).

GENERAL RANGE: Central Pacific endemic known only from the Hawaiian Islands, the Line Islands, and the Marquesas Islands. Benthic in reefs at 10–44 m (Böhlke & Randall, 2000).

***Gymnothorax rueppelliae* (McClelland)**

*Dalophis rueppelliae* McClelland, 1844, p. 213, Red Sea.

*Gymnothorax leucacme* Jenkins, 1903: Jenkins (1903), Snyder (1904).

*Gymnothorax waialuae* Snyder, 1904: Snyder (1904), Jordan & Evermann (1905).

*Gymnothorax petelli* (Bleeker, 1856): Jordan & Evermann (1905), Gosline & Brock (1960), Tinker (1982 text).

*Lycodontis petelli* (Bleeker, 1856): Fowler (1928).

*Gymnothorax rueppelliae* (McClelland, 1844): Hobson (1974), McCosker & Randall (1982), Tinker (1982 appendix), Myers (1989), Randall *et al.* (1990a), Hoover (1993, 2003), Randall (1996a), Böhlke & Randall (2000).

TAXONOMY: McCosker & Randall (1982), Böhlke & Randall (2000).

COMMON NAMES: Pūhi-'ou (Hoover, 1993), Pūhi 'ou (Randall, 1996a), Pūhi-'ou (Hoover, 2003), Yellowhead moray (Hoover, 1993, 2003), Banded moray (Randall, 1996a).

HAWAIIAN RECORDS: Hawai'i Island to O'ahu at 1–5 m (Jenkins, 1903; Snyder, 1904; Hobson, 1974; Hoover, 1993; Böhlke & Randall, 2000).

GENERAL RANGE: Indo-Pacific from east Africa and the Red Sea to Indonesia, the Ryukyus, Australia, Micronesia, the Hawaiian Islands, and the Marquesas. Benthic in crevices of reefs at 1 to at least 40 m (Myers, 1989; Randall *et al.*, 1990a; Randall & Golani, 1995; Böhlke & Randall, 2000).

***Gymnothorax steindachneri* Jordan & Evermann**

*Gymnothorax steindachneri* Jordan & Evermann, 1903a, p. 166, Honolulu, O'ahu, Hawaiian Islands.

*Muraena flavomarginatus* var. non (Rüppell, 1830) [a valid species also found in the Hawaiian Islands]: Steindachner (1900).

*Lycodontis kidako* non (Temminck & Schlegel, 1846) [a valid species also found in the Hawaiian Islands]: Fowler (1928, 1934, in part).

*Gymnothorax steindachneri* Jordan & Evermann, 1903a: Jordan & Evermann (1903a, 1905), Jenkins (1903), Jordan & Snyder (1904a), Snyder (1904), Gosline & Brock (1960), Struhsaker (1973a), Tinker (1982), Humphreys *et al.* (1984), Uchida & Uchiyama (1986), Randall *et al.* (1993b), Hoover (1994, 2003), Böhlke & Randall (1995, 2000), Randall (1996a).

TAXONOMY: Randall *et al.* (1993b), Böhlke & Randall (1995, 2000).

COMMON NAMES: Pūhi (Hoover, 1993), Puhī (Randall, 1996a; Hoover, 2003), Steindachner's moray (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: O'ahu to Midway at 5–124 m; more abundant in the Northwestern Hawaiian Islands than in the main Hawaiian Islands (Steindachner, 1900; Jordan & Evermann, 1905; Struhsaker, 1973a; Uchida & Uchiyama, 1986; Randall *et al.*, 1993b; Hoover, 1994; Böhlke & Randall, 1995, 2000).

GENERAL RANGE: Hawaiian endemic. Benthic in reefs and on trawlable substrates at 5–124 m (Uchida & Uchiyama, 1986; Randall *et al.*, 1993b; Hoover, 1994; Böhlke & Randall, 2000).

[*Gymnothorax tile* (Hamilton)]

*Muraenophis tile* Hamilton, 1822, p. 18, Ganges River estuary near Calcutta, India.

*Lycodontis tile* non (Hamilton, 1822): Fowler (1928).

*Gymnothorax tile* (Hamilton, 1822): Kottelat *et al.* (1993).

TAXONOMY: Kottelat *et al.* (1993).

HAWAIIAN RECORDS: Fowler (1928) reported "*Lycodontis tile*" from the Hawaiian Islands, an obvious misidentification. Fowler's record cannot be attributed to species until the specimen upon which the record is based is identified.

GENERAL RANGE: India, Indonesia, and the Philippines. Benthic in shallow estuaries (Kottelat *et al.*, 1993).

*Gymnothorax undulatus* (Lacépède)

*Muraenophis undulata* Lacépède, 1803, p. 629, 642, Pl. 19 (fig. 2), no type locality given.

*Muraena valenciennii* Eydoux & Souleyet, 1850: Eydoux & Souleyet (1850).

*Lycodontis undulata* (Lacépède, 1803): Fowler (1928, 1931, 1949, in part).

*Muraena acutirostris* Abbott, 1861: Abbott (1861).

*Thyrsoidea kaupii* Abbott, 1861: Abbott (1861).

*Muraena undulata* (Lacépède, 1803): Streets (1877).

*Lycodontis acutirostris* (Abbott, 1861): Fowler (1900).

*Lycodontis kaupii* (Abbott, 1861): Fowler (1900).

*Lycodontis pseudothyroidea* non (Bleeker, 1852) [a valid *Gymnothorax* species not found in the Hawaiian Islands]: Fowler (1900).

*Eurymyctera acutirostris* (Abbott, 1861): Jordan & Evermann (1905).

*Gymnothorax undulatus* (Lacépède, 1803): Jenkins (1903), Snyder (1904), Gilbert (1905), Jordan & Evermann (1905), Gosline & Brock (1960), Tinker (1982), Okamoto & Kanenaka (1984), Humphreys *et al.* (1984), Randall (1985a, 1996a), Randall *et al.* (1985a, 1993b, 1997a), Uchida & Uchiyama (1986), Myers (1989), Hoover (1993, 2003), Allen & Robertson (1994), Böhlke & Randall (2000), Robertson & Allen (2002).

TAXONOMY: Böhlke & Randall (2000). The inclusion of *Muraena acutirostris* Abbott, 1861, as a junior synonym of *G. undulatus*, initially proposed by Fowler (1928), follows Böhlke & Randall (2000). Eschmeyer (1998) erroneously placed it as a junior synonym of the Atlantic species *G. moringa* (Cuvier) based on earlier publications, but this was corrected in the website for Eschmeyer's (1998) catalog. *Muraena acutirostris* had previously also been considered to be a junior synonym of *G. flavimarginatus* by Böhlke (1989) and of *Enchelynassa canina* by Gosline & Brock (1961). Abbott's (1861) description of *M. acutirostris* certainly invokes this last species in many respects, but Böhlke & Smith (2002) established the correct identity of this taxon from direct examination of the holotype.

COMMON NAMES: Pūhi-lau-milo (Hoover, 1993), Puhī lau milo (Randall, 1996a), Puhī-lau-milo (Hoover, 2003), Leopard moray (AFS), Undulated moray (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Maui to Kure at 9–110 m (Eydoux & Souleyet, 1850; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Hoover, 1993; Böhlke & Randall, 2000). Jordan & Evermann (1905) recorded *G. undulatus* from a dredge sample at 406–911 m, but Gilbert (1905) stated that this was incorrect station data and that the record was from 40–51 m.

GENERAL RANGE: Indo-transPacific from South Africa and the Red Sea to Indonesia, Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, French Polynesia, and the eastern Pacific from the Revillagigedos to Costa Rica and Panama. Benthic within reefs and rubble at 9–110 m (Myers, 1989; Uchida & Uchiyama, 1986; Allen & Robertson, 1994; Randall *et al.*, 1997b; Böhlke & Randall, 2000; Robertson & Allen, 2002).

***Gymnothorax ypsilon*** Hatooka & Randall

*Gymnothorax ypsilon* Hatooka & Randall, 1992, p. 183, Figs. 1–2, Uotsurimima Island, Senkaku Islands, Japan.

*Gymnothorax* sp.: Clarke (1972), Randall (1976a).

*Gymnothorax ypsilon* Hatooka & Randall, 1992: Hatooka & Randall (1992), Randall *et al.* (1997a), Böhlke & Randall (2000).

TAXONOMY: Hatooka & Randall (1992), Böhlke & Randall (2000).

COMMON NAMES: Y-bar moray.

HAWAIIAN RECORDS: O'ahu at 150–185 m (Clarke, 1972; Böhlke & Randall, 2000).

GENERAL RANGE: Western and central North Pacific endemic known from southern Japan, Okinawa, the Ogasawara Islands and the Hawaiian Islands. Benthic at 120–185 m (Hatooka & Randall, 1992; Randall *et al.*, 1997b; Böhlke & Randall, 2000).

***Gymnothorax zonipectis*** Seale

*Gymnothorax zonipectis* Seale, 1906, p. 7, Fig. 1, Tahiti, Society Islands.

*Gymnothorax zonipectis* Seale, 1906: Myers (1989), Randall *et al.* (1990a), Kosaki *et al.* (1991), Böhlke & Randall (2000).

TAXONOMY: Randall *et al.* (1990a), Böhlke & Randall (2000).

COMMON NAMES: Barred-fin moray (Randall *et al.*, 1997a; Myers, 1999).

HAWAIIAN RECORDS: Johnston Atoll, unknown from the Hawaiian Islands (Kosaki *et al.*, 1991; Böhlke & Randall, 2000).

GENERAL RANGE: Indo-Pacific from East Africa to Indonesia, Taiwan, Australia, Micronesia, Johnston Atoll, and the Marquesas. Benthic, usually in rubble or crevices of caves and ledges at >20 m (Myers, 1989; Randall *et al.*, 1990a; Kosaki *et al.*, 1991).

***Monopenchelys acuta*** (Parr)

*Uropterygius acutus* Parr, 1930, p. 16, Fig. 2, West Caicos Island, Bahamas.

*Monopenchelys acuta* (Parr, 1930): Böhlke & McCosker (1982), Böhlke & Randall (2000).

TAXONOMY: Böhlke & McCosker (1982), Böhlke & Randall (2000).

COMMON NAMES: Redface moray (Böhlke & Randall, 2000).

HAWAIIAN RECORDS: O'ahu at 20–45 m (Böhlke & McCosker, 1982; Böhlke & Randall, 2000).

GENERAL RANGE: Circumtropical and subtropical from disjunct localities; known in the Atlantic Ocean from the Bahamas, Caribbean Sea, and Ascension Island; in the Indian Ocean from the Seychelles, Comoros, and Agalegas; known only from Fiji and the Hawaiian Islands in the Pacific Ocean. Benthic in crevices of reef and rock from 13–45 m (Böhlke & McCosker, 1982; Böhlke & Randall, 2000).

***Scuticaria okinawae*** (Jordan & Snyder)

*Uropterygius okinawae* Jordan & Snyder, 1901b, p. 886, Fig. 22, Okinawa, Ryukyu Islands, Japan.

*Uropterygius sealei* Whitley, 1932: Gosline (1958), Gosline & Brock (1960), Tinker (1982).

*Ichthyophis bennettii* non (Günther, 1870): Severns & Fiene-Severns (1993).

*Scuticaria bennettii* non (Günther, 1870): McCosker *et al.* (1984), Böhlke *et al.* (1989), Randall (1996a).

*Scuticaria okinawae* (Jordan & Snyder, 1901b): Böhlke & McCosker (1997), Böhlke & Randall (2000).

TAXONOMY: Böhlke & Randall (2000). This species has traditionally been given the specific name *bennettii*, originally described in *Gymnomuraena*. Böhlke & McCosker (1997) noted that *Gymnomuraena bennettii* Günther is a junior synonym of *Channomuraena vittata* (Richardson) and the *Scuticaria* species usually called *bennettii* must take the next available name, *Scuticaria okinawae* (Jordan & Snyder).

COMMON NAMES: Puhi (Randall, 1996a), Bennett's moray (Randall, 1996a), Shorttailed snake moray (Böhlke & Randall, 2000).

HAWAIIAN RECORDS: Maui and O'ahu (Gosline, 1958; Severns & Fiene-Severns, 1993; Böhlke & Randall, 2000).

GENERAL RANGE: Indo-Pacific from Mauritius to Indonesia and eastward through Japan, the Hawaiian Islands, and Tahiti. Benthic at unspecified depths (McCosker *et al.*, 1984; Severns & Fiene-Severns, 1993; Böhlke & McCosker, 1997; Böhlke & Randall, 2000).

***Scuticaria tigrinus* (Lesson)**

*Ichthyophis tigrinus* Lesson, 1828, p. 399, Borabora, Society Islands.

*Gymnomuraena tigrina* (Lesson, 1828): Smith & Swain (1882).

*Scuticaria tigrina* (Lesson, 1828): Jordan & Evermann (1905).

*Uropterygius tigrinus* (Lesson, 1828): Fowler (1928, 1934), Gosline & Brock (1960), Tinker (1982), Randall *et al.* (1985a), Myers (1989), Severns & Fiene-Severns (1993), Allen & Robertson (1994).

*Scutitaria tigrina* (Lesson, 1828) [a *lapsus* in spelling of the genus name]: Borodin (1930).

*Scuticaria tigrinus* (Lesson, 1828): Böhlke *et al.* (1989), Hoover (1993, 2003), Randall (1996a), Böhlke & McCosker (1997), Böhlke & Randall (2000).

TAXONOMY: Böhlke & McCosker (1997), Böhlke & Randall (2000).

COMMON NAMES: Pūhi (Hoover, 1993), Pūhi (Randall, 1996; Hoover, 2003), Tiger moray (Hoover, 1993, 2003; Randall, 1996a), Tiger snake moray.

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Necker at ca. 24 m (Smith & Swain, 1882, Jordan & Evermann, 1905; Randall *et al.*, 1985b; Hoover, 1993; Böhlke & Randall, 2000).

GENERAL RANGE: Indo-transPacific from South Africa to Indonesia, the Philippines, Micronesia, the Hawaiian Islands, the Society Islands, and the eastern tropical Pacific from the Gulf of California to Panama and Ecuador. Benthic, usually deep in crevices of reefs (Myers, 1989; Böhlke & McCosker, 1997; Böhlke & Randall, 2000).

***Uropterygius fuscoguttatus* Schultz**

*Uropterygius fuscoguttatus* Schultz in Schultz *et al.*, 1953, p. 156, Fig. 33, Amen Island, Bikini Atoll, Marshall Islands.

*Uropterygius fuscoguttatus* Schultz in Schultz *et al.*, 1953: Gosline (1958), Gosline & Brock (1960), Tinker (1982), Randall *et al.* (1985a, 1990a), Myers (1989), Winterbottom *et al.* (1989), Randall & Golani (1995), Böhlke & Randall (2000).

TAXONOMY: Randall & Golani (1995), Böhlke & Randall (2000).

COMMON NAMES: Brown-spotted snake moray (Myers, 1999).

HAWAIIAN RECORDS: Johnston Atoll and O'ahu at 3–23 m (Gosline, 1958; Randall *et al.*, 1985b; Böhlke & Randall, 2000).

GENERAL RANGE: Indo-Pacific from the Chagos and Maldive Archipelagos to Australia, Micronesia, the Hawaiian Islands, and the Society Islands. Benthic in coral rubble at 3–25 m (Gosline & Brock, 1960; Myers, 1989; Winterbottom *et al.*, 1989; Randall *et al.*, 1990a; Böhlke & Randall, 2000).

***Uropterygius inornatus* Gosline**

*Uropterygius inornatus* Gosline, 1958, p. 225, Figs. 1e, 2a, Waikiki Reef, O'ahu, Hawaiian Islands.

*Uropterygius inornatus* Gosline, 1958: Gosline (1958), Gosline & Brock (1960), Tinker (1982), Randall *et al.* (1985a), Winterbottom *et al.* (1989), McCosker & Smith (1997), Böhlke & Randall (2000).

TAXONOMY: McCosker & Smith (1997), Böhlke & Randall (2000).

COMMON NAMES: Drab snake moray (Böhlke & Randall, 2000).

HAWAIIAN RECORDS: Hawai'i Island to O'ahu at 4–11 m (Gosline, 1958; Randall *et al.*, 1985b; Böhlke & Randall, 2000). The specimen of *U. inornatus* from Johnston reported by Randall *et al.* (1985b) was reidentified by McCosker & Smith (1997), who designated it a paratype of *U. xenodontus*.

GENERAL RANGE: Indo-Pacific from the Chagos Archipelago to Indonesia, Tonga, the Marshall Islands, the Gilbert Islands and the Hawaiian Islands. Benthic in crevices at 4–18 m (Gosline, 1958; Winterbottom *et al.*, 1989; McCosker & Smith, 1997; Böhlke & Randall, 2000).

***Uropterygius macrocephalus* (Bleeker)**

*Gymnomuraena macrocephalus* Bleeker, 1864a, p. 54, Ambon Island, Moluccas Islands, Indonesia.

*Uropterygius knighti* (Jordan & Starks in Jordan & Seale, 1906): Gosline (1958, 1965), Gosline & Brock (1960, in part), Tinker (1982, in part).

*Uropterygius macrocephalus* (Bleeker, 1864): McCosker *et al.* (1984), Randall *et al.* (1985a), Myers (1989), Allen & Robertson (1994), Böhlke & Randall (2000), Robertson & Allen (2002).

TAXONOMY: McCosker *et al.* (1984), Böhlke & Randall (2000).

COMMON NAMES: Largehead snake moray (Myers, 1999).



HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to French Frigate at 1–3 m (Gosline, 1958, 1965; Randall *et al.*, 1985b; Böhlke & Randall, 2000).

GENERAL RANGE: Indo-transPacific from Christmas Island (Indian Ocean) and Indonesia to Papua New Guinea, Japan, Micronesia, the Hawaiian Islands, the Society Islands, and the eastern tropical Pacific at the offshore islands and southern Baja California to Peru including the Gulf of California. Benthic in rocks along shorelines with strong waves at 1–14 m (Gosline & Brock, 1960; Myers, 1989; Allen & Robertson, 1994; Böhlke & Randall, 2000; Robertson & Allen, 2002).

### *Uropterygius marmoratus* (Lacépède)

*Gymnomuraena marmorata* Lacépède, 1803, p. 648, New Britain Island, Bismarck Archipelago.

*Uropterygius concolor* non Rüppell, 1838 [a valid species not found in Hawai'i]: Fowler (1928, in part).

*Uropterygius knighti* non (Jordan & Starks in Jordan & Seale, 1903) [a junior synonym of *Uropterygius macrocephalus* (Bleeker, 1864a), a species that also occurs in the Hawaiian Islands]: Gosline & Brock (1960, in part).

*Uropterygius marmoratus* (Lacépède, 1803): Snyder (1904), Jordan & Evermann (1905), Gilbert (1905), Fowler (1928, 1949), Gosline (1958), McCosker *et al.* (1984), Myers (1989), Randall *et al.* (1990a), Böhlke & Randall (2000).

TAXONOMY: McCosker *et al.* (1984), Böhlke & Randall (2000).

COMMON NAMES: Marbled snake moray (Myers, 1999), Marbled moray (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Hawai'i Island to French Frigate at 23–121 m (Snyder, 1904; Jordan & Evermann, 1905; Gilbert, 1905; Böhlke & Randall, 2000). It is likely that the records of Snyder (1904) and Jordan & Evermann (1905) are of misidentified *Anarchias* species (J.E. Randall, pers. comm., 9 July 2002).

GENERAL RANGE: Indo-Pacific from east Africa to the Ryukyus, Australia, Micronesia, the Hawaiian Islands, and the Marquesas. Benthic in crevices in shallow water to 121 m, usually at 1–20 m in exposed rocky shores or reefs (Gilbert, 1905; Myers, 1989; Randall *et al.*, 1990a; Böhlke & Randall, 2000).

### *Uropterygius polyspilus* (Regan)

*Gymnomuraena polyspila* Regan, 1909b, p. 438, Tahiti, Society Islands.

*Uropterygius polyspilus* (Regan, 1909b): Gosline (1958), Gosline & Brock (1960), Tinker (1982), Randall *et al.* (1985a), Myers (1989), Winterbottom *et al.* (1989), Randall & Golani (1995), Randall (1996a), Böhlke & Randall (2000).

TAXONOMY: Randall & Golani (1995), Böhlke & Randall (2000).

COMMON NAMES: Large-spotted snake moray (Myers, 1999).

HAWAIIAN RECORDS: Johnston Atoll and O'ahu to Pearl and Hermes Reef at unspecified depths (Gosline, 1958; Randall *et al.*, 1985b; Böhlke & Randall, 2000).

GENERAL RANGE: Indo-Pacific from east Africa and the Red Sea to the Philippines, Micronesia, the Hawaiian Islands, Samoa and the Society Islands. Benthic on reef flats at 1–18 m (Myers, 1989; Winterbottom *et al.*, 1989; Randall & Golani, 1995; Böhlke & Randall, 2000).

### *Uropterygius supraforatus* (Regan)

*Gymnomuraena supraforata* Regan, 1909b, p. 439, Savai'i, [Western] Samoa.

*Uropterygius dentatus* Schultz in Schultz *et al.*, 1953; Schultz in Schultz *et al.* (1953).

*Uropterygius supraforatus* (Regan, 1909b): Gosline (1958), Gosline & Brock (1960), Tinker (1982), Randall *et al.* (1985a, 1993b), Myers (1989), Winterbottom *et al.* (1989), Randall & Golani (1995), Böhlke & Randall (2000), Robertson & Allen (2002).

TAXONOMY: Randall & Golani (1995), Böhlke & Randall (2000).

COMMON NAMES: Manytoothed snake moray (Böhlke & Randall, 2000).

HAWAIIAN RECORDS: Johnston Atoll and O'ahu to Midway (Gosline, 1958; Randall *et al.*, 1985b, 1993b).

GENERAL RANGE: Indo-Pacific from the Chagos Archipelago to Papua New Guinea, the Philippines, Micronesia, the Hawaiian Islands, the Society Islands, and Clipperton Island in the eastern Pacific. Benthic in crevices of reefs at 1–15 m (Myers, 1989; Winterbottom *et al.*, 1989; Böhlke & Randall, 2000; Robertson & Allen, 2002).

***Uropterygius xenodontus* McCosker & Smith**

*Uropterygius xenodontus* McCosker & Smith, 1997, p. 1006, Figs. 1–2, Chesterfield Bank, Coral Sea.

*Uropterygius inornatus* non Gosline, 1958 [a valid species found in the Hawaiian Islands but misidentified from Johnston Atoll]; Randall *et al.* (1985a).

*Uropterygius xenodontus* McCosker & Smith, 1997; McCosker & Smith (1997), Böhlke & Randall (2000).

TAXONOMY: McCosker & Smith (1997).

COMMON NAMES: Strange-toothed snake moray (Myers, 1999).

HAWAIIAN RECORDS: Johnston Atoll at 6–9 m. Not known from the Hawaiian Islands (McCosker & Smith, 1997; Böhlke & Randall, 2000).

GENERAL RANGE: Central and western Pacific endemic known from the Coral Sea (NE Australia), Samoa, the Marshall Islands, and Johnston Atoll. Benthic in crevices of reefs at 6–9 m (McCosker & Smith, 1997).

**Congroidei****Synphobranchidae — Cutthroat eels****[*Dysomma anguillare* Barnard]**

*Dysomma anguillaris* Barnard, 1923, p. 443, Off Tugela River mouth, Natal, South Africa.

*Dysomma anguillare* Barnard, 1923 [a valid species probably not found in the Hawaiian Islands]; Iwai (1976), Robins & Robins (1989).

TAXONOMY: Robins & Robins (1989).

COMMON NAMES: Shortbelly eel (AFS).

HAWAIIAN RECORDS: Iwai (1976) presented a photograph and a description in Japanese of a synphobranchid collected at 265 m in the central North Pacific near the Hawaiian Islands that he identified as *D. anguillare*. The other species included in Iwai (1976) indicated that his collections probably came from seamounts and island at the northern end of the Ridge. *Dysomma anguillare* is otherwise unrecorded from the Pacific Plate, although its wide distribution makes it possible that it could occur in the region.

GENERAL RANGE: Known from the western North Atlantic, South Africa, and western Pacific from Indonesia, the Philippines, off China and Japan. Engybenthic, usually at 100 m or less, an unusually shallow depth range for a synphobranchid (Robins & Robins, 1989).

***Dysomma brevirostre* (Facciola)**

*Nettastoma brevirostre* Facciola, 1887, p. 166, Pl. 3 (fig. 3), Sicily, Italy.

*Dysomma brevirostre* (Facciola, 1887): Smith & Castle (1981), Tinker (1982), Robins & Robins (1989).

TAXONOMY: Robins & Robins (1989).

HAWAIIAN RECORDS: Hawai'i Island at 458 m (Smith & Castle, 1981).

GENERAL RANGE: Known only from the Mediterranean Sea, eastern and western Atlantic, and the Hawaiian Islands. Engybenthic over soft substrata, most abundant at 200–1000 m (Robins & Robins, 1989).

**[*Dysomma muciparus* (Alcock)]**

*Dysommopsis muciparus* Alcock, 1891, p. 137, Bay of Bengal, India.

*Dysomma muciparus* (Alcock, 1891): Smith & Castle (1981), Tinker (1989), Robins & Robins (1989).

TAXONOMY: Robins & Robins (1989).

HAWAIIAN RECORDS: Specimens collected northeast of O'ahu at 24°04.1'N, 153°33.0'W at 284 m indicate that this species could occur in the Hawaiian Islands (Smith & Castle, 1981).

GENERAL RANGE: Known only from the Bay of Bengal in the Indian Ocean and northeast of the Hawaiian Islands in the Pacific, perhaps in the eastern Atlantic. Engybenthic at 284–505 m (Robins & Robins, 1989).

***Dysommima rugosa* Ginsburg**

*Dysommima rugosa* Ginsburg, 1951, p. 450, Fig. 6, Off Cumberland Island, Georgia, U.S.A.

*Dysommia rugosa* Ginsburg, 1951: Robins & Robins (1976), Randall (1980a), Smith & Castle (1981), Tinker (1982), Robins & Robins (1989).

TAXONOMY: Robins & Robins (1989).

HAWAIIAN RECORDS: North of Maui at 786 m (Robins & Robins, 1976).

GENERAL RANGE: Probably circumtropical and subtropical, known from the western Atlantic, Caribbean Sea, Mozambique Channel in Indian Ocean, Japan, south of New Caledonia and the Hawaiian Islands. Engyebenthic at 260–775 m (Robins & Robins, 1989; P. Castle, pers. comm., Aug. 1997).

[*Histiobranchus bathybius* (Günther)]

*Synaphobranchus bathybius* Günther, 1877b, p. 445, North Pacific south of Tokyo, Japan, and South Atlantic between Cape of Good Hope and Kerguelen Islands.

*Histiobranchus bathybius* (Günther, 1877b): Sulak & Shcherbachev (1997), Karmovskaya & Merrett (1998).

TAXONOMY: Karmovskaya & Merrett (1998).

HAWAIIAN RECORDS: None, but a record of this wide-ranging, deep-sea species from 36°10'N, 178°0'E (Sulak & Shcherbachev, 1997; Karmovskaya & Merrett, 1998), northwest of the Hancock Seamounts suggests that it could be expected at the northwestern end of the region.

GENERAL RANGE: Disjunct distribution in the North Atlantic and Pacific oceans, but only known from the eastern Pacific from two records off Baja California and mainland Mexico. Records of this species from the Southern Hemisphere are now considered to be of a distinct species, *H. australis* (Regan, 1913). Engyebenthic at 731–5440 m but most abundant at 2420–3500 m (Sulak & Shcherbachev, 1997; Karmovskaya & Merrett, 1998).

*Meadia abyssalis* (Kamohara)

*Dysomma abyssale* Kamohara, 1938, p. 12, Fig. 3, Sagami Sea, Japan.

“Arrowtooth eels” and “ilyophine eel”: Chave & Mundy (1994).

*Meadia abyssalis* (Kamohara, 1938): Robins & Robins (1976), Randall (1980a), Tinker (1982), Humphreys *et al.* (1984), Uchida & Uchiyama (1986), Robins & Robins (1989).

TAXONOMY: Robins & Robins (1989).

HAWAIIAN RECORDS: O‘ahu to the Hancock Seamounts at 263–329 m (Robins & Robins, 1976; Humphreys *et al.*, 1984; Uchida & Uchiyama, 1986). This is the ilyophine synaphobranchid eel that Chave & Mundy (1994) recorded as living in gold coral bushes (*Gerardia* sp., order Zoanthinaria), as seen from submersibles, throughout the main Hawaiian Islands at 343–396 m.

GENERAL RANGE: Indo-Pacific but known only from Reunion, Japan, the Kermadec Islands, the Emperor Seamounts, and the Hawaiian Islands. Engyebenthic at 263–329 m (Robins & Robins, 1976; Uchida & Uchiyama, 1986; P. Castle, pers. comm., Aug. 1997).

*Simenchelys parasitica* Gill

*Simenchelys parasiticus* Gill in Goode & Bean, 1879, p. 27, Baquereau, Canada.

*Simenchelys parasiticus* Gill in Goode & Bean, 1879: Solomon-Raju & Rosenblatt (1971), Wilson *et al.* (1985), Robins & Robins (1989).

*Simenchelys parasitica* Gill in Goode & Bean, 1879: Sulak & Shcherbachev (1997).

TAXONOMY: Sulak & Shcherbachev (1997).

HAWAIIAN RECORDS: An uncatalogued specimen at the NMFS PIFSC was collected in the vicinity of the Hancock Seamounts (R. Moffitt, pers. comm., 1998). Specimens from Darwin Guyot (22°07'–7'N, 171°38'–0'E) and near Wake Island (19°18'–2'N, 166°35'E) at 1280–1572 m (Solomon-Raju & Rosenblatt, 1971) indicate that *S. parasitica* could occur in Hawai‘i.

GENERAL RANGE: Almost circumglobal on continental slopes and seamounts in the Atlantic, Indian and Pacific oceans, but absent from the eastern Pacific except for the Nazca/Sala y Gomez Ridge extension of the Indo-Pacific region. Perhaps antiequatorial. Engyebenthic at 136–2620 m and most abundant at 500–1800 m with most shallow occurrences in northern parts of range (Robins & Robins, 1989; Sulak & Shcherbachev, 1997).

***Synaphobranchus affinis* Günther**

*Synaphobranchus affinis* Günther, 1877b, p. 445, off Inoshima, Japan.

*Synaphobranchus brachysomus* Gilbert, 1905: Gilbert (1905), Clarke (1972), Gosline & Brock (1960), Tinker (1982).

*Synaphobranchus brevidorsalis* non Günther, 1877b [a valid species also found in the Hawaiian Islands]: Fowler (1928, in part).

*Synaphobranchus affinis* Günther, 1877b: Prosser *et al.* (1975), Hughes & Iwai (1978), Smith & Castle (1981), Uchida & Uchiyama (1986), Robins & Robins (1989), Sulak & Shcherbachev (1997).

TAXONOMY: Robins & Robins (1989), Sulak & Shcherbachev (1997).

HAWAIIAN RECORDS: Hawai'i Island to Northampton Bank at 406–2100 m (Gilbert, 1905; Clarke, 1972; Prosser *et al.*, 1975; Uchida & Uchiyama, 1986). Unidentified *Synaphobranchus* sp. have been observed off Hawai'i Island at 1175–1400 m (Chave & Mundy, 1994).

GENERAL RANGE: Nearly circumglobal in the tropical through temperate Atlantic, Indian, and Pacific oceans but not found in the northeastern or eastern tropical Pacific and not reaching the continental slopes of South America. Engybenthic over rocky substrata with currents at 290–2334 m but most abundant at 500–1500 m (Prosser *et al.*, 1975; Hughes & Iwai, 1978; Robins & Robins, 1989; Sulak & Shcherbachev, 1997).

***Synaphobranchus brevidorsalis* Günther**

*Synaphobranchus brevidorsalis* Günther, 1887, p. 255, Pl. 63 (fig. C), north of New Guinea and off Japan.

*Synaphobranchus brevidorsalis* Günther, 1887: Fowler (1928, in part), Wilson *et al.* (1985), Robins & Robins (1989), Chave & Mundy (1994), Sulak & Shcherbachev (1997).

TAXONOMY: Robins & Robins (1989), Sulak & Shcherbachev (1997).

HAWAIIAN RECORDS: *Synaphobranchus brevidorsalis* has been tentatively identified from photographs taken from submersibles at Lō'ihī and Cross Seamounts, and Hawai'i Island at 1175–1530 m (Chave & Mundy, 1994). Specimens collected from Horizon Guyot (19°20'N, 169°00'W) at 1422–2187 m (Wilson *et al.*, 1985) indicate that *S. brevidorsalis* could occur in the Hawaiian Islands.

GENERAL RANGE: Probably almost circumglobal in the tropical through warm-temperate Atlantic, Indian, and western-central Pacific oceans, but absent in the eastern Pacific. Engybenthic at 230–2960 m but most abundant at 1000–2500 m (Wilson *et al.*, 1985; Robins & Robins, 1989; Sulak & Shcherbachev, 1997).

***Synaphobranchus kaupii* Johnson**

*Synaphobranchus kaupii* Johnson, 1862, p. 169, Madeira.

*Synaphobranchus kaupii* Johnson, 1862: Wilson *et al.* (1985), Robins & Robins (1989), Chave & Mundy (1994), Sulak & Shcherbachev (1997).

TAXONOMY: Robins & Robins (1989), Sulak & Shcherbachev (1997).

COMMON NAMES: Northern cutthroat eel (AFS).

HAWAIIAN RECORDS: *Synaphobranchus kaupii* has been tentatively identified from photographs taken from submersibles at Cross Seamount and near Hawai'i Island at 810–1725 m (Chave & Mundy, 1994). Specimens from Darwin Guyot (22°07'–7'N, 171°38'–0'E) and Horizon Guyot (19°20'N, 169°00'W) at 1500–1600 m (Wilson *et al.*, 1985) indicate that *S. kaupii* could occur in Hawai'i.

GENERAL RANGE: Nearly circumglobal in the Atlantic, Indian, and northwestern and central Pacific oceans but absent in the eastern Pacific. Rare outside of temperate areas and perhaps antiequatorial. Engybenthic at 274–2869 m but most abundant at 400–2200 m (Robins & Robins, 1989; Sulak & Shcherbachev, 1997).

**Ophichthidae — Snake eels*****Apterichtus flavicaudus* (Snyder)**

*Sphagebranchus flavicaudus* Snyder, 1904, p. 516, Pl. 2 (fig. 4), Auau Channel between Maui and Lāna'i, Hawaiian Islands.

*Sphagebranchus flavicaudus* Snyder, 1904: Snyder (1904), Gilbert (1905), Jordan & Evermann (1905).

*Caecula flavicauda* (Snyder, 1904): Fowler (1928, 1931), Gosline (1951b, 1965), Gosline & Brock (1960), Tinker (1982).

*Verma flavicauda* (Snyder, 1904): Struhsaker (1973a), Tinker (1982).

*Apterichtus flavicaudus* (Snyder, 1904): McCosker (1979, 2002), Randall *et al.* (1993b), McCosker & Randall (2005).

**TAXONOMY:** McCosker (1979). McCosker (2002) stated that although he had previously considered the Hawaiian Islands population of this species to be conspecific with specimens from Rapa, "... examination of specimens from across Oceania to the western Indian Ocean now indicate [sic] that the Hawaiian population may in fact be unique." McCosker & Randall (2005) determined that the Hawaiian population is, in fact, *A. flavicaudus*, but that specimens from elsewhere in the Pacific included undescribed species of the genus.

**HAWAIIAN RECORDS:** Hawai'i Island to Midway at 16–250 m (Snyder, 1904; Gilbert, 1905; Gosline, 1965; Randall *et al.*, 1993b).

**GENERAL RANGE:** Currently considered to be a central Pacific endemic known from Rapa, the Society Islands, the Marquesas, and the Hawaiian Islands, but perhaps a Hawaiian Islands endemic. Benthic, burrowing in sand at 16–250 m (Gosline, 1965; McCosker, 1979, 2002).

### ***Apterichtus klazingai* (Weber)**

*Sphagebranchus klazingai* Weber, 1913, p. 47, Fig. 9, Banda, Indonesia.

*Apterichtus klazingai* (Weber, 1913): Randall *et al.* (1997), Michael (1988), Myers (1999), McCosker & Randall (2005).

**TAXONOMY:** McCosker & Randall (2005).

**COMMON NAMES:** Sharpnose snake eel (Randall *et al.* 1997; Myers, 1999).

**HAWAIIAN RECORDS:** Hawai'i Island at 20 m (McCosker & Randall, 2005).

**GENERAL RANGE:** Indo-Pacific from East Africa to the Great Barrier Reef, the Marshall Islands and the Hawaiian Islands. Benthic, burrowing in sand near coral reefs at 5–20 m (Michael, 1998; Myers, 1999; McCosker & Randall, 2005).

### ***Brachysomophis crocodilinus* (Bennett)**

*Ophisurus crocodilinus* Bennett, 1833, p. 32, Mauritius, western Indian Ocean.

*Brachysomophis sauropsis* Schultz, 1943: Gosline (1955), Gosline & Brock (1960), McCosker (1979), Tinker (1982), Randall *et al.* (1985a), Myers (1989).

*Brachysomophis crocodilinus* (Bennett, 1833): Myers (1989), Randall *et al.* (1995c, 1997a), McCosker & Randall (2001), McCosker (2002).

**TAXONOMY:** McCosker & Randall (2001). *Brachysomophis sauropsis* Schultz, 1943, has usually been considered to be a distinct species but McCosker & Randall (2001) placed *B. sauropsis* as a junior synonym of *B. crocodilinus*.

**COMMON NAMES:** Reptilian snake eel (Myers, 1999), Crocodile snake eel (Randall *et al.*, 1997a).

**HAWAIIAN RECORDS:** Johnston Atoll, not present in the Hawaiian Islands (Gosline, 1955; McCosker & Randall, 2001; McCosker, 2002).

**GENERAL RANGE:** Indo-Pacific from the Comoro Islands, Madagascar, the Laccadive Islands, and the Chagos Archipelago to the Ryukyu Islands, Tonga, the Marianas, Marshalls, Johnston Atoll, and the Society Islands. Benthic, burrowing in sand at 1–30 m (McCosker, 1979; Masuda *et al.*, 1984; McCosker & Castle *in* Smith & Heemstra, 1986; Myers, 1989; Randall, 1995c; Randall *et al.*, 1996a; McCosker & Randall, 2001).

### ***Brachysomophis henshawi* Jordan & Snyder**

*Brachysomophis henshawi* Jordan & Snyder, 1904b, p. 940, Honolulu, O'ahu, Hawaiian Islands.

*Brachysomophis crocodilinus* non (Bennett, 1833): Randall *et al.* (1995c, 1997a).

*Brachysomophis henshawi* Jordan & Snyder, 1904b: Jordan & Snyder (1904a), Jordan & Evermann (1905), Fowler (1928), Gosline (1951b), Gosline & Brock (1960), McCosker (1979, 2002), Tinker (1982), Myers (1989), Severns & Fiene-Severns (1993), Hoover (1994, 2003), McCosker & Randall (2001).

**TAXONOMY:** McCosker (1979, 2002), McCosker & Randall (2001). Several authors (i.e., Myers, 1989; Randall *et al.*, 1995c, 1996a) stated that *B. henshawi* Jordan & Snyder, 1904 is conspecific with *B. crocodilinus* (Bennett, 1833) but McCosker & Randall (2001) recognized both as valid species.

COMMON NAMES: Pūhi (Hoover, 1993), Puhī (Randall, 1996a; Hoover, 2003), Hawaiian crocodile eel (Hoover, 1993), Crocodile snake eel (Randall, 1996a; Hoover, 2003), Henshaw's snake eel (Hoover, 2003).

HAWAIIAN RECORDS: Maui to O'ahu at 10–34 m (Jordan & Snyder, 1904b; Severns & Fiene-Severns, 1993; Hoover, 1994; McCosker, 2002).

GENERAL RANGE: Indo-Pacific from the Arabian Sea to Indonesia, southern Japan, the Coral Sea, Palau, the Solomon Islands, the Hawaiian Islands, the Society Islands, and the Marquesas. Benthic, burrowing in sand at 1–35 m (McCosker, 1979; Severns & Fiene-Severns, 1993; Hoover, 1994; McCosker & Randall, 2001).

***Callechelys catostoma*** (Schneider & Forster)

*Sphagebranchus catostomus* Schneider & Forster in Bloch & Schneider, 1801, p. 536, Tahiti, Society Islands.  
*Callechelys catostoma* (Schneider & Forster in Bloch & Schneider, 1801): McCosker (1998, 2002).

TAXONOMY: McCosker (1998, 2002).

COMMON NAMES: Black-striped snake eel (Randall *et al.*, 1997a; Myers, 1999).

HAWAIIAN RECORDS: McCosker (1998, 2002) recorded a single specimen of *C. catostoma* from Hawai'i Island at 32 m.

GENERAL RANGE: Indo-Pacific from east Africa and Red Sea to Lord Howe Island, the Ryukyus, Micronesia, the Hawaiian Islands, and the Society Islands. Benthic, burrowing in sand at 1–32 m (McCosker, 1998, 2002).

***Callechelys lutea*** Snyder

*Callechelys luteus* Snyder, 1904, p. 517, Pl. 3 (fig. 5), South coast of Moloka'i, Hawaiian Islands.  
*Callechelys marmoratus* non (Bleeker, 1853) [a valid species not found in the Hawaiian Islands]: Fowler (1928, in part).

*Callechelys luteus* Snyder, 1904: Snyder (1904), Jordan & Evermann (1905), Fowler (1949), Gosline (1951b), Gosline & Brock (1960), McCosker (1979), Tinker (1982), Randall *et al.* (1993b), Hoover (1994, 2003).  
*Callechelys lutea* Snyder, 1904: Randall (1996a), McCosker (1998, 2002).

TAXONOMY: McCosker (1998, 2002).

COMMON NAMES: Pūhi (Hoover, 1993), Puhī (Hoover, 2003), Yellowspotted snake eel (Hoover, 1993), Freckled snake eel (Randall, 1996a; Hoover, 2003).

HAWAIIAN RECORDS: Hawai'i Island to Midway from the surface to 24 m (Snyder, 1904; Randall *et al.*, 1993b; Hoover, 1994; McCosker, 1998, 2002).

GENERAL RANGE: Hawaiian Islands endemic. Benthic, burrowing in sand at 4–24 m, often seen with the head and anterior body protruding vertically from a burrow; also rarely found swimming at surface (Gosline, 1951b; McCosker, 1979, 1998, 2002; Randall *et al.*, 1993b; Hoover, 1994).

***Cirrhimuraena playfairii*** (Günther)

*Ophichthys playfairii* Günther, 1870, p. 76, Zanzibar.  
*Microdonophis macgregori* Jenkins, 1903: Jenkins (1903), Jordan & Evermann (1905).  
*Ophichthys calamus* (Günther, 1870) [a valid species of *Cirrhimuraena* not found in the Hawaiian Islands]: Fowler (1928, 1934, in part).

*Cirrhimuraena macgregori* (Jenkins, 1903): Gosline (1951b), Gosline & Brock (1960), Tinker (1982).  
*Cirrhimuraena playfairii* (Günther, 1870): McCosker (1979, 2002), Randall *et al.* (1993b).

TAXONOMY: McCosker (1979, 2002).

HAWAIIAN RECORDS: Hawai'i Island to Midway from surface to unknown depths (Jenkins, 1903; Gosline, 1951b; Randall *et al.*, 1993b).

GENERAL RANGE: Indo-Pacific from Zanzibar to the Hawaiian Islands and the Marquesas. Benthic but sometimes collected swimming at surface (McCosker, 1979; Randall *et al.*, 1993b).

***Ichthyapus platyrhynchus*** (Gosline)

*Caecula* (*Sphagebranchus*) *platyrhyncha* Gosline, 1951b, p. 312, Figs. 1 & 14b,d, Hauula Park, windward O'ahu, Hawaiian Islands.

*Caecula platyrhyncha* Gosline, 1951: Gosline (1951b), Gosline & Brock (1960, in part).

*Caecula platyrhynchus* non Gosline, 1951: Tinker (1982 text, in part).

*Ichthyapus vulturis* non (Weber & de Beaufort, 1916) [a frequent misspelling of the species name]: Tinker (1982 appendix, in part).

*Ichthyapus vulturis* non (Weber & de Beaufort, 1916): Randall (1976a, in part), McCosker (1979, in part, 2002, in part), Randall *et al.* (1993b), McCosker & Randall (2005).

TAXONOMY: McCosker & Randall (2005).

HAWAIIAN RECORDS: Hawai'i Island to Kure Atoll at unspecified depths (McCosker & Randall, 2005).

GENERAL RANGE: A Hawaiian Islands endemic. Benthic, burrowing in sand at unspecified depths (McCosker & Randall, 2005).

### *Ichthyapus vulturis* (Weber & de Beaufort)

*Sphagebranchus vulturis* Weber & de Beaufort, 1916, p. 319, Nasi Besar, Sumatra, Indonesia.

*Caecula platyrhyncha* non Gosline, 1951: Gosline & Brock (1960, in part).

*Caecula platyrhynchus* non Gosline, 1951: Tinker (1982 text, in part).

*Ichthyapus vulturis* (Weber & de Beaufort, 1916): Randall (1976a, in part), McCosker (1979, in part, 2002, in part), Randall *et al.* (1997a), McCosker & Randall (2005).

*Ichthyapus vulturis* (Weber & de Beaufort, 1916) [*lapsus* for *vulturis*]: Tinker (1982 appendix, in part), Myers (1989).

TAXONOMY: McCosker (1979, 2002), but McCosker & Randall (2005) determined that the Hawaiian population is composed of two species, one of which is *I. vulturis*. The other is the endemic species that Gosline (1951b) described as *Caecula platyrhynchus*, which now takes the name *Ichthyapus platyrhynchus* (Gosline).

COMMON NAMES: Vulture sand eel (Myers, 1999).

HAWAIIAN RECORDS: O'ahu to Midway in shallow water (Gosline, 1951b; Randall *et al.*, 1993b; McCosker & Randall, 2005).

GENERAL RANGE: Indo-Pacific from the Mascarene Islands to Sumatra, Ogasawara Islands, Micronesia, the Hawaiian Islands, and Easter Island. Benthic, burrowing in sand (McCosker, 1979; Myers, 1989; Randall *et al.*, 1997b).

### *Leiuranus semicinctus* (Lay & Bennett)

*Ophisurus semicinctus* Lay & Bennett, 1839, p. 66, Pl. 20 (fig. 4), O'ahu, Hawaiian Islands?

*Ophisurus semicinctus* Lay & Bennett, 1839: Lay & Bennett (1839).

*Stethopterus semicinctus* (Lay & Bennett, 1839): Fowler (1949).

*Leiuranus semicinctus* (Lay & Bennett, 1839): Fowler (1900), Snyder (1904), Jordan & Evermann (1905), Fowler (1928), Gosline (1951b), Gosline & Brock (1960), McCosker (1979, 2002), Tinker (1982), Randall *et al.* (1985a, 1990a), Myers (1989), Winterbottom *et al.* (1989).

TAXONOMY: McCosker (1979, 2002).

COMMON NAMES: Saddled snake eel (Myers, 1999), Culverin (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Johnston Atoll and O'ahu at unspecified depths (Lay & Bennett, 1839; Jordan & Evermann, 1905; Randall *et al.*, 1985b).

GENERAL RANGE: Indo-Pacific from South Africa to Japan, Australia, Micronesia, the Hawaiian Islands, the Society Islands, and the Marquesas. Benthic on sand and in seagrass at 1–10 m (Gosline, 1951b; Myers, 1989; Winterbottom *et al.*, 1989; Randall *et al.*, 1990a).

### *Muraenichthys schultzei* Bleeker

*Muraenichthys schultzei* Bleeker, 1857c, p. 366, Karangbollong, Java, Indonesia.

*Muraenichthys schultzei* Bleeker, 1857c: Gosline (1951b), Gosline & Brock (1960), McCosker (1979, 2002), Tinker (1982), Randall *et al.* (1985a), Myers (1989), Winterbottom *et al.* (1989), Castle & McCosker (1999).

TAXONOMY: McCosker (1979, 2002), Castle & McCosker (1999).

COMMON NAMES: Schultz's worm eel (Myers, 1999).

HAWAIIAN RECORDS: Johnston Atoll, unknown from Hawai'i (Gosline, 1951b; Randall *et al.*, 1985b).

GENERAL RANGE: Indo-Pacific from east Africa and the Red Sea to Japan, Micronesia, Samoa, the Line Islands, and Johnston Atoll. Benthic at 1–13 m (Gosline, 1951b; Myers, 1989; Winterbottom *et al.*, 1989).

***Myrichthys colubrinus*** (Boddaert)

*Muraena colubrina* Boddaert, 1781, p. 56, Pl. 2 (fig. 3), Ambon Island, Moluccas Islands, Indonesia.

*Chlevastes colubrinus colubrinus* (Boddaert, 1781): Fowler (1949, in part).

*Myrichthys bleekeri* Gosline, 1951b: Gosline (1951b), Gosline & Brock (1960), McCosker (1979), Tinker (1982), Randall *et al.* (1985a), Myers (1989).

*Myrichthys colubrinus* (Boddaert, 1781): Fowler (1928), Myers (1989), Randall *et al.* (1990a, 1997a), McCosker & Rosenblatt (1993), McCosker (2002).

**TAXONOMY:** McCosker & Rosenblatt (1993). Although Paxton *et al.* (1989) considered *M. bleekeri* Gosline, 1951b, to be a valid species distinct from *M. colubrinus*. McCosker & Rosenblatt (1993) and McCosker (2002) considered them to be the same species. Eschmeyer's (1998) treatment of these taxa listed *M. bleekeri* as a valid species.

**COMMON NAMES:** Banded snake eel (Myers, 1999), Harlequin snake eel (Randall *et al.*, 1997a).

**HAWAIIAN RECORDS:** Johnston Atoll, unknown from Hawai'i (Gosline, 1951b; McCosker, 2002).

**GENERAL RANGE:** Indo-Pacific from east Africa and the Red Sea to Indonesia, the Ryukyu and Ogasawara Islands, Australia, Micronesia, the Line Islands, Johnston Atoll, and the Society Islands. Benthic in shallow sandy areas or seagrass beds (Gosline, 1951b; McCosker, 1979; Myers, 1989; McCosker & Rosenblatt, 1993; Randall *et al.*, 1997b).

***Myrichthys magnificus*** (Abbott)

*Pisoödonophis magnifica* Abbott, 1861, p. 476, Hawaiian Islands.

*Pisoödonophis magnifica* Abbott, 1861: Abbott (1861).

*Ophichthys stypurus* Smith & Swain, 1882: Smith & Swain (1882).

*Myrichthys stypurus* (Smith & Swain, 1882): Jordan & Evermann (1905).

*Myrichthys maculosus* non (Cuvier, 1816) [a valid Indo-transPacific species absent in the Hawaiian Islands]: Fowler (1928), Gosline (1951b), Gosline & Brock (1960), McCosker (1979), Tinker (1982), Okamoto & Kanenaka (1984), Randall *et al.* (1985a, 1993b), Hoover (1993), Chave & Mundy (1994).

*Myrichthys magnificus* (Abbott, 1861): Fowler (1900, 1912), Jordan & Evermann (1905), McCosker & Rosenblatt (1993), Randall (1996a), McCosker (2002), Hoover (2003).

**TAXONOMY:** McCosker & Rosenblatt (1993), McCosker (2002).

**COMMON NAMES:** Pūhi-lā'au (Hoover, 1993), Puhī lā'au (Randall, 1996a; Hoover, 2003), Magnificent snake eel (Hoover, 1993, 2003; Randall, 1996a), Hawaiian spotted snake eel.

**HAWAIIAN RECORDS:** Johnston Atoll and O'ahu to Kure at 1–262 m (Abbott, 1861; Smith & Swain, 1882; Gosline, 1951b; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Hoover, 1993).

**GENERAL RANGE:** Hawaiian Island and Johnston Atoll endemic. Benthic in crevices and on sandy or rocky substrata at 1–262 m (McCosker, 1979; Randall *et al.*, 1985b; Chave & Mundy, 1994; McCosker & Rosenblatt, 1993).

***Ophichthus fowleri*** (Jordan & Evermann)

*Microdonophis fowleri* Jordan & Evermann, 1903a, p. 164, Honolulu, Hawai'i.

*Microdonophis fowleri* Jordan & Evermann, 1903a: Jordan & Evermann (1903a, 1905), Snyder (1904), Tinker (1982).

*Ophichthus polyophthalmus* non (Bleeker, 1864a) [a valid species also found in the Hawaiian Islands]: Fowler (1928, 1934, in part), Gosline (1951b, in part), Tinker (1982, in part), i.e., description and photograph identified as *O. polyophthalmus*.

*Caecula polyophthalma* non (Bleeker, 1864a): Fowler (1949, in part).

*Ophichthus erabo* non (Jordan & Snyder, 1901) [a valid species not found in the Hawaiian Islands]: McCosker (1979, 2002, in part), McCosker & Randall (1982, in part), Severns & Fiene-Severns (1993).

*Ophichthus bonaparti* non (Kaup, 1856) [a valid species not found in the Hawaiian Islands]: McCosker (2002).

*Ophichthus fowleri* (Jordan & Evermann, 1903a). J.E. Randall (pers. comm., 2005).

**TAXONOMY:** J.E. Randall (pers. comm., Mar. 2005) recognized *O. fowleri* as a valid species, noting that McCosker (2002) misidentified a specimen from the Hawaiian Islands as *O. bonaparti*. Randall also considers all records of *O. erabo* from the Hawaiian Islands to be based on *O. fowleri*.

**COMMON NAMES:** Fowler's snake eel (J.E. Randall, pers. comm., Mar. 2005).

**HAWAIIAN RECORDS:** Lāna'i, Maui, and O'ahu from tide pools to 155 m (Jordan & Evermann, 1903a, 1905; Severns & Fiene-Severns, 1993; McCosker, 2002; J.E. Randall, pers. comm., Mar. 2005).



GENERAL RANGE: Hawaiian endemic. Benthic, burrowing in sand, from shallow tide pools to 155 m (McCosker, 2002; J.E. Randall, pers. comm., Mar. 2005).

***Ophichthus kunaloa*** McCosker

*Ophichthus kunaloa* McCosker, 1979, p. 61, Figs. 3–4, Barber’s Point, O’ahu, Hawaiian Islands.  
*Ophichthus kunaloa* McCosker, 1979: McCosker (1979, 2002), Chave & Mundy (1994).

TAXONOMY: McCosker (1979, 2002).

HAWAIIAN RECORDS: Hawai’i Island to O’ahu at 220–475 m (perhaps Gosline, 1951b — see McCosker, 1979, 2002; Chave & Mundy, 1994). Specimens have been collected in traps at Cross Seamount and observed from submersibles at Moloka’i (R. Moffitt & B. Mundy, unpubl. data, 1999).

GENERAL RANGE: Hawaiian endemic. Benthic on fine sand or hard substrata with crevices at 220–382 m (Chave & Mundy, 1994; McCosker, 2002).

***Ophichthus polyophthalmus*** (Bleeker)

*Ophichthus polyophthalmus* Bleeker, 1864a, p. 43, Ambon Island, Moluccas Islands, Indonesia.  
*Ophichthus polyophthalmus* (Bleeker, 1864a): Fowler (1928, in part), Gosline (1951b, in part), Gosline & Brock (1960, in part), McCosker (1979, 2002), Tinker (1982, in part), i.e., description and photograph are of *O. fowleri*, McCosker & Castle in Smith & Heemstra (1986).

TAXONOMY: See McCosker (1979, 2002) for comments on records of *O. polyophthalmus* and *O. “erabo”*.

COMMON NAMES: Large-spotted snake eel (Myers, 1999).

HAWAIIAN RECORDS: Kaho’olawe to O’ahu (Fowler, 1928; Gosline, 1951b; McCosker, 1979).

GENERAL RANGE: Indo-Pacific, South Africa to Indonesia, and the Hawaiian Islands (Gosline, 1951b; McCosker & Castle in Smith & Heemstra, 1986).

***Phaenomonas cooperae*** Palmer

*Phaenomonas cooperae* Palmer, 1970, p. 219, Fig. 1, Betio, Tarawa, Gilbert Islands, Kiribati.  
*Phaenomonas cooperae* Palmer, 1970: Palmer (1970), McCosker (1979, 2002), Randall (1980a), Myers (1989).

TAXONOMY: McCosker (1979, 2002).

HAWAIIAN RECORDS: O’ahu at 60 m (Palmer, 1970; McCosker, 1979, 2002).

GENERAL RANGE: Indo-Pacific from the Red Sea and Aldabra to Micronesia, the Hawaiian Islands, and the Marquesas. Benthic at 60 m (McCosker, 1979; Myers, 1989).

***Phyllophichthus xenodontus*** Gosline

*Phyllophichthus xenodontus* Gosline, 1951b, p. 316, Figs. 17a-b, Hauula, O’ahu, Hawaiian Islands.  
*Phyllophichthus xenodontus* Gosline, 1951b: Gosline (1951b), Gosline & Brock (1960), McCosker (1979, 2002), Tinker (1982 appendix), Myers (1989).

TAXONOMY: McCosker (1979, 2002).

COMMON NAMES: Flappy snake eel (Myers, 1999).

HAWAIIAN RECORDS: Johnston Atoll and O’ahu from shallow water (Gosline, 1951b).

GENERAL RANGE: Indo-Pacific from East Africa to Micronesia, the Hawaiian Islands, the Society Islands, and the Marquesas. Benthic in shallow water (Gosline, 1951b; McCosker, 1979; Myers, 1989).

***Schismorhynchus labialis*** (Seale)

*Muraenichthys labialis* Seale, 1917, p. 79, Arnho Atoll, Marshall Islands.  
*Leptenchelys labialis* (Seale, 1917): Gosline & Brock (1960), Tinker (1982 text).  
*Schismorhynchus labialis* (Seale, 1917): McCosker (1979, 2002), Tinker (1982 text and appendix), Randall *et al.* (1985a), Myers (1989), Winterbottom *et al.* (1989).

TAXONOMY: McCosker (1979, 2002).

HAWAIIAN RECORDS: Johnston Atoll, unknown from the Hawaiian Archipelago although Myers (1989) included the Hawaiian Islands in its range (Gosline & Brock, 1960; McCosker, 1979; Randall *et al.*, 1985b).

GENERAL RANGE: Indo-Pacific from the Chagos Archipelago to Micronesia, Johnston Atoll, the Society Islands, and Easter Island. Benthic at 1 m (Myers, 1989; Winterbottom *et al.*, 1989).

***Schultzidia johnstonensis*** (Schultz & Woods)

*Muraenichthys johnstonensis* Schultz & Woods, 1949, p. 172, Fig. 1, Johnston Island.

*Muraenichthys johnstonensis* Schultz & Woods, 1949: Schultz & Woods (1949).

*Schultzidia johnstonensis* (Schultz & Woods, 1949): Gosline (1951b), Gosline & Brock (1960), McCosker (1979, 2002), Tinker (1982), Randall *et al.* (1985a, 1990a, 1993b), Myers (1989), Winterbottom *et al.* (1989).

TAXONOMY: McCosker (1979, 2002).

COMMON NAMES: Johnston snake eel (Randall *et al.*, 1997a), Peppered worm eel (Myers, 1999).

HAWAIIAN RECORDS: Johnston Atoll and O'ahu to Midway at unspecified depths (Schultz & Woods, 1949; Gosline, 1951b; Gosline & Brock, 1960; Randall *et al.*, 1993b).

GENERAL RANGE: Indo-Pacific from the Chagos Archipelago to Australia, Micronesia, the Hawaiian Islands, the Line Islands, Society Islands, and Marquesas. Benthic at 7–12 m (Gosline, 1951b; Winterbottom *et al.*, 1989; Myers, 1989; Randall *et al.*, 1990a).

***Scolecenchelys cookei*** (Fowler)

*Muraenichthys cookei* Fowler, 1928, p. 41, Fig. 9, Milaekahana [sic] [= Mālaekahana], O'ahu, Hawaiian Islands.

*Muraenichthys cookei* Fowler, 1928: Fowler (1928), Gosline (1951b), Gosline & Brock (1960), McCosker (1979), Tinker (1982), Randall *et al.* (1985a, 1993b).

*Scolecenchelys cookei* (Fowler, 1928): Castle & McCosker (1999), McCosker (2002).

TAXONOMY: McCosker (1979). Castle & McCosker (1999) and McCosker (2002) for genus.

HAWAIIAN RECORDS: Johnston Atoll and O'ahu to Midway at 3–5 m (Fowler, 1928; Gosline, 1951b; Randall *et al.*, 1985b, 1993b).

GENERAL RANGE: Hawaiian Islands and Johnston Atoll endemic. Benthic in sand pockets among coral at 3–5 m (Gosline, 1951b; McCosker, 1979; Randall *et al.*, 1985b, 1993b).

***Scolecenchelys gymnota*** (Bleeker)

*Muraenichthys gymnotus* Bleeker, 1857a, p. 90, Ambon Island, Moluccas Islands, Indonesia.

*Muraenichthys gymnotus* Bleeker, 1857a: Gosline & Brock (1960), McCosker (1979), Tinker (1982), Randall *et al.* (1985a), Myers (1989).

*Scolecenchelys gymnota* (Bleeker, 1857a): Castle & McCosker (1999), McCosker (2002).

TAXONOMY: McCosker (1979). Castle & McCosker (1999) and McCosker (2002) for genus.

COMMON NAMES: Slender worm eel (Myers, 1999).

HAWAIIAN RECORDS: Johnston Atoll, not found in Hawai'i (Gosline & Brock, 1960; Randall *et al.*, 1985b).

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to Japan, Australia, Micronesia, the Line Islands, Johnston Atoll, the Society Islands, and Rapa. Benthic, burrowing in sand (Myers, 1989).

***Scolecenchelys puhioilo*** (McCosker)

*Muraenichthys puhioilo* McCosker, 1979, p. 59, Figs. 1–2, Barber's Point, O'ahu, Hawaiian Islands.

*Muraenichthys macropterus* non Bleeker, 1857 [a valid species not found in the Hawaiian Islands]: Clarke (1972), Randall (1976a), Tinker (1982).

*Muraenichthys puhioilo* McCosker, 1979: McCosker (1979).

*Scolecenchelys puhioilo* (McCosker, 1979): Castle & McCosker (1999), McCosker (2002).

TAXONOMY: McCosker (1979). Castle & McCosker (1999) and McCosker (2002) for genus.

HAWAIIAN RECORDS: Recorded in the published literature from one specimen captured at 275 m off Barber's Point, O'ahu (Clarke, 1972; McCosker, 1979). An additional specimen has been captured at Maro Reef (R. Moffitt, pers. comm., 1999).

GENERAL RANGE: Hawaiian endemic. Benthic at 275 m (McCosker, 1979).

**Derichthyidae — Longneck eels*****Derichthys serpentinus*** Gill

*Derichthys serpentinus* Gill, 1884, p. 433, Western Atlantic at 39°44'30"N, 71°04'00"W.

*Derichthys serpentinus* Gill, 1884: Castle (1970), Tinker (1982), Karmovskaya (1985), Robins (1989), Boehlert *et al.* (1992), Boehlert & Mundy (1992, 1996).

TAXONOMY: Karmovskaya (1985).

COMMON NAMES: Longneck eel.

HAWAIIAN RECORDS: Johnston Atoll and O'ahu to the Hancock Seamounts at unspecified depths (Boehlert *et al.*, 1992; Boehlert & Mundy, 1992, 1996). Tinker (1982) listed this species from the Hawaiian Islands without comment. Collections of larvae confirm its presence within 30 km of O'ahu (Boehlert & Mundy, 1996).

GENERAL RANGE: Circumglobal in tropical to temperate areas except in Caribbean and Gulf of Mexico. Meso- to bathypelagic at 200–2000 m with most occurrences at 200–700 m (Castle 1970, Karmovskaya 1985, Robins 1989).

[*Nessorhamphus danae* Schmidt]

*Nessorhamphus danae* Schmidt, 1931, p. 487, Fig. 4, Indian Ocean west of Sumatra, Indonesia.

*Nessorhamphus* sp.: Loeb (1979)?

*Nessorhamphus danae* Schmidt, 1931: Karmovskaya (1985), Clarke (1987), Robins (1989), Smith (1989).

TAXONOMY: Karmovskaya (1985).

HAWAIIAN RECORDS: Loeb (1979) recorded larval *Nessorhamphus* from 28°N, 155°W. The species of *Nessorhamphus* in the central North Pacific is *N. danae* (D.G. Smith, pers. comm.). Clarke (1987) did not find this species from the Hawaiian Islands southward to 5°N. Thus it may have a disjunct distribution in the central North Pacific. Karmovskaya (1985) did not record either species of *Nessorhamphus* from the central North Pacific.

GENERAL RANGE: Equatorial Atlantic, Indian, and Pacific oceans between 10°N–10°S, absent from the eastern Pacific, present in central North Pacific? Meso- and bathypelagic at 300–1800 m (Karmovskaya, 1985; Robins, 1989; Smith, 1989a).

### Nemichthyidae — Snipe eels

[*Avocettina bowersii* (Garman)]

*Labichthys bowersii* Garman, 1899, p. 323, Pl. 64 (fig. 1), off Panama at 6°10'N, 83°06'W.

*Avocettina bowersi* Garman, 1899 [*lapsus*]: Nielsen & Smith (1978).

TAXONOMY: Nielsen & Smith (1978).

COMMON NAMES: Slender snipe eel.

HAWAIIAN RECORDS: Unknown from the Hawaiian Islands but records to the southeast of Hawai'i Island (11°50'N, 144°48'W) indicate that it could occur in the islands as a waif (Nielsen & Smith, 1978).

GENERAL RANGE: Eastern tropical Pacific endemic, from southern California to Peru and west to about 150°W. Mesopelagic at 100–1500 m (Nielsen & Smith, 1978).

*Avocettina infans* (Günther)

*Nemichthys infans* Günther, 1878, p. 251, Mid-Atlantic at 5°48'N, 14°20'W.

*Avocettina* sp.: Amesbury (1975).

*Borodulina gilli* (Bean, 1890): Novikov *et al.* (1981).

*Borodulina infans* (Günther, 1878): Novikov *et al.* (1981).

*Avocettina infans* (Günther, 1878): Nielsen & Smith (1978), Borets & Sokolovsky (1978).

TAXONOMY: Nielsen & Smith (1978).

HAWAIIAN RECORDS: O'ahu to Koko Seamount at 750–850 m (Amesbury, 1975; Nielsen & Smith, 1978; Novikov *et al.*, 1981).

GENERAL RANGE: All oceans except the eastern tropical Pacific from 55°N–15°S. Meso- and bathypelagic at 100–4580 m but usually at 1200–2000 m (Nielsen & Smith, 1978).

*Labichthys carinatus* Gill & Ryder

*Labichthys carinatus* Gill & Ryder, 1883, p. 261, off Georges Bank, western North Atlantic, at 41°13'00"N, 65°00'50"W.

*Labichthys carinatus* Gill & Ryder, 1883: Nielsen & Smith (1978).

TAXONOMY: Nielsen & Smith (1978).

HAWAIIAN RECORDS: O'ahu (Nielsen & Smith, 1978).

GENERAL RANGE: Rare in the tropical and subtropical Gulf of Mexico, Atlantic, Indian, and Pacific oceans. Meso- and bathypelagic at 500–2000 m, usually below 1200 m (Nielsen & Smith, 1978).

***Nemichthys larseni*** Nielsen & Smith

*Nemichthys larseni* Nielsen & Smith, 1978, p. 55, Figs. 34–36, Pacific Ocean off Mexico at 29°50'30"N, 117°22'W.

*Nemichthys larseni* Nielsen & Smith, 1978: Nielsen & Smith (1978).

TAXONOMY: Nielsen & Smith (1978).

HAWAIIAN RECORDS: Hawai'i Island and O'ahu, northeast to 28°N, 154°W, at ca. 190–1000 m (Nielsen & Smith, 1978).

GENERAL RANGE: Eastern and central Pacific endemic, from Oregon to the Gulf of California westward to the Hawaiian Islands. Mesopelagic at 190–1000 m (Nielsen & Smith, 1978).

***Nemichthys scolopaceus*** Richardson

*Nemichthys scolopacea* Richardson, 1848, p. 25, Pl. 10 (figs. 1–3), South Atlantic off Brazil.

*Nematoprora polygonifera* Gilbert, 1905: Gilbert (1905), Fowler (1928), Gosline & Brock (1960), Tinker (1982).

*Nemichthys scolopaceus* Richardson, 1848: Nielsen & Smith (1978), Borets & Sokolovsky (1978), Novikov *et al.* (1981).

TAXONOMY: Nielsen & Smith (1978).

COMMON NAMES: Slender snipe eel (AFS).

HAWAIIAN RECORDS: O'ahu to Milwaukee Seamount at >1–1464 m (Gilbert, 1905; Nielsen & Smith, 1978; Novikov *et al.*, 1981).

GENERAL RANGE: Circumglobal except in boreal seas, 55°N–45°S. Mesopelagic to 1500 m, usually at 100–1000 m (Nielsen & Smith, 1978).

### Congridae — Conger eels

***Acromycter alcocki*** (Gilbert & Cramer)

*Promyllantor alcocki* Gilbert & Cramer, 1897, p. 405, Pl. 36 (fig. 1), Penguin Bank off Moloka'i, Hawai'i at 21°12'00"N, 157°49'00"W.

*Promyllantor alcocki* Gilbert & Cramer, 1897: Gilbert & Cramer (1897), Gilbert (1905), Fowler (1928), Gosline & Brock (1960), Struhsaker (1973a), Tinker (1982).

*Acromycter alcocki* (Gilbert & Cramer, 1897): Smith & Kanazawa (1977), Smith & Leiby (1980 — Hawaiian specimens only), Smith (1989).

TAXONOMY: Smith (1989a).

HAWAIIAN RECORDS: Maui to O'ahu at 388–640 m (Gilbert & Cramer, 1897; Struhsaker, 1973a).

GENERAL RANGE: Hawaiian endemic. Presumed enyebenthic at 388–640 m (Struhsaker, 1973a; Smith, 1989a).

[***Ariosoma anago*** (Temminck & Schlegel)]

*Conger anago* Temminck & Schlegel, 1846, p. 259, Pl. 13 (fig. 2), Japan.

*Anago anago* (Temminck & Schlegel, 1846): Fowler (1928, 1931, 1932, 1934, 1949), Asano (1962), Borets & Sokolovsky (1978), Asano *in* Masuda *et al.* (1984), Machida *in* Okamura & Kitajima (1984).

*Ariosoma anago* (Temminck & Schlegel, 1846): Smith (1989a).

TAXONOMY: Asano (1962), Asano *in* Masuda *et al.* (1984), Smith (1989a).

HAWAIIAN RECORDS: Machida *in* Okamura & Kitajima (1984) recorded this species from the Hawaiian Islands. The species is not included in reviews of the fauna of the islands and is not listed as occurring in the Hawaiian Islands by Asano *in* Masuda *et al.* (1984). Machida's record may refer to the listing of the Hawaiian Islands in this species' range by Asano (1962). Asano's record was based on a citation of Fowler (1932), who may have included *A. marginatum* with this species. Fowler (1928, 1931, 1934a, 1949) did not list *A. anago* as occurring in the Hawaiian Islands. Borets & Sokolovsky (1978) did not state if their specimens were collected in the Hawaiian Ridge or the Emperor Seamounts.

GENERAL RANGE: Indo-Pacific from unspecified Indian Ocean localities to Taiwan, Japan, the Okinawa Trough, and perhaps the Emperor Seamounts. Benthic at 10–250 m (Borets & Sokolovsky, 1978; Masuda *et al.*, 1984; Machida *in* Okamura & Kitajima, 1984; Smith, 1989a).

[*Ariosoma anagoides* (Bleeker)]

*Conger anagoides* Bleeker, 1853a, p. 76, Banda Neira, Banda Islands, Indonesia.  
*Alloconger anagoides* (Bleeker, 1853a): Borets & Sokolovsky (1978), Novikov *et al.* (1981).  
*Ariosoma anagoides* (Bleeker, 1853a): Asano *in* Masuda *et al.* (1984), Smith (1989a).

TAXONOMY: Asano *in* Masuda *et al.* (1984), Smith (1989a).

HAWAIIAN RECORDS: A record from Milwaukee Seamount (Novikov *et al.*, 1981) indicates that *A. anagoides* could occur at the Hancock Seamounts.

GENERAL RANGE: Eastern Indian Ocean and western and central Pacific from Indonesia to Japan and the southern Emperor Seamounts. Benthic, usually in shallow areas with soft sediments (Asano *in* Masuda *et al.*, 1984).

*Ariosoma fasciatus* (Günther)

*Poecilconger fasciatus* Günther, 1872a, p. 673, Pl. 68, Manado, Sulawesi, Indonesia.  
*Poecilconger fasciatus* Günther, 1872a: Fowler (1928), Randall (1986, 1996a), Myers (1989), Severns & Fiene-Severns (1993).  
*Ariosoma fasciatus* (Günther, 1872a): Shen (1998).

TAXONOMY: Shen (1998) synonymized *Poecilconger* with *Ariosoma*.

COMMON NAMES: Barred conger (Randall, 1996a).

HAWAIIAN RECORDS: Hawai'i Island and Maui at 32 m (Randall, 1986; Severns & Fiene-Severns, 1993).

GENERAL RANGE: Indo-Pacific from Madagascar to Indonesia, the Marshall Islands, Tahiti, and the Hawaiian Islands, but only known from six specimens. Benthic, burrowing in sand at 3–32 m (Randall, 1986; Myers, 1989; Severns & Fiene-Severns, 1993).

*Ariosoma marginatum* (Vaillant & Sauvage)

*Congrogadus marginatus* Vaillant & Sauvage, 1875, p. 282, Hawaiian Islands.  
*Congrogadus marginatus* Vaillant & Sauvage, 1875: Vaillant & Sauvage (1875), Jordan & Evermann (1905), Fowler (1928), Tinker (1982).  
*Congrellus bowersi* Jenkins, 1903: Jenkins (1903), Snyder (1904), Jordan & Evermann (1905).  
*Atopichthys nuttalli* Fowler, 1912: Fowler (1912, 1928)?  
*Conger bowersi* (Jenkins, 1903): Fowler (1928).  
*Ariosoma bowersi* (Jenkins, 1903): Fowler (1934, 1941), Gosline & Brock (1960), Gosline (1965), Struhsaker (1973a), Tinker (1982).  
*Leptocephalus nuttalli* (Fowler, 1912): Fowler (1949)?  
*Ariosoma marginatum* (Vaillant & Sauvage, 1875): Castle (1980), Humphreys *et al.* (1984), Uchida & Uchiyama (1986), Smith (1989), Randall *et al.* (1993b), Chave & Mundy (1994), Randall (1996a).

TAXONOMY: Castle (1980), Smith (1989a).

COMMON NAMES: Puhī (Randall, 1996a), Large-eye conger (Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll, Cross Seamount, and Hawai'i Island to Midway and Ladd Seamount at 1.5–490 m (Vaillant & Sauvage, 1875; Jordan & Evermann, 1905; Gosline, 1965; Struhsaker, 1973a; Humphreys *et al.*, 1984; Uchida & Uchiyama, 1986; Randall *et al.*, 1993b; Chave & Mundy, 1994).

GENERAL RANGE: Hawaiian and Johnston endemic. Benthic, burrowing in sediment at 1.5–490 m (Gosline, 1965; Struhsaker, 1973a; Castle, 1980; Uchida & Uchiyama, 1986; Smith, 1989a).

[*Atopichthys* sp.]

*Atopeichthys* sp.: Fowler & Ball (1925).  
*Atopichthys* sp.: Fowler (1928).

TAXONOMY AND HAWAIIAN RECORDS: These are congrid leptocephali recorded from the Hawaiian Islands. *Atopichthys*, a synonym of *Albula* based on its leptocephalus larva, was used as a catchall genus for eel larvae in the early part of the 20th century (Eschmeyer, 1990). The identity of the *Atopeichthys* [sic] species of Fowler & Ball (1925) has yet to be determined.

***Bathycongrus aequorea*** (Gilbert & Cramer)

*Congermuraena aequorea* Gilbert & Cramer, 1897, p. 405, plate 37, Kaiwi Channel near Kaua'i, Hawaiian Islands.

*Congermuraena aequorea* Gilbert & Cramer, 1897: Gilbert & Cramer (1897).

*Leptocephalus aequoreus* (Gilbert & Cramer, 1897): Gilbert (1905).

*Rhechias aequorea* (Gilbert & Cramer, 1897): Smith (1970, 1989a), Smith & Kanazawa (1977).

*Congrellus aequoreus* (Gilbert & Cramer, 1897): Jordan & Evermann (1905), Gosline & Brock (1960), Clarke (1972), Novikov *et al.* (1981), Tinker (1982), Borets (1986), all in part?

*Rhechias armiger* Jordan, 1921: Jordan (1921a), Gosline & Brock (1960, family Muraenosocidae [sic], in part).

*Congrina aequoreus* (Gilbert & Cramer, 1897): Struhsaker (1973a, in part).

*Congrina aequorea* (Gilbert & Cramer, 1897): Humphreys *et al.* (1984) in part?, Uchida & Uchiyama (1986) in part?

*Bathycongrus guttulatus* non (Günther, 1887) [a valid species also found in the Hawaiian Islands]: Ben-Tuvia (1993, in part).

*Bathycongrus aequorea* (Gilbert & Cramer, 1897): Castle & Smith (1999).

TAXONOMY: Castle & Smith (1999).

HAWAIIAN RECORDS: Hawai'i Island to Kaua'i at 300–686 m (Castle & Smith, 1999). Between the time of this species' first description and the clarification of its taxonomy by Castle & Smith (1999), no distinction was made between *B. aequorea* and *B. guttulatus*. It is therefore impossible to separate records of the two Hawaiian *Bathycongrus* species from between 1897 and 1999. Unidentified *Bathycongrus* species were recorded from Maui to the Koko Seamount at 66–858 m (Gilbert & Cramer, 1897; Gilbert, 1905; Struhsaker, 1973a; Humphreys *et al.*, 1984; Uchida & Uchiyama, 1986; Borets, 1986). The *Bathycongrus* specimens collected in the Northwestern Hawaiian Islands and Emperor Seamounts need to be reidentified.

GENERAL RANGE: Probably a Hawaiian endemic known with certainty from Hawai'i Island to Kaua'i. Benthic at 300–686 m (Castle & Smith, 1999).

***Bathycongrus guttulatus*** (Günther)

*Congromuraena guttulata* Günther, 1887, p. 252, off Matuku, Fiji Islands.

*Congrellus aequoreus* non (Gilbert & Cramer, 1897) [a valid species also found in the Hawaiian Islands]: Jordan & Evermann (1905), Gosline & Brock (1960), Clarke (1972), Novikov *et al.* (1981), Tinker (1982), Borets (1986), all in part?

*Conger guttulata* (Günther, 1887): Fowler (1928).

*Rhechias armiger* non Jordan, 1921 [a junior synonym of *Bathycongrus aequorea* (Gilbert & Cramer, 1897)]: Gosline & Brock (1960, family Muraenosocidae [sic], in part).

*Congrina aequoreus* non (Gilbert & Cramer, 1897): Struhsaker (1973a, in part).

*Congrina aequorea* non (Gilbert & Cramer, 1897): Humphreys *et al.* (1984), Uchida & Uchiyama (1986, in part).

*Bathycongrus guttulatus* (Günther, 1887): Ben-Tuvia (1993, in part), Castle (1995), Castle & Smith (1999).

TAXONOMY: Castle & Smith (1999).

HAWAIIAN RECORDS: Castle & Smith (1999) identified specimens of *B. guttulatus* from Maui to Kaua'i at 300–600 m but also recorded leptocephali from a wider range far south of Hawai'i Island to south of Ni'ihau, which suggests that *B. guttulatus* occurs at least throughout the main Hawaiian Islands. See *B. aequorea*.

GENERAL RANGE: Indo-Pacific from east Africa to the Philippines, Australia, New Caledonia, Fiji, and the Hawaiian Islands. Benthic at 66–1270 m (Struhsaker, 1973a; Uchida & Uchiyama, 1986; Smith, 1989a; Ben-Tuvia, 1993; Castle, 1995; Castle & Smith, 1999).

***Bathyuroconger vicinus*** (Vaillant)

*Uroconger vicinus* Vaillant, 1888, p. 86, Pl. 6 (figs. 1, 1a-b), Cape Verde Islands, Sudan, and Arguin Bank.

Congridae sp. A: Struhsaker (1973a, in part).

*Bathyuroconger vicinus* (Vaillant, 1888): Smith (1989a), Chave & Mundy (1994).

TAXONOMY: Struhsaker (1973a) described "Congridae sp. A" as similar to *Bathyuroconger braueri* Weber & de Beaufort, mentioning the presence of a black peritoneum. Smith (1989a) identified specimens of Struhsaker's Congridae sp. A as *B. vicinus* and *Uroconger lepturus*, and included the Hawaiian Islands in the range of both species.

HAWAIIAN RECORDS: Hawai'i Island to Kaua'i at 622–900 m (Struhsaker, 1973a; Smith, 1989a; Chave & Mundy, 1994).

GENERAL RANGE: Circum-subtropical in the Gulf of Mexico, Atlantic, Indian, and Pacific oceans; in the Pacific known from Australia, the Philippines, and the Hawaiian Islands. Engyobenthic over sand at 229–1318 m (Smith, 1989a; Chave & Mundy, 1994).

### *Conger cinereus marginatus* Valenciennes

*Conger marginatus* Valenciennes in Eydoux & Souleyet, 1850, p. 201, Pl. 9 (fig. 1), Hawaiian Islands.

*Leptocephalus marginatus* (Valenciennes in Eydoux & Souleyet, 1850): Fowler (1912, in part), Jordan & Evermann (1905), Jenkins (1903), Snyder (1904).

*Veternio verrens* Snyder, 1904: Snyder (1904), Jordan & Evermann (1905), Fowler (1931), Gosline & Brock (1960), Tinker (1982).

*Veternio verus* non (Risso, 1827) [a junior synonym of *Conger conger* Linnaeus, 1758, a valid species not found in the Hawaiian Islands; Fowler's use of this name may have been a *lapsus* for *V. verrens*]: Fowler (1928, 1949).

*Conger cinereus* Rüppell, 1830: Valenciennes (1841), Fowler (1928, 1931, 1934, 1949), Kanazawa (1958), Smith (1970), Tinker (1982), Okamoto & Kanenaka (1984), Randall (1985a, 1996a), Randall *et al.* (1985a), Uchida & Uchiyama (1986), Myers (1989), Smith (1989a), Randall *et al.* (1990a), Hoover (1993, 2003), Randall *et al.* (1993b).

*Conger marginatus* Valenciennes in Eydoux & Souleyet, 1850: Eydoux & Souleyet (1850), Günther (1880), Steindachner (1900), Gosline & Brock (1960), Hobson (1974).

TAXONOMY: The Hawaiian Islands population of *C. cinereus* is recognized as a subspecies distinct from the western Pacific Ocean populations. J.E. Randall (pers. comm., Mar. 2005) will argue that the Hawaiian subspecies deserves recognition as an endemic species, *C. marginatus*, by contemporary taxonomic standards. *Conger noordziekii* Bleeker, 1857, is a junior synonym of *C. cinereus cinereus* Rüppell, 1830, sometimes seen in older literature (Kanazawa, 1958; Smith, 1970, 1989a).

COMMON NAMES: Pūhi-ūhā (Hoover, 1993), Pūhi ūhā (Randall, 1996a; Hoover, 2003), Longfin conger (FAO), White eel (Hoover, 1993; DLNR), Mustache eel (Hoover, 1993), Mustache conger (Randall, 1996a; Hoover, 2003), Tohe (DLNR).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure at 3–71 m (Eydoux & Souleyet, 1850; Jordan & Evermann, 1905; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b; Uchida & Uchiyama, 1986; Randall *et al.*, 1993b).

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to the Ryukyus, Australia, Micronesia, the Hawaiian Islands, and Easter Islands. The subspecies is a Hawaiian and Johnston endemic. Benthic in crevices at 1–80 m (Kanazawa, 1958; Randall, 1985a; Myers, 1989; Randall *et al.*, 1990a).

### *Conger oligoporus* Kanazawa

*Conger oligoporus* Kanazawa, 1958, p. 251, Pls. 1 (fig. B), 3 (fig. B), Diamond Head, O'ahu, Hawaiian Islands.

*Conger wilsoni* non (Bloch & Schneider, 1801) [a valid Australian endemic species]: Fowler (1928), Gosline & Brock (1960).

*Conger oligoporus* Kanazawa, 1958: Kanazawa (1958), Clarke (1972), Struhsaker (1973a), Tinker (1982), Humphreys *et al.* (1984), Randall (1985a), Randall *et al.* (1985a), Uchida & Uchiyama (1986), Smith (1989a), Randall *et al.* (1993b), Chave & Mundy (1994), Greenfield (2003).

TAXONOMY: Kanazawa (1958), Smith (1989a).

HAWAIIAN RECORDS: Johnston Atoll and Moloka'i to Midway and the Hancock Seamounts at 2–507 m, with records from above 48 m being of juveniles (Kanazawa, 1958; Randall *et al.*, 1985b; Uchida & Uchiyama, 1986; Randall *et al.*, 1993b; Chave & Mundy, 1994; Greenfield, 2003).

GENERAL RANGE: Hawaiian and Johnston Island endemic. Benthic in crevices of hard substrata at 2–507 m (Randall, 1985a; Uchida & Uchiyama, 1986; Smith, 1989a; Chave & Mundy, 1994; Greenfield, 2003).

### *Gnathophis nystromi nystromi* (Jordan & Snyder)

*Leptocephalus nystromi* Jordan & Snyder, 1901b, p. 853, Fig. 5, Nagasaki, Japan.

*Rhynchocymba nystromi nystromi* (Jordan & Snyder, 1901b): Iwai (1976), Humphreys *et al.* (1984), Borets (1986), Uchida & Uchiyama (1986).

*Gnathophis nystromi nystromi* (Jordan & Snyder, 1901): Masuda *et al.* (1984), Smith (1989a).

TAXONOMY: Smith (1989a) and Eschmeyer (1998) commented that *G. nystromi* might be a junior synonym of *G. heterognathos* (Bleeker).

HAWAIIAN RECORDS: Bank 10 to Milwaukeese Seamount at 250–355 m (Iwai, 1976; Humphreys *et al.*, 1984; Borets, 1986; Uchida & Uchiyama, 1986).

GENERAL RANGE: Western and central North Pacific endemic known from the South China Sea to Japan, the Emperor Seamounts, and the northern Hawaiian Ridge. The other subspecies, *Gnathophis n. ginanago* (Asano, 1958) is a Japanese endemic and is sometimes considered a distinct species or a junior synonym of *G. heterognathos* (Bleeker) (e.g., see Smith 1989a). Presumed benthic at 250–355 m (Iwai 1976, Masuda *et al.* 1984, Borets 1986).

### ***Gnathophis* sp.**

*Gnathophis* sp.: Struhsaker (1973a).

TAXONOMY: The identity of Struhsaker's (1973a) *Gnathophis* sp. needs to be determined. Two species of *Gnathophis* have been observed in the Hawaiian Islands from HURL submersibles (C. Kelley, pers. comm., Sept. 2001).

HAWAIIAN RECORDS: Hawai'i Island to O'ahu at 115–280 m (Struhsaker, 1973a).

GENERAL RANGE: Unknown. Perhaps benthic at 115–280 m (Struhsaker, 1973a).

### ***Gorgasia hawaiiensis* Randall & Chess**

*Gorgasia hawaiiensis* Randall & Chess, 1980, p. 19, Figs. 1–3, Wa'awa'a Point, Puako, Hawai'i Island, Hawaiian Islands [the date of 1979 in this publication is incorrect, because this journal issue was not actually published until 1980 (J.E. Randall, pers. comm., Sept. 2003)].

*Gorgasia hawaiiensis* Randall & Chess, 1980: Randall & Chess (1980), Hoover (1993, 2003), Randall (1996a), Castle & Randall (1999).

TAXONOMY: Castle & Randall (1999).

COMMON NAMES: Puhi (Randall, 1996a), Hawaiian garden eel (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Hawai'i Island to O'ahu at 11–53 m (Randall & Chess, 1979; Hoover, 1993; Castle & Randall, 1999).

GENERAL RANGE: Hawaiian endemic. Benthic, burrowing in sand at 11–53 m (Randall & Chess 1980, Castle & Randall 1999).

### ***Uroconger lepturus* (Richardson)**

*Congrus lepturus* Richardson, 1845c, p. 106, Pl. 56 (figs. 1–6), Canton, China.

Congridae sp. A: Struhsaker (1973a).

*Uroconger lepturus* (Richardson, 1845c): Smith (1989a).

TAXONOMY: *Uroconger* needs revision (Smith, 1989a). See *Bathyroconger vicinus* for comments on the identification of this species in the Hawaiian Islands.

HAWAIIAN RECORDS: Maui to O'ahu at 622–704 m (Struhsaker, 1973a).

GENERAL RANGE: Indo-Pacific from East Africa to Japan, New Caledonia, and the Hawaiian Islands. Eurybenthic or benthic at 622–704 m (Struhsaker, 1973a; Smith, 1989a).

### **?Congridae**

Congridae(?) sp. B: Struhsaker (1973a).

TAXONOMY: Struhsaker (1973a).

HAWAIIAN RECORDS: Maui to O'ahu at 195–585 m; Struhsaker (1973a) collected thirty specimens of an eel tentatively assigned to the Congridae and listed the species as new to the Hawaiian Islands. Its identity needs to be determined.

GENERAL RANGE: Unknown. Benthic at 195–585 m (Struhsaker, 1973a).



**Nettastomatidae — Duckbill eels*****Nettastoma parviceps* Günther**

*Nettastoma parviceps* Günther, 1877b, p. 446, south of Tokyo, Japan.

*Metopomycter denticulatus* Gilbert, 1905: Gilbert (1905), Fowler (1928), Gosline & Brock (1960), Tinker (1982).

*Nettastoma parviceps* Günther, 1877b: Smith *et al.* (1981), Smith & Castle (1982), Chave & Mundy (1994).

TAXONOMY: Smith *et al.* (1981).

HAWAIIAN RECORDS: Cross Seamount and Hawai'i Island to Kaua'i at 748–1006 m (Gilbert, 1905; Chave & Mundy, 1994).

GENERAL RANGE: Indo-Pacific and anti-equatorial from South Africa to Japan, Australia, New Zealand, and the Hawaiian Islands. Engybenitic at 60–1190 m (Smith *et al.*, 1981; Smith & Castle, 1982; Chave & Mundy, 1994).

***Nettastoma solitarium* Castle & Smith**

*Nettastoma solitarium* Castle & Smith in Smith, Böhlke & Castle, 1981, p. 548, Figs. 2–7, near the Philippines at 13°49.2'N, 120°01.8'E to 13°48.2'N, 120°02.5'E.

*Nettastoma solitarium* Castle & Smith in Smith, Böhlke & Castle, 1981: Smith *et al.* (1981), Smith & Castle (1982).

TAXONOMY: Smith *et al.* (1981).

HAWAIIAN RECORDS: A *N. solitarium* was collected by shrimp trap off O'ahu (R. Moffitt, pers. comm., 1 Nov. 1993).

GENERAL RANGE: Indo-Pacific, known from isolated localities in the Indian Ocean, Indonesia, the Philippines, Australia, and the Hawaiian Islands. Engybenitic at 415–610 m (Smith *et al.*, 1981; Smith & Castle, 1982).

***Nettenchelys gephyra* Castle & Smith**

*Nettenchelys gephyra* Castle & Smith in Smith, Böhlke & Castle, 1981, p. 553, Figs. 8B, 11, Bulari Pass, New Caledonia.

*Nettenchelys gephyra* Castle & Smith in Smith, Böhlke & Castle, 1981: Smith *et al.* (1981), Smith & Castle (1982).

TAXONOMY: Castle & Smith in Smith *et al.* (1981).

HAWAIIAN RECORDS: Known in the Hawaiian Islands only from larvae collected at an unspecified location (Smith & Castle, 1982).

GENERAL RANGE: Indo-Pacific; adults known only from the Philippines and New Caledonia; larvae known from East Africa to Indonesia, the Philippines, New Caledonia, the Hawaiian Islands, and the Society Islands. Engybenitic at 412 m (Smith *et al.*, 1981; Smith & Castle, 1982).

**?*Nettenchelys* sp. C**

?*Nettenchelys* sp. C: Smith & Castle (1982).

TAXONOMY: Smith & Castle (1982).

HAWAIIAN RECORDS: Smith & Castle (1982) recorded larvae from an unspecified location in the Hawaiian Islands that are not assignable to known adults. They suggested that they are either larvae of a species whose adults have never been collected (p. 18) or the larvae of a *Venefica* species (p. 41).

GENERAL RANGE: This larval type is known from the Hawaiian Islands and New Guinea (Smith & Castle, 1982).

***Saurenchelys stylura* (Lea)**

*Leptocephalus stylurus* Lea, 1913, p. 29, Figs. 28–31; Pl. 5 (no. 3), North Atlantic at 26°03'N, 15°00'W.

*Saurenchelys* sp.: Struhsaker (1973a), Smith (1989a)?

*Saurenchelys stylurus* (Lea, 1913): Smith & Castle (1982), Smith (1989), Boehlert & Mundy (1992).

*Saurenchelys stylura* (Lea, 1913): Eschmeyer (1998).

TAXONOMY: Smith & Castle (1982); see discussion in Smith (1989a). Eschmeyer (1998) indicated that the species name should be *stylura*.

HAWAIIAN RECORDS: Hawai'i Island to Moloka'i and the Hancock Seamounts at 179–296 m (Struhsaker, 1973a; Boehlert & Mundy, 1992).

GENERAL RANGE: Circumtropical and subtropical in the Atlantic, Indian and Pacific oceans except the eastern Pacific. In the Pacific from Taiwan and southern Australia to New Caledonia and the Hawaiian Ridge. Engyberthentic at 27–460 m (Smith & Castle, 1982; Smith, 1989a).

[*Venefica tentaculata* Garman]

*Venefica tentaculata* Garman, 1899, p. 319, Pl. M (figs. 2–2a), eastern Pacific Ocean off Mexico.

*Venefica tentaculata* Garman, 1899: Edwards & Peden (1976), Wilson *et al.* (1985), Smith (1989a).

TAXONOMY: This genus needs revision (Smith, 1989a).

HAWAIIAN RECORDS: Specimens from Hamilton Guyot (19°55'N, 177°13'W) at 1600 m (Wilson *et al.*, 1985) indicate that *Venefica tentaculata* could occur in the Hawaiian Islands. Eels resembling *Venefica* have been photographed from submersibles in the Hawaiian Islands but none have been collected. See “?Nettenchelys sp. C”.

GENERAL RANGE: Eastern tropical Pacific to Mid-Pacific Seamounts. Perhaps bathypelagic or engyberthentic at 1600–2112 m (Edwards & Peden, 1976).

### Serrivomeridae — Sawtooth eels<sup>12</sup>

*Serrivomer sector* Garman

*Serrivomer sector* Garman, 1899, p. 320, Pl. 63, eastern Pacific at 3–7°N, 79–86°W.

*Serrivomer beani* non Gill & Ryder, 1883 [a valid Atlantic Ocean species]: Gilbert (1905), Fowler (1928), Gosline & Brock (1960), Struhsaker (1973a), Tinker (1982).

*Platuronides* sp. (males of *Serrivomer* sp.): Clarke (1984a).

*Serrivomer* sp.: Boehlert *et al.* (1992)?

*Serrivomer sector* Garman, 1899: Bauchot (1959), Amesbury (1975), Hughes & Iwai (1978), Tighe (1989).

TAXONOMY: Bauchot (1959), Tighe (1989). *Serrivomer jespersenii* Bauchot-Boutin and *S. sector* may both occur in the Hawaiian region (K. Tighe, pers. comm.). Identities of *Serrivomer* specimens from Hawai'i need to be confirmed.

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to French Frigate at 550–1951 m (Gilbert, 1905; Struhsaker, 1973a; Amesbury, 1975; Boehlert *et al.*, 1992).

GENERAL RANGE: Indo-Pacific from the Seychelles to Taiwan, New Guinea, the Mid-Pacific Seamounts, the Hawaiian Islands, and the Society Islands. Meso- and bathypelagic at 550–1951 m (Gilbert, 1905; Bauchot, 1959; Hughes & Iwai, 1978).

*Stemonidium hypomelas* Gilbert

*Stemonidium hypomelas* Gilbert, 1905, p. 586, Pl. 67, off Kawahioa Point, Ni'ihau, Hawaiian Islands.

*Stemonidium hypomelas* Gilbert, 1905: Gilbert (1905), Fowler (1928), Bauchot (1959), Gosline & Brock (1960), Amesbury (1975), Karmovskaya (1983), Clarke (1984a), Tighe (1989).

TAXONOMY: Bauchot (1959).

HAWAIIAN RECORDS: O'ahu to Ni'ihau at 175–1229 m (Gilbert, 1905; Clarke, 1984a).

GENERAL RANGE: Circumtropical and subtropical in the South and central Atlantic, southern Indian Ocean, and Pacific from Japan to the Loyalty Islands, the Hawaiian Islands, and the Society Islands. Mesopelagic at 550–1229 m during the day to 175–400 m at night (Karmovskaya, 1983; Clarke, 1984a; Tighe, 1989).

[*Thalassenchelys coheni* Castle & Raju]

*Thalassenchelys coheni* Castle & Raju, 1975, p. 10, Fig. 3; Pl. 1 (fig. 3), off California, U.S.A. at 34°13'N, 125°54'W.

*Thalassenchelys coheni* Castle & Raju, 1975: Castle & Raju (1975), Lavenberg (1988), Shimokawa *et al.* (1995).

TAXONOMY AND HAWAIIAN RECORDS: Castle & Raju (1975) recorded two specimens from 27°20'–30'N, 155°25'–35'W, northeast of Hawai'i. They placed *Thalassenchelys* in the Xenocoelidae [= Chlopsidae], but suggested that the familial placement was not correct. Lavenberg (1988) removed *Thalassenchelys* from the Chlopsidae and assigned it as *incertae sedis*. In an analysis of mitochondrial DNA, Obermiller & Pfeiler (2003) found that *Thalassenchelys* is a sister taxon of *Serrivomer* (*Stemonidium* was not included in their analysis).

GENERAL RANGE: North Pacific transition zone endemic known from east of Japan and the vicinity of the northern Hawaiian Ridge to British Columbia and Baja California. Known only from epi- and mesopelagic larvae collected at 0–1000 m (Castle & Raju, 1975; Shimokawa *et al.*, 1995).

### Saccopharyngoidei

#### Cyematidae — Bobtail snipe eels

##### *Cyema atrum* Günther

*Cyema atrum* Günther, 1878, p. 251, South Pacific and Antarctic oceans, Challenger stations 158 and 295.

*Cyema atrum* Günther, 1878: Fowler (1928), Castle (1978), Miller *et al.* (1979), Loeb (1979), Smith (1989a).

TAXONOMY: Castle (1978), Smith (1989a).

COMMON NAMES: Bobtail snipe eel.

HAWAIIAN RECORDS: Main Hawaiian Islands to the Hancock Seamounts. Miller *et al.* (1979) recorded *Cyema* larvae from unspecified locations in the Hawaiian Islands and Loeb (1979) collected larvae at 28°N, 155°W. *Cyema* larvae have also been collected at the Hancock Seamounts (C. Wilson, unpubl. data).

GENERAL RANGE: Circumglobal in the Atlantic, Indian, and Pacific oceans. Meso- and bathypelagic at 330–3000 m (Smith, 1989a).

##### *Leptocephalus* species 1

Cyematidae sp. 1: Okiyama (1988).

*Leptocephalus holti* non Schmidt, 1909: Olivar & Fortuño (1991, in part).

“*Leptocephalus holti*” type non Schmidt, 1909: Boehlert & Mundy (1992, in part).

*Leptocephalus holti* species 1 non Schmidt, 1909: Smith & Miller (1996).

TAXONOMY: Smith & Miller (1996). Raju (1974) hypothesized that *Leptocephalus holti* are larvae of an undescribed Cyematidae species, a suggestion that has been accepted by others (Okiyama, 1988). It has also been suggested that one of the *L. holti* types lacking lateral melanophores (types 1 and 3) is the larva of *Neocyema erythrosoma* Castle, 1978 (see Smith, 1989a; Smith & Miller, 1996).

HAWAIIAN RECORDS: The Hancock Seamounts at 50–100 m (Boehlert & Mundy, 1992).

GENERAL RANGE: Known from the western North, eastern tropical, and eastern South Atlantic, and from the western and central North Pacific oceans. Larvae are epi- and mesopelagic at 1–356 m (Okiyama, 1988; Olivar & Fortuño, 1991; Boehlert & Mundy, 1992; Smith & Miller, 1996).

##### *Leptocephalus holti* Schmidt

*Leptocephalus holti* Schmidt, 1909, p. 6, Pl. 1 (fig. 7); Fig. 2, eastern North Atlantic at 48°55'N, 12°03'W.

*Leptocephalus holti* Schmidt, 1909: Raju (1974), Smith (1989).

Cyematidae sp. 2: Okiyama (1988).

*Leptocephalus holti* Schmidt, 1909 [species 2]: Smith & Miller (1996).

TAXONOMY: Smith & Miller (1996).

HAWAIIAN RECORDS: The Hancock Seamounts at 0–100 m (Smith & Miller, 1996).

GENERAL RANGE: Known from the western and eastern North Atlantic, and the western North, central North, and central South Pacific oceans. Larvae are epi- and mesopelagic at 1–475 m, with fishing depths to 900 m (Okiyama, 1988; Smith & Miller, 1996).

##### *Leptocephalus* species 3

“*Leptocephalus holti*” type non Schmidt, 1909: Boehlert & Mundy (1992, in part).

*Leptocephalus holti* species 3 non Schmidt, 1909: Smith & Miller (1996).

TAXONOMY: Smith & Miller (1996).

HAWAIIAN RECORDS: The Hancock Seamounts at 50–100 m (Boehlert & Mundy, 1992).

GENERAL RANGE: Known only from four specimens from the western North Atlantic and one from the central North Pacific. Larvae are epi- and mesopelagic at 1–304 m (Smith & Miller, 1996).

**Saccopharyngidae — Swallowers**[*Saccopharynx berteli* Tighe & Nielsen]

*Saccopharynx berteli* Tighe & Nielsen, 2000, p. 39, Fig. 1, east of the Line Islands at 4°01'N, 150°13'W.  
*Saccopharynx berteli* Tighe & Nielsen, 2000: Tighe & Nielsen (2000).

TAXONOMY: Tighe &amp; Nielsen (2000).

HAWAIIAN RECORDS: None. This species is included to alert ichthyologists to the possibility of the occurrence of this family in the region. Saccopharyngids are rare in collections with fewer than 100 specimens known and most species represented by only one or two specimens (Tighe & Nielsen, 2000). The discovery of *S. berteli* in the central North Pacific opens the possibility that it might occur in the Hawaiian region, although it may also be an equatorial species that does not occur here.

GENERAL RANGE: Known only from the holotype collected east of the Line Islands at 4°11'N, 150°13'W. Meso- or bathypelagic, caught at fishing depths of 0–1100 m (Tighe & Nielsen, 2000).

**Eurypharyngidae — Gulpers, Pelican eels**[*Eurypharynx pelecanoioides* Vaillant]

*Eurypharynx pelecanoioides* Vaillant, 1882, p. 1226, off Morocco, 29°52'N, 11°44'W.  
*Gastrostomus pacificus* Bean, 1904: Fowler (1928).  
*Eurypharynx pelecanoioides* Vaillant, 1882: Clarke & Wagner (1976), Loeb (1979), Tinker (1982), Nielsen *et al.* (1989).

TAXONOMY: Nielsen *et al.* (1989).

COMMON NAMES: Gulper eel (FAO), Pelican eel.

HAWAIIAN RECORDS: O'ahu at 425–1300 m (Clarke &amp; Wagner, 1976).

GENERAL RANGE: Circumglobal in the tropical through temperate Atlantic, Indian, and Pacific oceans. Meso- to abyssopelagic at 500–3000 m, perhaps 100–3299 m (Nielsen *et al.*, 1989).

**Monognathidae**[*Monognathus rosenblatti* Bertelsen & Nielsen]

*Monognathus rosenblatti* Bertelsen & Nielsen, 1987, p. 176, Fig. 21, central North Pacific at 31°N, 159°W.  
*Monognathus* sp.: Raju (1974 text).  
*Monognathus isaacsi* non Raju, 1974 [a valid species not recorded from Hawai'i]: Raju (1974, distribution map record near Hawai'i only).  
*Monognathus rosenblatti* Bertelsen & Nielsen, 1987: Bertelsen & Nielsen (1987).

TAXONOMY: Bertelsen &amp; Nielsen (1987).

HAWAIIAN RECORDS: A specimen captured northeast of O'ahu at 23°N, 151°W at 3000 m (Raju, 1974; Bertelsen & Nielsen, 1987) indicates that this species can be expected within the region.

GENERAL RANGE: Central and northeastern Pacific endemic known from southern California to northeast of the Hawaiian Islands and northeast of the Line Islands. Bathy- and hadalpelagic at 2000–5266 m (Bertelsen & Nielsen, 1987).

[*Monognathus smithi* Bertelsen & Nielsen]

*Monognathus smithi* Bertelsen & Nielsen, 1987, p. 183, Fig. 26, central North Pacific at 30°N, 160°W.  
*Monognathus smithi* Bertelsen & Nielsen, 1987: Bertelsen & Nielsen (1987).

TAXONOMY: Bertelsen &amp; Nielsen (1987).

HAWAIIAN RECORDS: Known only from 30°N, 160°W, northeast of the Hawaiian Ridge; this record indicates that *M. smithi* might be expected in Hawai'i (Bertelsen & Nielsen, 1987).

GENERAL RANGE: Central Pacific endemic. Abyssopelagic at 4000–5200 m (Bertelsen & Nielsen, 1987).

**Clupeiformes**  
**Clupeoidei**

**Engraulidae — Anchovies**

[*Anchoa compressa* (Girard)]

*Engraulis compressus* Girard, 1858, p. 336, San Diego, California, U.S.A.

*Anchoa compressa* (Girard, 1858): Brock (1960), Maciolek (1984), Grande (1985), Randall (1987a), Whitehead *et al.* (1988).

TAXONOMY: Grande (1985), Whitehead *et al.* (1988).

COMMON NAMES: Deepbody anchovy (AFS; FAO).

HAWAIIAN RECORDS: This species was introduced from California to Kāneʻohe Bay, Oʻahu, in 1932, but it did not become established (Brock, 1960; Maciolek, 1984; Randall, 1987a).

GENERAL RANGE: Eastern tropical Pacific endemic, from Point Conception, California, to southern Baja California. Epipelagic in coastal waters (Whitehead *et al.*, 1988).

[*Anchoviella mauii* Fowler & Bean]

*Anchoviella mauii* Fowler & Bean, 1923, p. 4, Maui, Hawaiian Islands.

*Anchoviella mauii* Fowler & Bean, 1923: Fowler & Bean (1923), Fowler (1928).

*Engraulis australis* (White, 1790): Fowler (1934), Strasburg (1960), Whitehead *et al.* (1988).

TAXONOMY AND HAWAIIAN RECORDS: Originally described with an erroneous Hawaiian type locality, *Anchoviella mauii* is a junior synonym of *Engraulis australis*, a species endemic to coastal waters of southern Australia and New Zealand (Fowler, 1934a; Whitehead *et al.*, 1988).

***Encrasicholina punctifer* Fowler**

*Encrasicholina punctifer* Fowler, 1938b, p. 157, Pl. 7 (fig. 13), Fare Bay, Huahine Island, Society Islands.

*Encrasicholina punctifera* Fowler, 1938b: Fowler (1949).

*Scutengraulis zollingeri* non (Bleeker, 1849): Fowler (1949).

*Stolephorus buccaneeri* Strasburg, 1960: Strasburg (1960), Randall (1976a), Tinker (1982).

*Encrasicholina punctifer* Fowler, 1938b: Whitehead (1973), Nelson (1983), Wongratana (1983, 1987), Whitehead *et al.* (1988), Myers (1989), Randall (1996a).

TAXONOMY: Whitehead *et al.* (1988). Nelson (1983) placed the Hawaiian anchovies in *Encrasicholina*. Whitehead (1973) synonymized *S. buccaneeri* with *E. punctifer*, confirmed by Wongratana (1983). This species has often been called *Stolephorus zollingeri* in publications from other parts of the world but according to Eschmeyer (1998) that name is a junior synonym of *Engraulis japonicus* Temminck & Schlegel.

COMMON NAMES: Buccaneer anchovy (AFS; FAO; Randall, 1996), Oceanic anchovy (Myers, 1999).

HAWAIIAN RECORDS: Oʻahu to Niʻihau near the surface (Strasburg, 1960).

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to Japan, northern Australia, the Hawaiian Islands, the Line Islands, and the Society Islands. Epipelagic in coastal and oceanic waters. This is the only anchovy found in the open ocean far from land (Whitehead *et al.*, 1988).

***Encrasicholina purpurea* (Fowler)**

*Stolephorus purpureus* Fowler, 1900, p. 497, pl. 14 (fig.1), "Hawaiian Islands".

*Stolephorus purpureus* Fowler, 1900: Fowler (1900), Gosline & Brock (1960), Strasburg (1960), Nakamura (1970), Tinker (1982).

*Anchovia purpurea* (Fowler, 1900): Jenkins (1903), Snyder (1904), Jordan & Evermann (1905).

*Engraulis purpureus* (Fowler, 1900): Fowler (1928).

*Anchoviella purpurea* (Fowler, 1900): Fowler (1934).

*Scutengraulis purpureus* (Fowler, 1900): Fowler (1949).

*Encrasicholina purpurea* (Fowler, 1900): Whitehead *et al.* (1988), Randall (1996a).

TAXONOMY: Whitehead *et al.* (1988).

COMMON NAMES: Nehu (FAO; Randall, 1996a), Hawaiian anchovy (Randall, 1996a).

HAWAIIAN RECORDS: Hawaiʻi Island to Niʻihau (Fowler, 1900; Jordan & Evermann, 1905; Strasburg, 1960; Nakamura, 1970).

GENERAL RANGE: Hawaiian endemic. Epipelagic in estuaries and occasionally coastal areas (Whitehead *et al.*, 1988).

### Clupeidae — Herrings

#### *Dorosoma petenense* (Günther)

*Meletta petenensis* Günther, 1867, p. 603, Lake Petén, Guatemala.

*Dorosoma petenense* (Günther, 1867): Brock (1960), Tinker (1982), Maciolek (1984), Whitehead (1985), Randall (1987a), Devick (1991), Fuller *et al.* (1999), Yamamoto & Tagawa (2000).

TAXONOMY: Whitehead (1985).

COMMON NAMES: Threadfin shad (AFS; FAO).

HAWAIIAN RECORDS: Hawai'i Island to Kaua'i, persisting in the Wahiawā Reservoir (Lake Wilson) on O'ahu.

Introduced in 1958 from California (Brock, 1960) to freshwater reservoirs and streams (Maciolek, 1984; Devick, 1991; Fuller *et al.*, 1999; Yamamoto & Tagawa, 2000).

GENERAL RANGE: Gulf of Mexico drainage basins from Belize to western Florida, northward through the Mississippi and Ohio drainages; widely introduced throughout the United States. Pelagic in shallow brackish- and freshwaters (Whitehead, 1985; Fuller *et al.*, 1999).

#### [*Dussumieria* sp.]

*Dussumieria* species: Springer (1982).

*Dussumieria acuta* Valenciennes in Cuvier & Valenciennes, 1847, and *Dussumieria elopsoides* Bleeker, 1849: Whitehead (1985).

TAXONOMY: Whitehead (1985).

COMMON NAMES: Rainbow sardines (AFS; FAO).

HAWAIIAN RECORDS: Springer (1982) stated that *Dussumieria* sp. were reported from Hawai'i, but that these reports are doubtful. Whitehead (1985) did not record either recognized species from the region, but it must be noted that he also failed to record *Spratelloides delicatulus* from the islands, indicating that his geographic records were not complete for this region.

GENERAL RANGE: Indo-west-Pacific. *Dussumieria acuta* occurs from the Persian Gulf to Indonesia and the Philippines. *Dussumieria elopsoides*, if distinct, occurs from Mombassa and the Red Sea to Taiwan, northern Australia, and the Solomon Islands. Both are pelagic in coastal waters (Whitehead, 1985). Larvae of *Dussumieria*, not identifiable to species, have been collected in the lagoon of Palmyra Atoll in the Line Islands (B. Mundy, unpubl. data).

#### *Etrumeus teres* (DeKay)

*Alosa teres* DeKay, 1842, p. 262, Pl. 40 (fig. 128), New York harbor, New York, U.S.A.

*Etrumeus micropus* (Temminck & Schlegel, 1846): Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1949), Gosline & Brock (1960), Struhsaker (1973a), Tinker (1982).

*Etrumeus teres* (DeKay, 1842): Springer (1982), Whitehead (1985), Randall (1996a).

TAXONOMY: Whitehead (1985). The taxonomic status of *E. teres* and *E. micropus* is being re-evaluated (J.E. Randall, pers. comm., June 2003, Mar. 2005).

COMMON NAMES: Makiawa (Gosline & Brock, 1960), Round herring (AFS), Red-eye round herring (FAO; Randall, 1996a), Sardine (DLNR).

HAWAIIAN RECORDS: Maui to Lisianski at 1–<220 m (Jordan & Evermann, 1905; Fowler, 1928; Struhsaker, 1973a).

GENERAL RANGE: Tropical and subtropical in isolated areas from the Gulf of Mexico, the western North Atlantic, South Africa and Red Sea (Lessepsian immigrant into Mediterranean) to southern Australia, Japan, the Hawaiian Islands, and the eastern Pacific from southern California, to the Galapagos Islands and Peru. Epipelagic in coastal waters (Whitehead, 1985).

#### *Herklotsichthys quadrimaculatus* (Rüppell)

*Clupea quadrimaculata* Rüppell, 1837, p. 78, Pl. 21 (fig. 3), Bay of Massawa, Eritrea, Red Sea.

*Herklotsichthys quadrimaculatus* (Rüppell, 1837): Williams & Clarke (1983), Baldwin (1984), Maciolek (1984 addendum), Wass (1984), Whitehead (1985), Randall (1987a), Myers (1989), Randall (1996a), Randall *et al.* (1997a).

**TAXONOMY:** Pacific records of *H. punctata* (Rüppell, 1837), a valid Red Sea endemic species, refer to *H. quadrimaculatus*. Much of the literature on *H. quadrimaculatus* uses that incorrect identification (Wass, 1984; Whitehead, 1985).

**COMMON NAMES:** Goldspot herring (AFS), Bluestripe herring (FAO), Goldspot sardine (Randall, 1996a), Fourspot herring (Randall *et al.*, 1997a).

**HAWAIIAN RECORDS:** Lānaʻi to Oʻahu at 1–13 m. *Herklotsichthys quadrimaculatus* was probably introduced to the Hawaiian Islands accidentally in 1972 by transport from the Marshall Islands in a fishing boat's baitwell (Williams & Clarke, 1983; Baldwin, 1984).

**GENERAL RANGE:** Indo-Pacific from South Africa and the Red Sea to southern Japan and the Ogasawara Islands, northern Australia, and Samoa. Pelagic in coastal waters at 1–13 m (Whitehead, 1985; Randall *et al.*, 1997b).

### ***Sardinella marquesensis* Berry & Whitehead**

*Sardinella marquesensis* Berry & Whitehead, 1968, p. 209, Figs. 1–6, Taiohae Bay, Nuku Hiva, Marquesas Islands. *Harengula vittata* non (Valenciennes in Cuvier & Valenciennes, 1847) [a junior synonym of *Sardinella melanura* (Cuvier, 1829), a valid species not found in the Hawaiian Islands]: Brock (1960).

*Sardinella marquesensis* Berry & Whitehead, 1968: Tinker (1982), Williams & Clarke (1983), Baldwin (1984), Maciolek (1984), Whitehead (1985), Randall (1987a, 1996a).

**TAXONOMY:** Whitehead (1985). Identified in the Hawaiian Islands as *Harengula vittata* prior to 1968 (Tinker, 1982).

**COMMON NAMES:** Marquesan sardine (AFS; Randall, 1996a), Marquesan sardinella (FAO).

**HAWAIIAN RECORDS:** Maui to Kauaʻi in shallow coastal waters (Baldwin, 1984; Randall, 1987a). Introduced to the Hawaiian Islands in 1955 from the Marquesas (Brock, 1960). Although established in the islands prior to *Herklotsichthys quadrimaculatus*, the latter species has become more abundant than *S. marquesensis* in the Hawaiian Islands (Williams & Clarke, 1983; Randall, 1987a).

**GENERAL RANGE:** Marquesan endemic. Pelagic in shallow coastal waters (Whitehead, 1985).

### ***Spratelloides delicatulus* (Bennett)**

*Clupea delicatula* Bennett, 1832, p. 168, Mauritius.

*Stolephorus delicatulus* (Bennett, 1831): Fowler (1928).

*Spratelloides delicatulus* (Bennett, 1831): Gosline & Brock (1960), Tinker (1982), Okamoto & Kanenaka (1984), Whitehead (1985), Myers (1989), Randall *et al.* (1993b), Randall (1996a).

**TAXONOMY:** Whitehead (1985).

**COMMON NAMES:** Pihā (Randall, 1996), Blue sprat (AFS), Delicate round herring (FAO; Randall, 1996a), Blue-backed sprat (Randall *et al.*, 1997a), Small round herring (DLNR).

**HAWAIIAN RECORDS:** Oʻahu to Kure at surface (Fowler, 1928; Okamoto & Kanenaka, 1984; Randall *et al.*, 1993b).

**GENERAL RANGE:** Indo-Pacific from South Africa and Red Sea to southern Japan, northern Australia, Micronesia, the Hawaiian Islands, and the Society Islands. Pelagic in shallow, coastal waters (Gosline & Brock, 1960; Whitehead, 1985; Myers, 1989).

## **Gonorynchiformes**

### **Chanoidei**

#### **Chanidae — Milkfishes**

### ***Chanos chanos* (Forsskål)**

*Mugil chanos* Forsskål, 1775, p. 74, Jidda, Saudi Arabia, Red Sea.

*Chanos cyprinella* Valenciennes in Cuvier & Valenciennes, 1847: Valenciennes in Cuvier & Valenciennes (1847), Eydoux & Souleyet (1850).

*Chanos salmoneus* Forster in Bloch & Schneider, 1801: Günther (1880).

*Chanos chanos* (Forsskål, 1775): Steindachner (1900), Jenkins (1903), Jordan & Snyder (1904b), Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Tinker (1982), Springer (1982), Winans (1985), Hoover (1993, 2003), Bagarinao (1994), Allen & Robertson (1994), Randall (1996a).

TAXONOMY: Bagarinao (1994).

COMMON NAMES: Awa (Hoover, 1993, 2003; Randall, 1996a), Awa kalamoku, Puawa, Milkfish (AFS; FAO; Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Hawai'i Island to at least O'ahu at 1–20 m (Valenciennes *in* Cuvier & Valenciennes, 1847; Eydoux & Souleyet, 1850; Jordan & Evermann, 1905; Fowler, 1928, 1949).

GENERAL RANGE: Indo-transPacific from South Africa and the Red Sea to Indonesia, southern Japan, Australia, the Hawaiian Islands, the Society Islands, and the eastern Pacific from southern California to the Galapagos and Peru. Benthopelagic in coastal and estuarine areas at 1–20 m (Gosline & Brock, 1960; Springer, 1982; Winans, 1985; Bagarinao, 1994; Allen & Robertson, 1994).

### Gonorynchoidei

#### Gonorynchidae — Beaked salmon

##### *Gonorynchus moseleyi* Jordan & Snyder

*Gonorynchus moseleyi* Jordan & Snyder, 1923, p. 347, Fig. 1, Honolulu, O'ahu, Hawaiian Islands.

*Gonorynchus gonorynchus* (Linnaeus, 1766) [a valid species not found in the Hawaiian Islands]: Fowler (1928), Gosline & Brock (1960), Borets & Sokolovsky (1978), Novikov *et al.* (1981), Tinker (1982).

*Gonorynchus* sp.: Struhsaker (1973a).

*Gonorynchus moseleyi* Jordan & Snyder, 1923: Jordan & Snyder (1923), Grande (1999).

TAXONOMY: Grande (1999).

COMMON NAMES: Beaked salmon (AFS), Beaked sandfish (FAO).

HAWAIIAN RECORDS: Grande (1999) gave the range as “widespread in the waters of the Hawaiian Islands,” showing locations of capture from Hawai'i Island to Kure. Precise locality records exist from Maui to O'ahu at 110–183 m, with occasional captures of juveniles near the sea surface (Jordan & Snyder, 1923; Gosline & Brock, 1960; Struhsaker, 1973a). *Gonorynchus* specimens from the Koko Seamount (Novikov *et al.*, 1981) need to be reidentified using the new key and information in Grande (1999).

GENERAL RANGE: Hawaiian endemic. Benthic and burrowing in sand, sometimes pelagic, at shallow depths to 183 m (Gosline & Brock, 1960; Struhsaker, 1973a).

### Cypriniformes

#### Cyprinidae — Carps or Minnows

##### *Carassius auratus* (Linnaeus)

*Cyprinus auratus* Linnaeus, 1758, p. 322, Habitat in Chinae, Japoniae fluviiis.

*Cyprinus aureata* Linnaeus, 1758 [a *lapsus* in spelling for the species name]: Wetmore (1890).

*Carassius auratus* (Linnaeus, 1758): Jordan & Evermann (1905), Fowler (1931), Brock (1960), Scott & Crossman (1973), Maciolek (1984), Robins *et al.* (1991a), Devick (1991), Fuller *et al.* (1999), Yamamoto & Tagawa (2000).

TAXONOMY: Robins *et al.* (1991a), Fuller *et al.* (1999).

COMMON NAMES: Goldfish (AFS), Funa (Yamamoto & Tagawa, 2000), I'a'ula'ula (Yamamoto & Tagawa, 2000).

HAWAIIAN RECORDS: Hawai'i Island to Kaua'i in reservoirs and other still or slow-moving freshwaters. Introduced prior to 1890, perhaps from China, with continual introductions from various sources thereafter. Not as widespread as in the past and currently found in Nu'uuanu Reservoir, O'ahu, and in old plantation ponds and reservoirs (Wetmore, 1890; Brock, 1960; Maciolek, 1984; Devick, 1991; Fuller *et al.*, 1999; Yamamoto & Tagawa, 2000).

GENERAL RANGE: Native to eastern Asia, cultivated in China. Introduced worldwide in temperate and subtropical regions, including all of the United States except Alaska. Benthopelagic in shallow lakes, ponds and rivers (Scott & Crossman, 1973; Fuller *et al.*, 1999).



[*Ctenopharyngodon idella* (Valenciennes)]

*Leuciscus idella* Valenciennes in Cuvier & Valenciennes, 1844, p. 362, China.

*Ctenopharyngodon idella* (Valenciennes in Cuvier & Valenciennes, 1844): Guillory in Lee *et al.* (1980), Maciolek (1984), Kottelat (1989), Robins *et al.* (1991a), Fuller *et al.* (1999).

TAXONOMY: Kottelat (1989), Robins *et al.* (1991a), Fuller *et al.* (1999).

COMMON NAMES: Grass carp (AFS).

HAWAIIAN RECORDS: This freshwater species was introduced to Hawai'i Island, probably in 1968, but failed to become established (Maciolek, 1984; Fuller *et al.*, 1999).

GENERAL RANGE: Pacific drainages of Asia from Siberia to Thailand. Introduced worldwide in temperate and subtropical regions. Benthopelagic in large freshwater rivers (Guillory in Lee *et al.*, 1980; Fuller *et al.*, 1999).

***Cyprinus carpio* Linnaeus**

*Cyprinus carpio* Linnaeus, 1758, p. 320, Habitat in Europa.

*Cyprinus carpio* Linnaeus, 1758: Jordan & Evermann (1905, p. 527), Brock (1960), Scott & Crossman (1973), Allen in Lee *et al.* (1980), Maciolek (1984), Robins *et al.* (1991a), Devick (1991), Fuller *et al.* (1999), Yamamoto & Tagawa (2000).

TAXONOMY: Robins *et al.* (1991a), Fuller *et al.* (1999).

COMMON NAMES: Common carp (AFS), Carp (DLNR), Koi, Nishigoi.

HAWAIIAN RECORDS: Hawai'i Island to Kaua'i in reservoirs and other still or slow-moving freshwaters. Introduced prior to 1900 (Brock, 1960; Maciolek, 1984; Devick, 1991; Yamamoto & Tagawa, 2000).

GENERAL RANGE: Native to temperate Eurasia, original range uncertain because of ancient introductions. Introduced worldwide in temperate and subtropical regions. Benthopelagic in shallow freshwaters except those with strong currents (Scott & Crossman, 1973; Allen in Lee *et al.*, 1980; Fuller *et al.*, 1999).

[*Puntius filamentosus* (Valenciennes)]

*Leuciscus filamentosus* Valenciennes in Cuvier & Valenciennes, 1844, p. 96, Pl. 492, Alypey, Syria [?].

*Puntius filamentosus* (Valenciennes in Cuvier & Valenciennes, 1844): Menon (1967), Riehl & Baensch (1987), Devick (1991), Fuller *et al.* (1999), Yamamoto & Tagawa (2000).

TAXONOMY: Menon (1967). The generic allocation is unsettled; this species is sometimes referred to as *Barbus filamentosus*, probably incorrectly (Fuller *et al.*, 1999).

COMMON NAMES: Blackspot barb (AFS), Featherfin barb.

HAWAIIAN RECORDS: Introduced to freshwater reservoirs of O'ahu in 1984. A population became established in the Nu'uuanu Reservoir but disappeared in the drought of 1984 when the reservoir dried (Devick, 1991; Fuller *et al.*, 1999; Yamamoto & Tagawa, 2000).

GENERAL RANGE: Sri Lanka, eastern and southern India, Burma, and perhaps Thailand. Benthopelagic in mountain streams (Menon, 1967; Riehl & Baensch, 1987; Fuller *et al.*, 1999).

[*Puntius semifasciolatus* (Günther)]

*Barbus semifasciolatus* Günther, 1868a, p. 484, "China" [replacement name for *Barbus fasciolatus* Günther, 1868, p. 140 of the same reference, which was preoccupied by *B. fasciolatus* Günther, 1868, p. 108 of the same reference, again].

*Barbus semifasciolatus* Günther, 1868a: Brock (1960), Maciolek (1984), Devick (1991).

*Puntius semifasciolatus* (Günther, 1868a): Riehl & Baensch (1987), Kottelat (1989), Fuller *et al.* (1999), Yamamoto & Tagawa (2000).

TAXONOMY: Kottelat (1989). The generic allocation of this species is uncertain. Fuller *et al.* (1999) noted that the identification of this species in the Hawaiian Islands is unconfirmed because museum voucher-specimens do not exist.

COMMON NAMES: Green barb (AFS), Gold barb, Schubert's barb.

HAWAIIAN RECORDS: O'ahu, introduced in 1940 to freshwater reservoirs. A population became established in the Nu'uuanu Reservoir but disappeared in the drought of 1984 when the reservoir dried (Brock, 1960; Maciolek, 1984; Devick, 1991; Fuller *et al.*, 1999; Yamamoto & Tagawa, 2000).

GENERAL RANGE: Southeast Asia from Hong Kong through coastal drainages of Vietnam. Benthopelagic in shallow freshwaters (Riehl & Baensch, 1987; Kottelat, 1989).

**Cobitidae — Loaches*****Misgurnus anguillicaudatus* (Cantor)**

*Cobitis anguillicaudata* Cantor, 1842, p. 485, Chusan Island, China.

*Misgurnus anguillicaudatus* (Cantor, 1842): Fowler (1931), Brock (1960), Hensley & Courtenay in Lee *et al.* (1980), Sawada (1982), Maciolek (1984), Kottelat (1989), Robins *et al.* (1991a), Devick (1991), Fuller *et al.* (1999), Englund *et al.* (2000a), Yamamoto & Tagawa (2000).

TAXONOMY: Sawada (1982), Kottelat (1989), Robins *et al.* (1991a), Fuller *et al.* (1999).

COMMON NAMES: Oriental weatherfish (AFS), Dojo, Weather loach (Yamamoto & Tagawa, 2000).

HAWAIIAN RECORDS: Hawai'i Island to Kaua'i. Introduced prior to 1900 into the lower reaches of freshwater streams. Populations persist on Hawai'i Island, Maui, O'ahu, and Kaua'i (Brock, 1960; Maciolek, 1984; Devick, 1991; Fuller *et al.*, 1999; Englund, 2000a; Yamamoto & Tagawa, 2000).

GENERAL RANGE: Native to East Asia, northern China to Hong Kong and southern Vietnam; original distribution uncertain because of ancient introductions. Introduced to scattered localities elsewhere in the world. Benthic, burrowing in mud bottoms of shallow, still and slowly flowing freshwaters (Hensley & Courtenay in Lee *et al.*, 1980; Kottelat, 1989; Fuller *et al.*, 1999).

**Characiformes****Anostomidae — Headstanders****[*Leporinus fasciatus* (Bloch)]**

*Salmo fasciatus* Bloch, 1794, p. 96, Pl. 379, Suriname.

*Leporinus fasciatus* (Bloch, 1794): Géry (1977), Riehl & Baensch (1987), Robins *et al.* (1991a), Devick (1991), Fuller *et al.* (1999).

TAXONOMY: Robins *et al.* (1991a). The taxonomy of this genus, possibly including that of the species brought to the Hawaiian Islands, is confused (Géry, 1977; Fuller *et al.*, 1999).

COMMON NAMES: Banded leporinus (AFS).

HAWAIIAN RECORDS: Released aquarium specimens were found in reservoirs of O'ahu in 1984. It is not known if populations became established (Devick, 1991; Fuller *et al.*, 1999) but the absence of recent reports of *Leporinus* (i.e., Yamamoto & Tagawa, 2000) suggests that *Leporinus* are no longer extant in the state.

GENERAL RANGE: South America from Venezuela and the Guianas through the Amazon basin. Benthopelagic in shallow freshwaters (Géry, 1977; Riehl & Baensch, 1987; Fuller *et al.*, 1999).

**Characidae — Characins****[*Colossoma macropomum* (Cuvier)]**

*Myletes macropomus* Cuvier, 1816, p. 185, Pl. 10 (fig. 1), "Brazil".

*Colossoma* species: Lindgard (2000).

*Colossoma macropomum* (Cuvier, 1816): Géry (1977), Robins *et al.* (1991a), Devick (1991), Fuller *et al.* (1999).

TAXONOMY: Géry (1977), Robins *et al.* (1991a), Fuller *et al.* (1999).

COMMON NAMES: Tambaqui (AFS), Blackfin pacu.

HAWAIIAN RECORDS: Released aquarium specimens were found in reservoirs of O'ahu in 1987 and 1989, in Kailua Canal, O'ahu in 2000, and a pool at the University of Hawai'i at Mānoa campus in 2004 (Devick, 1991; Lindgard, 2000; R. Nishimoto, pers. comm., Feb. 2004). They do not appear to have become established (Fuller *et al.*, 1999).

GENERAL RANGE: South America throughout the Amazon and Orinoco basins. Benthopelagic in freshwaters (Géry, 1977; Fuller *et al.*, 1999).

**[*Pygocentrus nattereri* Kner]**

*Pygocentrus nattereri* Kner, 1858, p. 166, Cuiabá and Mato Grosso, Brazil.

*Serrasalmus* sp.: Devick (1991).

*Pygocentrus nattereri*: Fink (1993), Radtke (1995), Fuller *et al.* (1999).

TAXONOMY: Fink (1993), Fuller *et al.* (1999).

COMMON NAMES: Red piranha (AFS), Black piranha.

HAWAIIAN RECORDS: Released aquarium specimens were collected from reservoirs and canals of O‘ahu in 1991–1993. Piranha are probably not established (Devick, 1991; Radtke, 1995; Fuller *et al.*, 1999).

GENERAL RANGE: Throughout central and southern South America. Benthopelagic in shallow, still and slow-moving freshwaters (Fink, 1993).

## Siluriformes

### Ictaluridae — Bullhead catfishes, North American freshwater catfishes

#### [*Ameiurus nebulosus* (Lesueur)]

*Pimelodus nebulosus* Lesueur, 1819, p. 149, Delaware River, Philadelphia, Pennsylvania, U.S.A.

*Ictalurus nebulosus* (Lesueur, 1819): Brock (1960), Maciolek (1984), Glodek *in Lee et al.* (1980).

*Ameiurus nebulosus* (Lesueur, 1819): Jordan & Evermann (1905), Robins *et al.* (1991a), Fuller *et al.* (1999).

TAXONOMY: Robins *et al.* (1991a), Fuller *et al.* (1999).

COMMON NAMES: Brown bullhead (AFS).

HAWAIIAN RECORDS: This freshwater species was introduced to Hawai‘i Island and O‘ahu in 1893 but failed to become established (Brock, 1960; Maciolek, 1984; Fuller *et al.*, 1999).

GENERAL RANGE: Indigenous to North America east of the Rocky Mountains from southern Canada to Texas. Widely introduced elsewhere. Benthopelagic in shallow still or slow-moving freshwaters (Glodek *in Lee et al.*, 1980; Fuller *et al.*, 1999).

#### *Ictalurus punctatus* (Rafinesque)

*Silurus punctatus* Rafinesque, 1818, p. 355, Ohio River, U.S.A.

*Ictalurus punctatus* Rafinesque, 1818: Brock (1960), Glodek *in Lee et al.* (1980), Maciolek (1984), Robins *et al.* (1991a), Devick (1991), Fuller *et al.* (1999), Yamamoto & Tagawa (2000).

TAXONOMY: Robins *et al.* (1991a), Fuller *et al.* (1999).

COMMON NAMES: Channel catfish (AFS).

HAWAIIAN RECORDS: Maui to Kaua‘i in freshwater reservoirs and occasionally in streams that drain them. Originally introduced to Hawai‘i Island, Maui, O‘ahu, and Kaua‘i in 1953. Now most abundant in Wahiawā, Ho‘omahulia, and Nu‘uanu Reservoirs on O‘ahu which are among the few appropriate habitats in the state that have water temperatures low enough to support successful reproduction of channel catfish (Brock, 1960; Maciolek, 1984; Devick, 1991; Yamamoto & Tagawa, 2000).

GENERAL RANGE: Indigenous to North America east of the Rocky Mountains from southern Canada through northeastern Mexico. Introduced elsewhere. Benthopelagic in shallow still to swiftly-flowing freshwaters (Glodek *in Lee et al.*, 1980; Fuller *et al.*, 1999).

### Clariidae — Labyrinth catfishes, Airbreathing catfishes

#### *Clarias fuscus* (Lacépède)

*Macropteronotus fuscus* Lacépède, 1803, p. 84, 88, Pl. 2 (fig. 2), “China”.

*Clarias magur* non (Hamilton, 1822) [perhaps a junior synonym of *C. batrachus* (Linnaeus), a valid species not found in the Hawaiian Islands; see Fuller *et al.* 1999 and Eschmeyer 1998]: Jordan & Evermann (1905, p. 527).

*Clarias fuscus* (Lacépède, 1803): Jordan & Evermann (1905), Brock (1960), Maciolek (1984), Burgess (1989), Devick (1991), Fuller *et al.* (1999), Yamamoto & Tagawa (2000), Englund & Eldredge (2001).

TAXONOMY: Burgess (1989), Fuller *et al.* (1999).

COMMON NAMES: Whitespotted clarias (AFS), Chinese catfish (DLNR), Puntat, ‘O‘opu kui (the last three from Yamamoto & Tagawa, 2000).

HAWAIIAN RECORDS: Hawai‘i Island to Kaua‘i. Introduced prior to 1900, established in freshwater streams, ditches, and taro patches (Brock, 1960; Maciolek, 1984; Devick, 1991; Fuller *et al.*, 1999; Yamamoto & Tagawa, 2000; Englund & Eldredge, 2001).

GENERAL RANGE: Indigenous to China and perhaps Taiwan and Ishigakijima Island, Japan. Widely introduced in many tropical and subtropical regions. Benthic in shallow, still freshwaters (Burgess, 1989; Fuller *et al.*, 1999).

[*Clarias* sp.]

“... a second species of *Clarias* ...”: Yamamoto & Tagawa (2000).

TAXONOMY: The occurrence of a second *Clarias* species in the Hawaiian Islands needs verification (Yamamoto & Tagawa, 2000).

HAWAIIAN RECORDS: Specimens of *Clarias* morphologically distinct from *C. fuscus* were collected in Kahawai stream, Waimānalo, O‘ahu in the late 20th century. It is not known if this is a species distinct from *C. fuscus* and, if so, if it is established (Yamamoto & Tagawa, 2000).

GENERAL RANGE: Unknown because of the lack of an identification for this species (Yamamoto & Tagawa, 2000).

### Ariidae — Sea catfishes

[*Arius dasycephalus* Günther]

*Arius dasycephalus* Günther, 1864d, p. 157, Fig., O‘ahu, Sandwich Islands [an erroneous type locality].

*Arius dasycephalus* Günther, 1864d: Allen & Robertson (1994).

*Arius tachycephalus* [a *lapsus* in spelling for *A. dasycephalus* Günther, 1864d]: Springer (1982).

TAXONOMY: Allen & Robertson (1994). Springer’s (1982) reference to *Arius tachycephalus* is clearly a spelling error, intended to refer to *A. dasycephalus*.

COMMON NAMES: Broadhead catfish (Allen & Robertson, 1994).

HAWAIIAN RECORDS: Günther (1864d) gave the Hawaiian Islands as the type locality in his description of *A. dasycephalus*. This locality was an error; the species does not occur in the Archipelago (Springer, 1982). Günther (1864) described this species from “the Haslar collection” which had several eastern tropical Pacific specimens with erroneous collection records from “the Sandwich Islands” (e.g., *Fodiator acutus rostratus*, *Chaetodon humeralis*, *Hypsoblennius sordidus*).

GENERAL RANGE: Eastern Pacific endemic known from Costa Rica and Panama. Engybenthic in shallow coastal and estuarine areas (Allen & Robertson, 1994).

### Mochokidae — Squeakers, Upsidedown catfishes

[*Synodontis* sp.]

*Synodontis* sp.: Burgess (1989), Devick (1991).

TAXONOMY: Burgess (1989).

COMMON NAMES: Squeaker (AFS), Upsidedown catfish.

HAWAIIAN RECORDS: There are unconfirmed reports of this genus from freshwaters of O‘ahu (Devick, 1991). These were not included in Fuller *et al.*’s (1999) review of introduced freshwater fishes in United States’ waters.

GENERAL RANGE: This genus is found throughout sub-Saharan Africa and the Nile drainage in all freshwater habitats. Benthic or engybenthic (Burgess, 1989).

### Callichthyidae — Plated catfishes, Armored catfishes

[*Corydoras aeneus* (Gill)]

*Hoplosoma aeneum* Gill, 1858, p. 403, Trinidad Island, West Indies.

*Corydoras aeneus* (Gill, 1858): Burgess (1989), Devick (1991), Fuller *et al.* (1999), Yamamoto & Tagawa (2000).

TAXONOMY: Burgess (1989), Fuller *et al.* (1999). *Corydora aeneus* is part of a species complex whose taxonomic composition and biogeography are unresolved (Fuller *et al.*, 1999).

COMMON NAMES: Bronze corydoras (AFS), Cory (Yamamoto & Tagawa, 2000).

HAWAIIAN RECORDS: Aquarium specimens were released into streams of O‘ahu and Kaua‘i in 1984. This species is established in Waihe‘e, Maunawili, and He‘eia streams on O‘ahu and in the Wailua River on Kaua‘i (Devick, 1991; Yamamoto & Tagawa, 2000).

GENERAL RANGE: Trinidad, perhaps in South America throughout the Amazon and Orinoco basins. Benthic in shallow, still to slow-moving freshwaters (Burgess, 1989).

**Loricariidae — Suckermouth catfishes*****Ancistrus* cf. *temminckii*** (Valenciennes)

*Hypostomus temminckii* Valenciennes in Cuvier & Valenciennes, 1840b, p. 514, Suriname.

*Ancistrus* species: Devick (1991, in part), Fuller *et al.* (1999, in part).

*Ancistrus* cf. *temmincki* (Valenciennes in Cuvier & Valenciennes, 1840b): Sabaj & Englund (1999), Englund *et al.* (2000a, 2000b), Yamamoto & Tagawa (2000).

*Ancistrus temminckii* (Valenciennes in Cuvier & Valenciennes, 1840b): Englund & Eldredge (2001).

TAXONOMY: Burgess (1989), Sabaj & Englund (1999).

COMMON NAMES: Bristlemouth catfish, Bristlenose/bearded catfish (Yamamoto & Tagawa, 2000).

HAWAIIAN RECORDS: O‘ahu in freshwater streams and reservoirs. Introductions were discovered in 1984 and the species is now a dominant organism in the lower reaches of many of O‘ahu’s streams (Devick, 1991; Sabaj & Englund, 1999; Englund *et al.*, 2000a, b; Yamamoto & Tagawa, 2000; Englund & Eldredge, 2001).

GENERAL RANGE: Guyana, Suriname, Brazil, and perhaps Peru. Benthic in shallow freshwater streams (Burgess, 1989; Sabaj & Englund, 1999).

***Hypostomus watwata*** Hancock, species group

*Hypostomus watwata* Hancock, 1828, p. 246, off Berbice River, Guyana.

*Hypostomus* species: Devick (1991, in part), Fuller *et al.* (1999, in part).

*Hypostomus* cf. *watwata* Hancock, 1828: Yamamoto & Tagawa (2000).

*Hypostomus watwata* Hancock, 1828 [group]: Sabaj & Englund (1999), Englund *et al.* (2000a, 2000b).

TAXONOMY: Sabaj & Englund (1999) discussed the taxonomy of this species, stating that a definitive identification is not possible with the poor existing taxonomic knowledge of *Hypostomus*. Fuller *et al.* (1999) noted that a recent systematic review of the family concluded that “... it is currently impossible to identify most species in the genus.”

COMMON NAMES: Suckermouth catfish (AFS), Armored catfish, Plecostomus (all from Yamamoto & Tagawa, 2000).

HAWAIIAN RECORDS: O‘ahu in freshwater streams and reservoirs. Recently discovered in Kanahā pond on Maui, as well. Introduced by aquarium releases in 1984–1987, this species has become one of the dominant species in the lower reaches of O‘ahu’s streams (Devick, 1991; Fuller *et al.*, 1999; Sabaj & Englund, 1999; Englund *et al.*, 2000a, b; Yamamoto & Tagawa, 2000).

GENERAL RANGE: Uncertain but at least in Guyana and Suriname. Benthic in freshwater streams and rivers (Sabaj & Englund, 1999).

**[*Peckoltia* sp.]**

*Ancistrus* species: Devick (1991, in part), Fuller *et al.* (1999, in part).

*Peckoltia* species: Isbrücker (1980), Burgess (1989), Devick (1991), Fuller *et al.* (1999).

TAXONOMY: Isbrücker (1980), Burgess (1989). Fuller *et al.* (1999) noted that the species identified as *Peckoltia* that was introduced to the Hawaiian Islands might also be *Panaque* species and that *Panaque maccus* Schaefer & Stewart, 1993, is also sold under the name “clown pleco”. The second “*Ancistrus*” species from O‘ahu mentioned by Devick (1991) and Fuller *et al.* (1999) was based on a misidentified specimen of a *Peckoltia* species thought to have been *P. vittata* (Steindachner, 1881) collected in a pool of a stream draining Wahiawā Reservoir on O‘ahu (M. Yamamoto, pers. comm., Jan. 2001).

COMMON NAMES: Clown pleco.

HAWAIIAN RECORDS: Specimens, presumably aquarium releases, were collected in freshwater streams on O‘ahu during 1984–87, 1989, 1990, and 1991 but specimens were not retained for a definitive identification. It is not known if this species (or these species if more than one is involved) became established but they have not been found in recent collection efforts (Devick, 1991; Fuller *et al.*, 1999; Englund *et al.*, 2000a, b).

GENERAL RANGE: Colombia, Venezuela, Brazil, and Amazonian Peru. Benthic in crevices or holes in shallow, flowing freshwaters (Burgess, 1989).

***Pterygoplichthys multiradiatus*** (Hancock)

*Hypostomus multiradiatus* Hancock, 1828, p. 246, Demerara, Guyana [probably near Santa Catalina in the Orinoco River system].

*Hypostomus* species: Devick (1991, in part), Fuller *et al.* (1999, in part).

*Liposarcus multiradiatus* (Hancock, 1828): Page (1994), Yamamoto & Tagawa (2000).

*Pterygoplichthys multiradiatus* (Hancock, 1828): Isbrücker (1980), Riehl & Baensch (1987), Burgess (1989), Devick (1991), Fuller *et al.* (1999), Sabaj & Englund (1999).

TAXONOMY: Isbrücker (1980), Burgess (1989), Fuller *et al.* (1999).

COMMON NAMES: Sailfin catfish (AFS), Long-fin armored catfish (Yamamoto & Tagawa, 2000).

HAWAIIAN RECORDS: O'ahu in freshwater streams, ditches, and reservoirs. Aquarium specimens were released by 1986 and possibly as early as 1982. Devick (1991) stated that aquarium specimens of at least two *Hypostomus* species were released into freshwater reservoirs in 1984 and have become established. One of the "*Hypostomus*" species mentioned by Devick (1991) was based on misidentified specimens of *P. multiradiatus* (M. Yamamoto, pers. comm., Jan. 2001). *Pterygoplichthys multiradiatus* became abundant in reservoir habitats of O'ahu and is now a pest species there (Devick, 1991; Fuller *et al.*, 1999; Sabaj & Englund, 1999; Yamamoto & Tagawa, 2000).

GENERAL RANGE: White water rivers of the Amazon and Orinoco basins. Introduced to Florida and the Hawaiian Islands. Benthic in crevices in shallow, still or slowly moving freshwaters (Riehl & Baensch, 1987; Burgess, 1989; Page, 1993; Fuller *et al.*, 1999).

**Osmeriformes****Argentinoidei****Argentinidae — Argentines, Herring smelts**

[*Argentina* sp.]

*Argentina striata* non Goode & Bean, 1896: Cohen & Atsoides (1969), Uchida & Uchiyama (1986).

TAXONOMY: Cohen & Atsoides (1969).

COMMON NAMES: Argentine (AFS).

HAWAIIAN RECORDS AND GENERAL RANGE: Necker at 430–494 m (Uchida & Uchiyama, 1986)? This record is puzzling, since *A. striata* is otherwise known only from the western Atlantic (Cohen & Atsoides, 1969). It is probable that these were specimens of the Pacific species *A. australiae* Cohen, *A. elongata* Hutton, *A. kagoshimae* Jordan & Snyder, an undescribed species, or misidentified specimens from another genus or family. *Argentina* species are otherwise unknown from the central Pacific.

***Glossanodon struhsakeri*** Cohen

*Glossanodon struhsakeri* Cohen, 1970, p. 377, Fig. 1, between Maui and Moloka'i, Hawai'i.

*Glossanodon* sp.: Clarke (1972).

*Glossanodon struhsakeri* Cohen, 1970: Cohen (1970), Struhsaker (1973a), Randall (1976a), Tinker (1982), Ahlstrom *et al.* (1984a), Humphreys *et al.* (1984), Uchida & Uchiyama (1986), Reid *et al.* (1991), Kobylansky (1998).

TAXONOMY: Cohen (1970), Ahlstrom *et al.* (1984a), Kobylansky (1998).

HAWAIIAN RECORDS: Hawai'i Island to the Hancock Seamounts at 185–373 m (Cohen, 1970; Struhsaker, 1973a; Humphreys *et al.*, 1984; Uchida & Uchiyama, 1986).

GENERAL RANGE: Hawaiian endemic. Benthopelagic at 185–373 m (Struhsaker, 1973a; Reid *et al.*, 1991). Australian specimens identified as *G. struhsakeri* by Paxton *et al.* (1989) have been described as a distinct species, *G. australis* (Kobylansky, 1998).

**Microstomatidae — Pencilsmelts*****Microstoma microstoma*** (Risso)

*Gasteropelecus microstoma* Risso, 1810, p. 356, Nice, France.

*Microstoma* sp. (Pacific): Ahlstrom *et al.* (1984a).

*Microstoma microstoma* (Risso, 1810): Cohen (1964b), Clarke & Wagner (1976), Borets & Sokolovsky (1978), Loeb (1979), Novikov *et al.* (1981), Cohen *in* Smith & Heemstra (1986).

TAXONOMY: Cohen (1964b) considered the genus monotypic, but Pacific populations may be an undescribed species based on differences between eggs and larvae from the Atlantic and Pacific (Ahlstrom *et al.*, 1984a).

COMMON NAMES: Dusky pencilsmelt (AFS), Slender argentine.

HAWAIIAN RECORDS: O'ahu to Koko Seamount at 490 m (Clarke & Wagner, 1976; Novikov *et al.*, 1981).

GENERAL RANGE: Probably circumglobal, known from the temperate through tropical Mediterranean Sea, eastern Atlantic, Gulf of Mexico, eastern Pacific, and the Hawaiian Islands. Mesopelagic between 1–1000 m fishing depths; most collected with 200–300 m wire out at ca. 140–212 m (Cohen, 1964b; Cohen *in* Smith & Heemstra, 1986).

[*Nansenia ahlstromi* Kawaguchi & Butler]

*Nansenia ahlstromi* Kawaguchi & Butler, 1984, p. 4, Fig. 2, off California, U.S.A., at 29°15'N, 126°07'W.

*Nansenia ahlstromi* Kawaguchi & Butler, 1984: Kawaguchi & Butler (1984).

TAXONOMY: Kawaguchi & Butler (1984).

HAWAIIAN RECORDS: A paratype collected at 24°46'N, 145°00'W suggests that this species could occur in the region (Kawaguchi & Butler, 1984).

GENERAL RANGE: Eastern North Pacific endemic, 24°–29°N, 126°–145°W. Mesopelagic between 1–754 m fishing depths (Kawaguchi & Butler, 1984).

[*Nansenia ardesiaca* Jordan & Thompson]

*Nansenia ardesiaca* Jordan & Thompson, 1914, p. 210, Pl. 24 (fig. 2), Okinose, Sagami Sea, Japan.

*Nansenia ardesiaca* Jordan & Thompson, 1914: Humphreys *et al.* (1984)?, Kawaguchi & Butler (1984).

TAXONOMY: Kawaguchi & Butler (1984).

HAWAIIAN RECORDS: Humphreys *et al.* (1984) reported this species from Milwaukee Seamount but it does not occur in the region (Kawaguchi & Butler, 1984). This record is probably based on *N. longicauda* or *N. pelagica*.

GENERAL RANGE: Indo-west-Pacific from South Africa to the Philippines, Borneo, Indonesia, and southern Japan. Benthopelagic between 420–2015 m fishing depths, most at 420–850 m (Kawaguchi & Butler, 1984).

*Nansenia longicauda* Kawaguchi & Butler

*Nansenia longicauda* Kawaguchi & Butler, 1984, p. 10, Fig. 10, North Pacific at 30°37'N, 147°24'W.

*Nansenia longicauda* Kawaguchi & Butler, 1984: Kawaguchi & Butler (1984).

TAXONOMY: Kawaguchi & Butler (1984).

HAWAIIAN RECORDS: O'ahu between 400–1100 m fishing depths. Records from either side of the Hancock Seamounts (Kawaguchi & Butler, 1984) indicate that it also occurs there.

GENERAL RANGE: Known from disjunct localities in the subtropical Atlantic and North Pacific between 20°–40°N. Mesopelagic between 400–1100 m fishing depths (Kawaguchi & Butler, 1984).

COMMENTS: The *Nansenia* sp. from O'ahu at 525–560 m (Clarke & Wagner, 1976), the Hancock Seamounts (Boehlert & Mundy, 1992), Koko Seamount, Milwaukee Seamount (Novikov *et al.*, 1981), and elsewhere near the Hawaiian Ridge (Borets & Sokolovsky, 1978; Loeb, 1979) were not identified to species.

*Nansenia pelagica* Kawaguchi & Butler

*Nansenia pelagica* Kawaguchi & Butler, 1984, p. 15, Fig. 15, western North Atlantic at 2°27'N, 34°52'W.

*Nansenia pelagica* Kawaguchi & Butler, 1984: Kawaguchi & Butler (1984).

TAXONOMY: Kawaguchi & Butler (1984).

HAWAIIAN RECORDS: O'ahu between 0–725 m fishing depths (Kawaguchi & Butler, 1984).

GENERAL RANGE: Probably circumtropical and subtropical but known only from the tropical Atlantic from 30°N–20°S, the central North Pacific at 20°–30°N, and off Vanuatu at 20°00'S, 170°03'E. Mesopelagic between 0–2000 m fishing depths (Kawaguchi & Butler, 1984).

*[Xenophthalmichthys danae* Regan]

*Xenophthalmichthys danae* Regan, 1925a, p. 59, near St. Lucia, Caribbean Sea, at 14°00'N, 61°40'W.

*Xenophthalmichthys danae* Regan, 1925a: Cohen (1964b), Clarke & Wagner (1976), Loeb (1979), Ahlstrom *et al.* (1984a), Cohen *in* Quéro *et al.* (1990).

TAXONOMY: Ahlstrom *et al.* (1984a) suggested that there are two species in this genus.

HAWAIIAN RECORDS: Records from the equatorial Pacific (3°30'N, 145°W) at 300 m (Clarke & Wagner, 1976) and the North Pacific at 28°N, 155°W (Loeb, 1979) indicate that this species could occur in Hawaiian waters.

GENERAL RANGE: Probably circumtropical and subtropical, known from the Caribbean Sea, the eastern tropical Atlantic, the Indian Ocean off Java, and the central North Pacific. Mesopelagic at ca. 300 m (Cohen, 1964b; Clarke & Wagner, 1976; Cohen *in* Quéro *et al.*, 1990).

**Bathylagidae — Deepsea smelts<sup>13</sup>***Bathylagus bericoides* (Borodin)

*Scopelus bericoides* Borodin, 1929, p. 110, North Atlantic at 41°30'N, 45°57'W.

*Bathylagus bericoides* (Borodin, 1929): Cohen (1964b), Loeb (1979), Ahlstrom *et al.* (1984a), Cohen *in* Smith & Heemstra (1986), Boehlert & Mundy (1992).

TAXONOMY: Ahlstrom *et al.* (1984a).

HAWAIIAN RECORDS: The Hancock Seamounts, larvae at 0–200 m (Boehlert & Mundy, 1992).

GENERAL RANGE: Circumglobal in the subtropical and tropical Atlantic, Indian, and Pacific oceans. Mesopelagic at 1–1700 m, perhaps with diel migration (Cohen, 1964b; Cohen *in* Smith & Heemstra, 1986).

*Bathylagus longirostris* Maul

*Bathylagus longirostris* Maul, 1948a, p. 35, Fig. 14, off Madeira.

*Bathylagus longirostris* Maul, 1948a: Loeb (1979), Ahlstrom *et al.* (1984a), Kobylansky (1985), Boehlert & Mundy (1992).

TAXONOMY: Ahlstrom *et al.* (1984a), Kobylansky (1985).

HAWAIIAN RECORDS: O'ahu to the Hancock Seamounts, adults at 200–400 m fishing depths, larvae at 0–200 m (Kobylansky, 1985; Boehlert & Mundy, 1992; NMFS, unpubl. data for O'ahu).

GENERAL RANGE: Circumglobal in the tropical and subtropical Atlantic, Indian, and Pacific oceans. Mesopelagic at 200–400 m (Kobylansky, 1985).

*[Bathylagus ochotensis* Schmidt]

*Bathylagus ochotensis* Schmidt, 1938, p. 654, Okhotsk Sea at 55°18'30"N, 146°39'E.

*Bathylagus ochotensis* Schmidt, 1938: Borets & Sokolovsky (1978), Ahlstrom *et al.* (1984a), Kobylansky (1985), Okamura (1985).

TAXONOMY: Ahlstrom *et al.* (1984a), Kobylansky (1985).

HAWAIIAN RECORDS: Specimens collected at 31°N, 176°E (Kobylansky, 1985) indicate that this species could occur at the Hancock Seamounts.

GENERAL RANGE: Subarctic and transition zone trans-Pacific endemic found between 24°–58°N from Asia to North America. Mesopelagic at 500–1100 m (Kobylansky, 1985; Okamura *et al.*, 1985).

*[Bathylagus pacificus* Gilbert]

*Bathylagus pacificus* Gilbert, 1890, p. 55, eastern North Pacific off Washington, U.S.A.

*Bathylagus pacificus* Gilbert, 1890: Rass & Kashkina (1967), Borets & Sokolovsky (1978), Novikov *et al.* (1981), Ahlstrom *et al.* (1984a).

TAXONOMY: Ahlstrom *et al.* (1984a).

HAWAIIAN RECORDS: Records from Koko Seamount indicate that this species could occur at the Hancock Seamounts (Novikov *et al.*, 1981).

GENERAL RANGE: North Pacific subarctic and transition zone endemic found from Asia to North America. Mesopelagic at 500–1000 m (Rass & Kashkina, 1967).



**Opisthoproctidae — Barreleyes, Spookfishes***[Dolichopteryx longipes (Vaillant)]*

*Aulostoma? longipes* Vaillant, 1888, p. 340, Pl. 27 (fig. 4), off Morocco.

*Dolichopteryx longipes* Vaillant, 1888: Cohen (1964b), Borets & Sokolovsky (1978), Loeb (1979), Ahlstrom *et al.* (1984a), Badcock (1988), Quéro *in* Quéro *et al.* (1990).

TAXONOMY: Ahlstrom *et al.* (1984a) recognized *D. longipes* as valid but the systematics of the genus are confused (Badcock, 1988).

HAWAIIAN RECORDS: None but a record from 28°N, 155°W (Loeb, 1979) indicates that *D. longipes* could occur near the Hawaiian Islands. Borets & Sokolovsky (1978) recorded *Dolichopteryx* sp. from unspecified locations in the Emperor Seamounts and Hawaiian Ridge.

GENERAL RANGE: Perhaps circumtropical and subtropical in the Atlantic, Indian, and Pacific oceans; known from the Bahamas, eastern tropical Atlantic, central North Pacific, and Galapagos Islands. Mesopelagic at >500 m (Cohen, 1964b; Quéro *in* Quéro *et al.*, 1990).

*Opisthoproctus grimaldii* Zugmayer

*Opisthoproctus grimaldii* Zugmayer, 1911, p. 2, Pl. 1 (fig. 5), off Portugal at 36°10'N, 11°48'W.

*Opisthoproctus grimaldii* Zugmayer, 1911: Clarke & Wagner (1976)?

*Opisthoproctus grimaldii* Zugmayer, 1911: Cohen (1964b), Ahlstrom *et al.* (1984a), Heemstra *in* Smith & Heemstra (1986), Paxton *et al.* (1989), Quéro *in* Quéro *et al.* (1990).

TAXONOMY: Cohen (1964b), Ahlstrom *et al.* (1984a).

HAWAIIAN RECORDS: O'ahu at 500 m, identified as this species with reservations (Clarke & Wagner, 1976).

GENERAL RANGE: Tropical and subtropical Atlantic Ocean, Indo-west Pacific, eastern Australia, and perhaps the central North Pacific. Mesopelagic at 200–>2000 m, usually at 300–400 m (Cohen, 1964b; Heemstra *in* Smith & Heemstra, 1986; Paxton *et al.*, 1989; Quéro *in* Quéro *et al.*, 1990).

*Opisthoproctus soleatus* Vaillant

*Opisthoproctus soleatus* Vaillant, 1888, p. 106, Pl. 14 (figs. 1–1a), off Morocco.

*Opisthoproctus soleatus* Vaillant, 1888: Cohen (1964b), Struhsaker (1973a), Amesbury (1975), Clarke & Wagner (1976), Loeb (1979), Tinker (1982), Ahlstrom *et al.* (1984a), Quéro *in* Quéro *et al.* (1990).

TAXONOMY: Cohen (1964b), Ahlstrom *et al.* (1984a).

HAWAIIAN RECORDS: O'ahu at 450–640 m (Struhsaker, 1973a; Clarke & Wagner, 1976).

GENERAL RANGE: Circumglobal in the tropical through temperate Atlantic, Indian, and Pacific oceans. Mesopelagic at 300–800 m, usually at 500–700 m (Cohen, 1964b; Quéro *in* Quéro *et al.*, 1990).

*Rhynchohyalus natalensis* (Gilchrist & von Bonde)

*Hyalorhynchus natalensis* Gilchrist & von Bonde, 1924, p. 4, Pl. 1 (fig. 1), off Table Bay, South Africa.

*Rhynchohyalus natalensis* (Gilchrist & von Bonde, 1924): Cohen (1964b), Clarke & Wagner (1976), Ahlstrom *et al.* (1984a), Heemstra *in* Smith & Heemstra (1986), Paxton *et al.* (1989).

TAXONOMY: Cohen (1964b), Ahlstrom *et al.* (1984a).

HAWAIIAN RECORDS: O'ahu at <600–<1100 m fishing depths (Clarke & Wagner, 1976).

GENERAL RANGE: Known from the tropical and subtropical Atlantic Ocean, off South Africa, southeastern Australia, and the Hawaiian Islands. Mesopelagic at 247–549 m, perhaps to <1100 m (Clarke & Wagner, 1976; Heemstra *in* Smith & Heemstra, 1986; Paxton *et al.*, 1989).

*Winteria telescopa* Brauer

*Winteria telescopa* Brauer, 1901, p. 126, Gulf of Guinea at 32°36'05"N, 3°27'05"W.

*Winteria telescopa* Brauer, 1901: Cohen (1964b), Parin *et al.* (1976), Clarke & Wagner (1976), Borets & Sokolovsky (1978), Ahlstrom *et al.* (1984a), Quéro *in* Quéro *et al.* (1990).

TAXONOMY: Cohen (1964b), Ahlstrom *et al.* (1984a).

HAWAIIAN RECORDS: Near the Hancock Seamounts (Parin *et al.*, 1976) and from 3°30'N, 145°W at 450 m (Clarke & Wagner, 1976), indicating that *W. telescopa* occurs throughout the Hawaiian Archipelago.

GENERAL RANGE: Circumglobal in the tropical through temperate Atlantic, Indian, and Pacific oceans except the North Atlantic and eastern North Pacific. Meso- and bathypelagic at 400–2500 m, usually at 500–700 m (Parin *et al.*, 1976; Quéro *in Quéro et al.*, 1990).

### Alepocephalidae — Slickheads<sup>14</sup>

#### *Alepocephalus blanfordii* Alcock

*Alepocephalus blanfordii* Alcock, 1892, p. 357, Gulf of Manaar, south of Cape Comorin, India, 6°58'N, 77°26'50"E.

*Alepocephalus blanfordii* Alcock, 1892: Iwamoto (1975a), Prosser *et al.* (1975), Randall (1980a), Tinker (1982), Iwamoto & Sazonov *in Quéro et al.* (1990).

TAXONOMY: The taxonomy of this species and the nearly circumglobal *A. productus* Gill, 1883, needs review; they may be synonymous (Iwamoto & Sazonov *in Quéro et al.*, 1990).

HAWAIIAN RECORDS: Hawai'i Island at ca. 1900–2000 m (Iwamoto, 1975a; Prosser *et al.*, 1975).

GENERAL RANGE: Indo-Pacific, known from the Indian Ocean and the Hawaiian Islands. Benthopelagic at ca. 1900–2000 m (Iwamoto, 1975; Prosser *et al.*, 1975); similar taxa occur at 1000–1720 m (Iwamoto & Sazonov *in Quéro et al.*, 1990).

#### [*Conocara kreffti* Sazonov]

*Conocara kreffti* Sazonov, 1997, p. 785, Fig., Indian Ocean at 28°13.6'S, 98°28.6'E.

*Conocara kreffti* Sazonov, 1997: Sazonov (1997).

TAXONOMY: Sazonov (1997).

HAWAIIAN RECORDS: None but a record from the Mid-Pacific Seamounts at 19°44'N, 171°54'E at 1180–1200 m (Sazonov, 1997) suggests that this species could be expected to occur in the Hawaiian Islands.

GENERAL RANGE: Indo-Pacific from the Saya de Malha Bank (Mascarene Ridge) to northwestern Australia, east of the Mariana Islands, and at the Mid-Pacific Seamounts. Benthopelagic at 1100–1700 m (Sazonov, 1997).

#### *Herwigia kreffti* (Nielsen & Larsen)

*Bathylaco kreffti* Nielsen & Larsen, 1970, p. 35, Fig. 5, off Uruguay at 34°01'S, 47°39'W.

*Herwigia kreffti* (Nielsen & Larsen, 1970): Iwamoto *et al.* (1976), Randall (1980a), Tinker (1982), Markle & Sazonov *in Quéro et al.* (1990).

TAXONOMY: Markle & Sazonov *in Quéro et al.* (1990).

COMMON NAMES: Kreffti's smooth-head.

HAWAIIAN RECORDS: Hawai'i Island at 0–760 m fishing depths (Iwamoto *et al.*, 1976).

GENERAL RANGE: Probably circumsubtropical except for the eastern Pacific, known from the eastern North Atlantic, off Uruguay, South and east Africa, Australia, and the Hawaiian Islands. Mesopelagic at 1000–1600 m and benthopelagic at 700–3200 m (Iwamoto *et al.*, 1976; Markle *in Smith & Heemstra*, 1986; Paxton *et al.*, 1989; Markle & Sazonov *in Quéro et al.*, 1990).

#### *Photostylus pycnopterus* Beebe

*Photostylus pycnopterus* Beebe, 1933a, p. 163, Fig. 41, 9 mi. south of Nonsuch Island, Bermuda.

*Photostylus pycnopterus* Beebe, 1933a: Clarke & Wagner (1976), Markle & Sazonov *in Quéro et al.* (1990), Tsukamoto *et al.* (1992).

TAXONOMY: Tsukamoto *et al.* (1992).

HAWAIIAN RECORDS: O'ahu at 750–1000 m (Clarke & Wagner, 1976).

GENERAL RANGE: Circumglobal in the tropical through temperate Atlantic, Indian, and Pacific oceans between 65°N–35°S. Meso- and bathypelagic at 750–2000 m (Clarke & Wagner, 1976; Markle & Sazonov *in Quéro et al.*, 1990).

**Platyroctidae — Tubeshoulders<sup>15</sup>*****Holtbyrnia innesi*** (Fowler)

*Bathytroctes innesi* Fowler, 1934b, p. 252, Fig. 14, western North Atlantic at 38°29'30"N, 70°54'30"W.

*Holtbyrnia kulikovi* Sazonov, 1976: Novikov *et al.* (1981), Borets (1986).

*Holtbyrnia innesi* (Fowler, 1934b): Matsui & Rosenblatt (1987), Quéro *et al. in* Quéro *et al.* (1990).

TAXONOMY: Pacific populations are recognized by Sazonov (1976) as a distinct species, *H. kulikovi* (discussed by Matsui & Rosenblatt, 1987).

HAWAIIAN RECORDS: The Hancock Seamounts to Jingu Seamount at 670–780 m (Borets, 1986; Matsui & Rosenblatt, 1987).

GENERAL RANGE: Known from the subarctic North Pacific, eastern South Pacific, central Atlantic, eastern South Atlantic, and western North Atlantic. Meso- and bathypelagic at 100–1500 m fishing depths (Matsui & Rosenblatt, 1987; Quéro *et al. in* Quéro *et al.*, 1990).

***Maulisia argipalla*** Matsui & Rosenblatt

*Maulisia argipalla* Matsui & Rosenblatt, 1979, p. 65, Figs. 2b, 3c-d, 4, San Clemente Basin off California, U.S.A. at 32°14.5'N, 117°57.7'W.

*Maulisia maui* Parr, 1960 [a valid species, see below]: Sazonov (1976), Quéro *et al. in* Quéro *et al.* (1990).

*Maulisia argipalla* Matsui & Rosenblatt, 1979: Matsui & Rosenblatt (1979, 1987), Borets (1986).

TAXONOMY: Although Matsui & Rosenblatt (1987) stated that *M. argipalla* replaces *M. maui* in the North Pacific, they also stated that the identities of some specimens are uncertain. This uncertainty is reflected in the differences in identifications between their text and distribution maps.

COMMON NAMES: Palegold searsid.

HAWAIIAN RECORDS: The Hancock Seamounts to Jingu Seamount at 500–1500 m (Sazonov, 1976; Borets, 1986).

GENERAL RANGE: *Maulisia argipalla* of Matsui & Rosenblatt (1979) occurs in the eastern North Atlantic, eastern Pacific from California to Chile, and the North Pacific. *Maulisia maui* of Matsui & Rosenblatt (1979) occurs in the eastern North Atlantic, South Atlantic, and Indian Ocean. Meso- and bathypelagic; *M. argipalla* at 850–1500 m, *M. maui* at 400–1000 m (Quéro *et al. in* Quéro *et al.*, 1990).

***Mentodus eubranchus*** (Matsui & Rosenblatt)

*Pellisolus eubranchus* Matsui & Rosenblatt, 1987, p. 87, Fig. 25e, off California, U.S.A. at 28°25'N, 118°11.5'W.

*Pellisolus eubranchus* Matsui & Rosenblatt, 1987: Matsui & Rosenblatt (1987).

*Mentodus eubranchus* (Matsui & Rosenblatt, 1987): Sazonov & Miya (1996).

TAXONOMY: Sazonov & Miya (1996).

HAWAIIAN RECORDS: Near the Kure Atoll at 28°43'N, 177°52.5'W (Matsui & Rosenblatt, 1987).

GENERAL RANGE: Eastern, and central North Pacific endemic from the Gulf of California, Mexico to California, and west to the Emperor Seamounts. Probably bathypelagic below 1000 m (Matsui & Rosenblatt, 1987).

***Mentodus mesalirus*** (Matsui & Rosenblatt)

*Tragularius mesalirus* Matsui & Rosenblatt, 1987, p. 83, Fig. 24b, southeast Atlantic Ocean at 7°32'N, 20°54'W.

*Tragularius mesalirus* Matsui & Rosenblatt, 1987: Matsui & Rosenblatt (1987).

*Mentodus mesalirus* (Matsui & Rosenblatt, 1987): Sazonov & Miya (1996).

TAXONOMY: Matsui & Rosenblatt (1987), Sazonov & Miya (1996).

HAWAIIAN RECORDS: A specimen collected southwest of Midway Atoll at 27°57'N, 177°53'W was tentatively identified as this species (Matsui & Rosenblatt, 1987).

GENERAL RANGE: Probably circumglobal, known from the eastern North and South Atlantic, western Indian Ocean, and perhaps the central North Pacific Ocean. Bathypelagic at 1300–2100 m (Matsui & Rosenblatt, 1987).

**[*Mirorictus taningi* Parr]**

*Mirorictus taningi* Parr, 1947, p. 60, Pl. 1, Gulf of Panama at 7°15'N, 78°54'W.

*Mirorictus taaningi* Parr, 1947: Sazonov (1976).  
*Mirorictus tanningi* Parr, 1947: Matsui & Rosenblatt (1987).

TAXONOMY: Matsui & Rosenblatt (1987).

HAWAIIAN RECORDS: A record from south of Hawai'i at ca. 12°N, 150°W and others from either side of the Pacific (Sazonov, 1976) indicate that *M. tanningi* could occur in the archipelago.

GENERAL RANGE: Indo-transpacific from the Persian Gulf to New Guinea, the central North Pacific, southern California, and Peru. Meso- to bathypelagic at 900 to ca. 1750 m (Matsui & Rosenblatt, 1987).

### *Sagamichthys abei* Parr

*Sagamichthys abei* Parr, 1953, p. 6, Fig. 1, Yodomi, Sagami Bay, Japan.  
*Sagamichthys abei* Parr, 1953: Sazonov (1976), Matsui & Rosenblatt (1987).

TAXONOMY: Matsui & Rosenblatt (1987).

HAWAIIAN RECORDS: The Hancock Seamounts (Sazonov, 1976).

GENERAL RANGE: Pacific endemic, with a disjunct distribution; known in the North Pacific from British Columbia to Baja California, west to Japan, and in the South Pacific from Peru to Chile, with two records from the central equatorial Pacific. Mesopelagic at 300–900 m (Matsui & Rosenblatt, 1987).

## Osmeroidei

### Osmeridae — Smelts

[*Plecoglossus altivelis* Temminck & Schlegel]

*Salmo (Plecoglossus) altivelis* Temminck & Schlegel, 1846, p. 229, Pl. 105 (figs. 1, 1a-c), Japan.  
*Plecoglossus altivelis* Temminck & Schlegel, 1846: Brock (1960), Maciolek (1984), Araga *in* Masuda *et al.* (1984), Randall (1987a), Nishida (1988), Begle (1991), Fuller *et al.* (1999).

TAXONOMY: Nishida (1988). Familial placement follows Begle (1991) and Johnson & Patterson (1996).

COMMON NAMES: Ayu (AFS).

HAWAIIAN RECORDS: Ayu were introduced to freshwaters of Hawai'i Island, Maui, O'ahu, and Kaua'i from Japan in 1925, but the introductions were not successful (Brock, 1960; Randall, 1987a; Fuller *et al.*, 1999).

GENERAL RANGE: Asia from Japan to Korea, China, and Taiwan. Benthopelagic in shallow freshwaters; amphidromous (Araga *in* Masuda *et al.*, 1984; Nishida, 1988).

## Salmoniformes

### Salmonidae — Trouts

*Oncorhynchus mykiss* (Walbaum)

*Salmo mykiss* Walbaum, 1792, p. 59, Kamchatka, Russia.  
*Salmo gairdneri* Richardson, 1836: Brock (1960), Scott & Crossman (1973), Maciolek (1984).  
*Salmo mykiss* Walbaum, 1792: Okazaki (1986).  
*Oncorhynchus mykiss* (Walbaum, 1792): Smith & Stearly (1989), Robins *et al.* (1991a), Fuller *et al.* (1999), Yamamoto & Tagawa (2000), Englund *et al.* (2000c), Englund & Polhemus (2001).

TAXONOMY: Okazaki (1986), Smith & Stearly (1989).

COMMON NAMES: Rainbow trout (AFS), Steelhead trout.

HAWAIIAN RECORDS: Rainbow trout were first brought to the Hawaiian Islands in 1894 and were introduced to freshwaters of all the main islands from 1920 through 1959. The species persists in streams of Kaua'i near Koke'e where populations continued to be stocked until 1992 (Brock, 1960; Maciolek, 1984; Yamamoto & Tagawa, 2000; Englund & Polhemus, 2001). Rainbow trout established naturally reproducing populations in four of these streams (Fuller *et al.*, 1999; Englund *et al.*, 2000a, b; Englund & Polhemus, 2001). Yamamoto & Tagawa (2000) stated that rainbow trout may also possibly be present in the Kohala region of Hawai'i Island.

GENERAL RANGE: Indigenous to western North America from Alaska to northern Mexico in drainages of the

Pacific and to Asia from the Kamchatka Peninsula and coastal Siberia. Introduced throughout cold-temperate areas worldwide. Anadromous or landlocked. Juveniles occur throughout the subarctic Pacific. Small juveniles, reproductive adults, and landlocked populations are benthopelagic in shallow freshwaters. Larger juveniles are pelagic from the ocean surface to unknown depths (Scott & Crossman, 1973; Okazaki, 1986; Fuller *et al.*, 1999).

[*Oncorhynchus tshawytscha* (Walbaum)]

*Salmo tshawytscha* Walbaum, 1792, p. 71, Kamchatka, Russia.

*Oncorhynchus tshawytscha* Walbaum, 1792: Brock (1960), Scott & Crossman (1973), Kendall & Behnke (1984), Maciolek (1984), Randall (1987a), Robins *et al.* (1991a), Fuller *et al.* (1999).

TAXONOMY: Kendall & Behnke (1984), Robins *et al.* (1991a).

COMMON NAMES: Chinook salmon (AFS), King salmon.

HAWAIIAN RECORDS: Chinook were introduced to freshwaters of Hawai'i Island and Kaua'i in 1876, 1925, and 1927 but the introductions were unsuccessful (Brock, 1960; Randall, 1987a; Fuller *et al.*, 1999).

GENERAL RANGE: Indigenous to Pacific and Arctic drainage basins of North America from the Yukon to southern California and of Asia from northern Siberia to northern Japan and Korea. Introduced in other cold-temperate areas. Usually anadromous, sometimes landlocked. Juveniles occur throughout the subarctic Pacific. Pelagic or benthopelagic in shallow freshwaters, oceanic juveniles pelagic from the surface to unknown depths (Scott & Crossman, 1973; Fuller *et al.*, 1999).

[*Salmo trutta* Linnaeus]

*Salmo trutta* Linnaeus, 1758, p. 308, Habitat in fluviis Europae.

*Salmo trutta* Linnaeus, 1758: Brock (1960), Scott & Crossman (1973), Kendall & Behnke (1984), Maciolek (1984), Fuller *et al.* (1999).

TAXONOMY: Scott & Crossman (1973), Kendall & Behnke (1984).

COMMON NAMES: Brown trout (AFS).

HAWAIIAN RECORDS: Brown trout were introduced to streams on Kaua'i in 1935 but none have been found there since 1949 (Brock, 1960; Fuller *et al.*, 1999).

GENERAL RANGE: Indigenous to Europe and western Asia, but original range uncertain because of ancient introductions. Widely introduced in cold-temperate areas worldwide. Benthopelagic in shallow freshwaters (Scott & Crossman, 1973; Fuller *et al.*, 1999).

[*Salvelinus fontinalis* (Mitchill)]

*Salmo fontinalis* Mitchill, 1814, p. 12, New York, U.S.A.

*Salvelinus fontinalis* (Mitchill, 1815): Jordan & Evermann (1905), Brock (1960), Scott & Crossman (1973), Kendall & Behnke (1984), Maciolek (1984), Fuller *et al.* (1999).

TAXONOMY: Scott & Crossman (1973), Kendall & Behnke (1984).

COMMON NAMES: Brook trout (AFS).

HAWAIIAN RECORDS: Brook trout were stocked in freshwaters of the Hawaiian Islands in 1876, 1894, and 1896 but the introductions were not successful (Brock, 1960; Fuller *et al.*, 1999).

GENERAL RANGE: Indigenous to eastern North America, introduced elsewhere. Benthopelagic in freshwater streams, rivers, and lakes (Scott & Crossman, 1973; Fuller *et al.*, 1999).

## Stomiiformes<sup>16</sup>

### Gonostomatioidei

#### Gonostomatidae — Bristlemouths

##### Diplophinae<sup>17</sup>

*Diplophos orientalis* Matsubara

*Diplophos taenia orientalis* Matsubara, 1940, p. 317, Huji R., Kambara, Japan.

*Diplophos orientalis* Matsubara, 1940: Ozawa *et al.* (1990).

TAXONOMY: Ozawa *et al.* (1990).

HAWAIIAN RECORDS: Larvae of this species occur at the Hancock Seamounts, but only in winter (B. Mundy, unpubl. data, 1992).

GENERAL RANGE: Western Pacific transition zone endemic between 30°–40°N, southern Japan to the Emperor Seamounts and east to ca. 35°N, 148°W. Mesopelagic at unknown depths (Ozawa *et al.*, 1990).

***Diplophos taenia* Günther**

*Diplophos taenia* Günther, 1873b, p. 102, Fig., mid-Atlantic from 22°N, 30°W and 30°39'S, 24°20'W.

*Diplophos pacificus* Günther, 1889: Fowler (1934, 1949).

*Diplophos taenia* Günther, 1873b: Clarke (1974), Mukhacheva (1978), Borets & Sokolovsky (1978), Loeb (1979), Novikov *et al.* (1981), Clarke (1982), Ozawa *et al.* (1990), Boehlert *et al.* (1992).

TAXONOMY: Ozawa *et al.* (1990).

HAWAIIAN RECORDS: Johnston Atoll and O'ahu to Milwaukee Seamount at 15–100 m at night and 400–650 m during day (Clarke, 1974; Novikov *et al.*, 1981; Clarke, 1982; Boehlert *et al.*, 1992).

GENERAL RANGE: Circumglobal in the tropical through temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans except the eastern North and eastern tropical Pacific. Mesopelagic at 15–650 m (Clarke, 1974; Mukhacheva, 1978; Ozawa *et al.*, 1990).

**Gonostomatinae<sup>18</sup>**

***Cyclothone acclinidens* Garman**

*Cyclothone acclinidens* Garman, 1899, p. 247, Pl. J (fig. 4), off the Galapagos Islands at 0°36'S, 78°138'[sic]W.

*Cyclothone acclinidens* Garman, 1899: Mukhacheva (1964), Kobayashi (1973), Maynard (1982).

TAXONOMY: Kobayashi (1973).

HAWAIIAN RECORDS: Hawai'i Island to O'ahu at 480–1080 m (Mukhacheva, 1964; Maynard, 1982).

GENERAL RANGE: Circumglobal in the Atlantic, Indian, and Pacific oceans, usually tropical and subtropical but also found through cold-temperate areas. Meso- and bathypelagic at 100–1900 m, usually at 300–1500 m (Kobayashi, 1973).

COMMENTS: The *Cyclothone* sp. collected by Grey (1961) off Hawai'i Island, by Struhsaker (1973a) off Hawai'i Island at 823 m, at the Hancock Seamounts (Boehlert & Mundy, 1992), and at Johnston Atoll (Boehlert *et al.*, 1992) were not identified to species.

***Cyclothone alba* Brauer**

*Cyclothone signata* var. *alba* Brauer, 1906, p. 80, Fig. 30, several localities.

*Cyclothone alba*: Mukhacheva (1964), Kobayashi (1973), Loeb (1979), Maynard (1982).

TAXONOMY: Kobayashi (1973).

HAWAIIAN RECORDS: Hawai'i Island to the Hancock Seamounts at 320–1445 m with most at 425–625 m (Mukhacheva, 1964; Maynard, 1982).

GENERAL RANGE: Circumglobal in the tropical through cold-temperate Atlantic, Indian, and Pacific oceans except the eastern tropical Pacific. Mesopelagic at 25–4938 m fishing depths, usually at 300–800 m (Kobayashi, 1973).

***Cyclothone atraria* Gilbert**

*Cyclothone atraria* Gilbert, 1905, p. 605, Pl. 72 (fig. 2), off Kaua'i, Hawaiian Islands.

*Cyclothone pacifica* Mukhacheva, 1964: Mukhacheva (1964).

*Cyclothone atraria* Gilbert, 1905: Gilbert (1905), Fowler (1928), Gosline & Brock (1960), Kobayashi (1973), Borets & Sokolovsky (1978), Loeb (1979), Novikov *et al.* (1981), Tinker (1982), Maynard (1982).

TAXONOMY: Kobayashi (1973).

HAWAIIAN RECORDS: O'ahu to Milwaukee Seamount at 929–1286 m (Gilbert, 1905; Novikov *et al.*, 1981; Maynard, 1982).

GENERAL RANGE: Temperate and sub-tropical North Pacific endemic, from southern Japan to Baja California, from 21°N and into the Bering Sea. Meso- to bathypelagic at 298–4938 m fishing depths, usually at 400–2400 m with maximum abundance at 2100–2200 m (Kobayashi, 1973; Maynard, 1982).

***Cyclothone obscura*** Brauer

*Cyclothone obscura* Brauer, 1902, p. 280, “Atlantic and Indian oceans”.

*Cyclothone obscura* Brauer, 1902: Kobayashi (1973), Maynard (1982), Miya & Nemoto (1987), Boehlert & Mundy (1992).

TAXONOMY: Kobayashi (1973).

HAWAIIAN RECORDS: O‘ahu to the Hancock Seamounts at >1000 m (Maynard, 1982; Boehlert & Mundy, 1992).

GENERAL RANGE: Circumtropical in the Atlantic, Indian, and Pacific oceans with a few records northward in the temperate Pacific. Bathy- to abyssopelagic at 1214–3500 m, usually at 2000–2600 m (Kobayashi, 1973; Maynard, 1982; Miya & Nemoto, 1987).

***Cyclothone pallida*** Brauer

*Cyclothone pallida* Brauer, 1902, p. 281, “Atlantic and Indian oceans”.

*Cyclothone canina* Gilbert, 1905: Gilbert (1905), Fowler (1928), Gosline & Brock (1960), Tinker (1982).

*Cyclothone pallida* Brauer, 1902: Mukhacheva (1964), Kobayashi (1973), Loeb (1979), Maynard (1982).

TAXONOMY: Kobayashi (1973).

HAWAIIAN RECORDS: Hawai‘i Island to the Hancock Seamounts at 350–2337 m, usually at 600–1300 m (Gilbert, 1905; Kobayashi, 1973; Maynard, 1982).

GENERAL RANGE: Circumglobal in the tropical through cold-temperate Atlantic, Indian, and Pacific oceans, primarily between 40°N–40°S. Meso- to bathypelagic at 16–4663 m fishing depths, usually at 600–1800 m (Kobayashi, 1973).

***Cyclothone pseudopallida*** Mukhacheva

*Cyclothone pseudopallida* Mukhacheva, 1964, p. 104, Fig. 7a, North Pacific at 38°34'N, 144°18'E.

*Cyclothone pseudopallida* Mukhacheva, 1964: Mukhacheva (1964), Kobayashi (1973), Loeb (1979), Novikov *et al.* (1981), Maynard (1982).

TAXONOMY: Kobayashi (1973).

HAWAIIAN RECORDS: Hawai‘i Island to Milwaukee Seamount at 320–1445 m, usually at 525–750 m (Mukhacheva, 1964; Maynard, 1982).

GENERAL RANGE: Circumglobal in the tropical through cold-temperate Atlantic, Indian, and Pacific oceans from 65°N–30°S. Meso- to bathypelagic at 33–4938 m fishing depths, usually at 300–1400 m (Kobayashi, 1973; Maynard, 1982).

***Cyclothone signata*** Garman

*Cyclothone signata* Garman, 1899, p. 246, Pl. J (fig. 3), Gulf of Panama at 6°21'N, 80°41'W.

*Cyclothone signata* Garman, 1899: Mukhacheva (1964), Kobayashi (1973), Borets & Sokolovsky (1978), Novikov *et al.* (1981), Maynard (1982).

TAXONOMY: Kobayashi (1973).

HAWAIIAN RECORDS: Hawai‘i Island to Milwaukee Seamount at 425–600 m (Mukhacheva, 1964; Novikov *et al.*, 1981; Maynard, 1982).

GENERAL RANGE: Central and eastern Pacific endemic, from Micronesia and Vanuatu to the Hawai‘i Islands, Oregon, and Chile. Meso- and bathypelagic at 16–4938 m fishing depths, usually at 200–800 m (Mukhacheva, 1964; Kobayashi, 1973).

***Gonostoma atlanticum*** Norman

*Gonostoma denudatum atlanticum* Norman, 1930, p. 283, eastern Atlantic.

*Gonostoma atlanticum* Norman, 1930: Grey (1961), Mukhacheva (1972), Clarke (1974), Amesbury (1975), Borets & Sokolovsky (1978), Loeb (1979), Tinker (1982), Clarke (1982), Quéro *et al.* in Quéro *et al.* (1990), Boehlert *et al.* (1992), Boehlert & Mundy (1992), Harold (1998), Miya & Nishida (2000).

TAXONOMY: Mukhacheva (1972), Miya & Nishida (2000).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to the Hancock Seamounts at 150–260 m at night and 400–560 m during day (Grey, 1961; Clarke, 1974; Clarke, 1982; Boehlert *et al.*, 1992; Boehlert & Mundy, 1992).

GENERAL RANGE: Circumglobal in the tropical and subtropical Gulf of Mexico, Atlantic, Indian, and Pacific oceans. Rare in the eastern Pacific except for a few records off southern California. Mesopelagic at 50–1000 m, usually at 50–260 m at night and 300–600 m during day (Mukhacheva, 1972; Quéro *et al.* in Quéro *et al.*, 1990).

***Margrethia obtusirostra*** Jespersen & Tåning

*Margrethia obtusirostra* Jespersen & Tåning, 1919, p. 222, Pl. 17 (figs. 11–12), Cadiz Bay, Spain, 20°26'N, 61°03'W.

*Margrethia obtusirostra* Jespersen & Tåning, 1919: Clarke (1974), Mukhacheva (1976), Borets & Sokolovsky (1978), Loeb (1979), Quéro *et al.* in Quéro *et al.* (1990), Boehlert & Mundy (1992).

TAXONOMY: Mukhacheva (1976).

HAWAIIAN RECORDS: O'ahu to the Hancock Seamounts at 180–200 m at night and 350–540 m during day (Clarke, 1974; Boehlert & Mundy, 1992).

GENERAL RANGE: Circumglobal in the tropical through temperate Atlantic, Indian, and Pacific oceans except the eastern tropical and eastern North Pacific. Mesopelagic at 150–1500 m, usually at 100–300 m at night and 200–500 m during day (Mukhacheva, 1976; Quéro *et al.* in Quéro *et al.*, 1990).

***Sigmops ebelingi*** (Grey)

*Gonostoma ebelingi* Grey, 1960, p. 109, off the Marshall Islands at 12°27'N, 164°30'E to 12°38.8'N, 165°09'E.

*Gonostoma ebelingi* Grey, 1960: Mukhacheva (1972), Clarke (1974), Amesbury (1975), Loeb (1979), Clarke (1982), Harold (1998).

*Sigmops ebelingi* (Grey, 1960): Miya & Nishida (2000).

TAXONOMY: Mukhacheva (1972), Miya & Nishida (2000).

HAWAIIAN RECORDS: Hawai'i Island to Kaua'i at 125–300 m at night and 400–700 m during day (Mukhacheva, 1972; Clarke, 1974; Clarke, 1982).

GENERAL RANGE: Tropical and subtropical Pacific endemic, from the Philippines and Samoa to the Hawai'i Islands and the eastern Pacific off Baja California. Mesopelagic at 125–700 m (Mukhacheva, 1972; Clarke, 1974).

***Sigmops elongatum*** (Günther)

*Gonostoma elongatum* Günther, 1878, p. 187, south of New Guinea.

*Cyclothone rhodadenia* Gilbert, 1905: Gilbert (1905), Fowler (1928).

*Gonostoma elongata* Günther, 1878: Fowler (1928).

*Gonostoma elongatum* Günther, 1878: Mukhacheva (1972), Struhsaker (1973a), Clarke (1974), Amesbury (1975), Borets & Sokolovsky (1978), Hughes & Iwai (1978), Loeb (1979), Novikov *et al.* (1981), Tinker (1982), Clarke (1982), Humphreys *et al.* (1984), Quéro *et al.* in Quéro *et al.* (1990), Boehlert *et al.* (1992), Harold (1998).

*Sigmops elongatum* (Günther, 1878): Miya & Nishida (2000).

TAXONOMY: Mukhacheva (1972), Miya & Nishida (2000).

HAWAIIAN RECORDS: Johnston Atoll and O'ahu to Milwaukee Seamount at 60–1006 m; 60–265 m at night and 400–800 m during day (Gilbert, 1905; Struhsaker, 1973a; Clarke, 1974; Clarke, 1982; Humphreys *et al.*, 1984; Boehlert *et al.*, 1992).

GENERAL RANGE: Circumglobal in the tropical through temperate Atlantic, Indian, and Pacific oceans except for the eastern tropical and eastern North Pacific. Meso- to bathypelagic at 25–1500 m (Mukhacheva 1972, Hughes & Iwai 1978, Quéro *et al.* in Quéro *et al.* 1990).

***Sigmops gracile*** (Günther)

*Gonostoma gracile* Günther, 1878, p. 187, south of Japan.

*Gonostoma gracile* Günther, 1878: Mukhacheva (1972), Kawaguchi (1973), Borets & Sokolovsky (1978), Novikov *et al.* (1981), Harold (1998).

*Sigmops gracile* (Günther, 1878): Miya & Nishida (2000).

TAXONOMY: Mukhacheva (1972), Miya & Nishida (2000).



HAWAIIAN RECORDS: The Hancock Seamounts (Mukhacheva, 1972).

GENERAL RANGE: North Pacific subarctic and transition zone endemic, from Taiwan to the Aleutians, east to ca. 40°N, 140°W. Mesopelagic, nonmigratory at 200–1000 m, usually at 300–700 m (Mukhacheva, 1972; Kawaguchi, 1973).

### Sternoptychidae

#### *Araiophos gracilis* Grey

*Araiophos gracilis* Grey, 1961, p. 465, Figs. 1–3, off Ho‘okena, Mauna Loa lava flow, Hawai‘i Island, Hawaiian Islands.

*Araiophos gracilis* Grey, 1961: Grey (1961), Ahlstrom & Moser (1969), Tinker (1982).

TAXONOMY: Ahlstrom & Moser (1969).

HAWAIIAN RECORDS: Known only from the 10 types collected at Hawai‘i Island on the surface near lava flowing into the sea, from 10 specimens trawled from 0–200 m ca. 15 nmi to the north of the type locality, and by observations from a submersible of specimens hovering 1–2 m above the bottom at 392 m at West St. Rogatien Bank (Grey, 1961; B. Mundy, unpubl. data Sept. 2000).

GENERAL RANGE: Hawaiian endemic. Benthopelagic at 0–200 m (Grey, 1961; B. Mundy, unpubl. data Sept. 2000).

#### [*Argyripnus atlanticus* Maul]

*Argyripnus atlanticus* Maul, 1952, p. 56, Fig. 17, Funchal Harbor, Madeira.

*Argyripnus atlanticus* Maul, 1952: Grey (1961)?, Badcock & Merrett (1972), Struhsaker (1973b), Borets & Sokolovsky (1978), Tinker (1982), Humphreys *et al.* (1984)?, Uchida & Uchiyama (1986)?, Quéro *et al.* in Quéro *et al.* (1990), Parin (1992).

TAXONOMY: Struhsaker (1973b), Parin (1992).

HAWAIIAN RECORDS: Hawai‘i Island to the Hancock Seamounts at 263–293 m (Grey, 1961; Humphreys *et al.*, 1984; Uchida & Uchiyama, 1986)? This species was not found among the hundreds of *Argyripnus* examined from the Hawaiian Islands by Struhsaker (1973a, b). This, together with the small size and damaged state of the two specimens identified by Grey (1961), suggests that Hawaiian specimens of *A. atlanticus* were misidentified. The snout-to-anal origin distance increases with growth in *A. atlanticus*, while the snout-to-dorsal origin distance remains the same (Badcock & Merrett, 1972). Grey’s specimens were identified by these criteria without consideration of ontogenetic changes, suggesting that her specimens may have been the young of one of the other two Hawaiian *Argyripnus* species, one of which was unknown at the time of Grey’s study. Identifications of this species from the archipelago need verification.

GENERAL RANGE: Probably endemic to the Atlantic Ocean and adjacent seas. Recorded from the Gulf of Mexico, Caribbean Sea, Bahamas, eastern north Atlantic, and possibly the Hawaiian Islands. Engy-benthic or benthopelagic at ca. 200–500 m (Quéro *et al.* in Quéro *et al.*, 1990; Parin, 1992).

#### *Argyripnus brocki* Struhsaker

*Argyripnus brocki* Struhsaker, 1973b, p. 828, Fig. 1, Penguin Bank off southwest Moloka‘i, Hawaiian Islands.

*Argyripnus* species: Struhsaker (1973a).

*Argyripnus brocki* Struhsaker, 1973b: Struhsaker (1973b), Randall (1976a), Tinker (1982), Parin (1992), Harold & Lancaster (2003).

TAXONOMY: Parin (1992).

HAWAIIAN RECORDS: Hawai‘i Island to O‘ahu at 180–280 m (Struhsaker, 1973a, b).

GENERAL RANGE: Hawaiian Islands endemic. Specimens identified as *A. brocki* from other areas of the Indo-west Pacific, including off East Africa, Madagascar, northwestern Australia, the Coral Sea, and the Philippines, have been reidentified as *A. pharos* Harold & Lancaster (2003). Engy-benthic or benthopelagic at 180–380 m (Struhsaker, 1973b; Parin, 1992; Harold & Lancaster, 2003).

#### *Argyripnus ephippiatus* Gilbert & Cramer

*Argyripnus ephippiatus* Gilbert & Cramer, 1897, p. 414, Pl. 39 (fig. 2), Hawaiian Islands.

*Argyripnus ephippiatus* Gilbert & Cramer, 1897: Gilbert & Cramer (1897), Gilbert (1905), Fowler (1928), Gosline & Brock (1960), Struhsaker (1973a, 1973b), Tinker (1982), Paxton *et al.* (1989), Parin (1992).

TAXONOMY: Struhsaker (1973b), Parin (1992).

HAWAIIAN RECORDS: Hawai'i Island to O'ahu at 325–518 m (Gilbert & Cramer, 1897; Gilbert, 1905; Struhsaker, 1973a, b).

GENERAL RANGE: Western and central Pacific endemic known only from the Hawaiian Islands and north-eastern Australia. Engybenitic or benthopelagic at 325–518 m (Struhsaker, 1973b; Paxton *et al.*, 1989; Parin, 1992).

***Argyripnus* sp.**

*Argyripnus* species: Okamura *et al.* (1982), Parin (1992), Mundy & Parrish (2004).

TAXONOMY: Parin (1992).

HAWAIIAN RECORDS: A specimen of this undescribed species was collected at ca. 1 m above the bottom by a submersible at 462 m on St. Rogatien Bank, Northwestern Hawaiian Islands (C. Kelley, pers. comm., Sept. 2002). The author has examined the specimen and confirmed the identification.

GENERAL RANGE: Western and central North Pacific endemic known only from the Kyushu-Palau Ridge and the Northwestern Hawaiian Islands. Engybenitic or benthopelagic at 330–462 m (Okamura *et al.*, 1982; C. Kelley, pers. comm., Sept. 2002).

***Argyrolepecus aculeatus* Valenciennes**

*Argyrolepecus aculeatus* Valenciennes in Cuvier & Valenciennes, 1849, p. 406, Azores.

*Argyrolepecus amabilis* (Ogilby, 1888): Borets & Sokolovsky (1978).

*Argyrolepecus olfersi* non (Cuvier, 1829) [a valid species unknown from the region]: Borets & Sokolovsky (1978)?

*Argyrolepecus aculeatus* Valenciennes in Cuvier & Valenciennes, 1849: Baird (1971), Haruta (1975), Borets & Sokolovsky (1978), Borodulina (1978), Novikov *et al.* (1981), Humphreys *et al.* (1984), Uchida & Uchiyama (1986), Ridge-Cooney (1987), Quéro *et al. in* Quéro *et al.* (1990), Harold (1993).

TAXONOMY: Baird (1971), Harold (1993).

HAWAIIAN RECORDS: O'ahu to Koko Seamount at 225–550 m (Baird, 1971; Borodulina, 1978; Novikov *et al.*, 1981; Uchida & Uchiyama, 1986; Ridge-Cooney, 1987).

GENERAL RANGE: Circumglobal between 40°N–40°S in the tropical through temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans, except the eastern tropical and eastern North Pacific. Mesopelagic at 80–600 m, 80–500 m at night and 200–600 m during day (Baird, 1971; Borodulina, 1978; Quéro *et al. in* Quéro *et al.*, 1990).

***Argyrolepecus affinis* Garman**

*Argyrolepecus affinis* Garman, 1899, p. 237, off the "Antilles" at 15°24'40"N, 63°31'30"W.

*Argyrolepecus pacificus* Schultz, 1961: Tinker (1982).

*Argyrolepecus affinis* Garman, 1899: Haig (1955), Gosline & Brock (1960), Baird (1971), Haruta (1975), Borodulina (1978), Borets & Sokolovsky (1978), Loeb (1979), Tinker (1982), Ridge-Cooney (1987), Quéro *et al. in* Quéro *et al.* (1990), Harold (1993).

TAXONOMY: Baird (1971), Harold (1993).

HAWAIIAN RECORDS: Hawai'i Island to the Hancock Seamounts at 450–875 m (Haig, 1955; Borodulina, 1978; Ridge-Cooney, 1987).

GENERAL RANGE: Circumglobal between 40°N–40°S in the tropical through warm-temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans. Mesopelagic at 170–875 m, 170–500 m at night and 350–600 m during day (Baird, 1971; Ridge-Cooney, 1987; Quéro *et al. in* Quéro *et al.*, 1990).

***Argyrolepecus hemigymnus* Cocco**

*Argyrolepecus Emigymnus* [sic] Cocco, 1829, p. 146, Messina, Italy [see Eschmeyer, 1998, for notes on the spelling of the species name].

*Argyrolepecus heathi* Gilbert, 1905: Gilbert (1905), Fowler (1928), Haig (1955), Gosline & Brock (1960), Tinker (1982).

*Argyrolepecus intermedius* Clarke, 1878: Borets & Sokolovsky (1978).

*Argyrolepecus hemigymnus* Cocco, 1829: Fowler (1949), Baird (1971), Haruta (1975), Amesbury (1975), Borodulina (1978), Loeb (1979), Ridge-Cooney (1987), Quéro *et al. in* Quéro *et al.* (1990), Harold (1993).

TAXONOMY: Baird (1971), Harold (1993).

HAWAIIAN RECORDS: Hawai'i Island to the Hancock Seamounts at 300–850 m (Gilbert, 1905; Haig, 1955; Baird, 1971; Haruta, 1975; Amesbury, 1975; Borodulina, 1978; Ridge-Cooney, 1987).

GENERAL RANGE: Cosmopolitan except in polar seas at 60°N–60°S. Mesopelagic at 100–850 m, 100–650 m at night and 200–700 m during day (Baird, 1971; Ridge-Cooney, 1987; Quéro *et al.* in Quéro *et al.*, 1990).

### *Argyrolepecus sladeni* Regan

*Argyrolepecus sladeni* Regan, 1908, p. 218, Salomon Atoll, Chagos Archipelago.

*Argyrolepecus lynchus* [sic] *hawaiiensis* Schultz, 1961: Schultz (1961).

*Argyrolepecus hawaiiensis* Schultz, 1961: Tinker (1982).

*Argyrolepecus sladeni* Regan, 1908: Haig (1955), Gosline & Brock (1960), Baird (1971), Amesbury (1975), Haruta (1975), Borets & Sokolovsky (1978), Borodulina (1978), Loeb (1979), Ridge-Cooney (1987), Harold (1993).

TAXONOMY: Baird (1971), Harold (1993).

HAWAIIAN RECORDS: Hawai'i Island to Koko Seamount at 250–625 m (Haig, 1955; Baird, 1971; Amesbury, 1975; Haruta, 1975; Ridge-Cooney, 1987).

GENERAL RANGE: Circumglobal between 50°N–40°S in the tropical through temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans. Mesopelagic at 100–375 m at night and 350–625 m during day (Baird, 1971; Borodulina, 1978).

### *Danaphos oculatus* (Garman)

*Mauroliticus oculatus* Garman, 1899, p. 241, Pl. 53 (fig. 3), off California, U.S.A., at 35°19'30"N, 125°21'30"W.

*Danaphos oculatus* (Garman, 1899): Grey (1961), Ahlstrom (1972), Clarke (1974), Amesbury (1975), Loeb (1979), Tinker (1982), Clarke (1982), Ahlstrom *et al.* (1984b), Willis *et al.* (1988).

TAXONOMY: Ahlstrom *et al.* (1984b). No recent review of genus.

HAWAIIAN RECORDS: Hawai'i Island to O'ahu at 400–650 m (Grey, 1961; Clarke, 1974; Amesbury, 1975; Clarke, 1982).

GENERAL RANGE: Eastern North Pacific endemic from northern Mexico to British Columbia and west to the Hawaiian Islands. Grey (1961) stated that *Danaphos* occurs in the Indian Ocean but no other reference to a wider range has been found. Mesopelagic at 400–650 m (Ahlstrom, 1972; Clarke, 1974; Willis *et al.*, 1988).

### Sternoptychidae

maurolicine alpha: Ahlstrom (1974), Ahlstrom *et al.* (1984b).

TAXONOMY: Ahlstrom (1974) described and illustrated distinctive larvae, which he was unable to identify to genus or species, under the non-binomial name "maurolicine alpha". The identity of this larval form remains unknown (Ahlstrom *et al.*, 1984b). The only sternoptychid species from the Hawaiian Islands whose larvae are unknown and which have vertebral counts within the range of the myomere counts of maurolicine alpha larvae are the *Argyripnus* species.

HAWAIIAN RECORDS: "Maurolicine alpha" larvae have been collected at 0–200 m off Hawai'i Island and O'ahu (B. Mundy, unpubl. data; T.A. Clarke, pers. comm.).

GENERAL RANGE: Unknown. Larvae are pelagic at ca. 0–200 m.

### *Mauroliticus imperatorius* Parin & Kobylansky

*Mauroliticus imperatorius* Parin & Kobylansky, 1993, p. 94, Emperor Seamounts at 32°17'N, 173°11'E.

*Mauroliticus muelleri* non (Gmelin, 1789) [a valid species not present in the Emperor Seamounts]: Borets & Sokolovsky (1978), Novikov *et al.* (1981), Humphreys *et al.* (1984), Borets (1986), Boehlert & Mundy (1992), Boehlert *et al.* (1994 — Emperor Seamounts specimens only).

*Mauroliticus imperatorius* Parin & Kobylansky, 1993: Parin & Kobylansky (1993).

TAXONOMY: Parin & Kobylansky (1993).

COMMON NAMES: Emperor Seamount lightfish.

HAWAIIAN RECORDS: The Hancock to Koko seamounts at 0–400 m (Borets & Sokolovsky, 1978; Novikov *et al.*, 1981; Humphreys *et al.*, 1984; Borets, 1986).

GENERAL RANGE: Emperor Seamounts (transition zone?) endemic. Benthopelagic at 0–400 m (Borets, 1986; Parin & Kobylansky, 1993).

***Maurolicus japonicus*** Ishikawa

*Maurolicus japonicus* Ishikawa, 1915, p. 183, Pls. 12–13, Uodan [Uodu], Japan.

*Maurolicus muelleri* non (Gmelin, 1789) [a valid species not present in the Hawaiian Islands]: Struhsaker (1973a), Okiyama (1971), Tinker (1982), Boehlert *et al.* (1994 — Hawaiian and Japanese specimens only).

*Maurolicus japonicus* Ishikawa, 1915: Parin & Kobylansky (1993).

TAXONOMY: Parin & Kobylansky (1993).

COMMON NAMES: North Pacific lightfish.

HAWAIIAN RECORDS: Hawai‘i Island to Maui at 238–400 m (Struhsaker, 1973a).

GENERAL RANGE: North Pacific endemic with a disjunct range in Japan and the Hawaiian Islands; these populations are separated by *M. imperatorius*. Benthopelagic at 50–400 m (Okiyama, 1971; Struhsaker, 1973a).

***Polyipnus matsubarai*** Schultz

*Polyipnus matsubarai* Schultz, 1961, p. 641, Fig. 17, Kumano-Nada, Japan.

*Polyipnus matsubarai* Schultz, 1961: Baird (1971), Borets & Sokolovsky (1978), Novikov *et al.* (1981), Borets (1986), Harold (1994), Parin *et al.* (1995).

TAXONOMY: Baird (1971), Harold (1994).

HAWAIIAN RECORDS: The Hancock Seamounts to Koko Seamount at 20–400 m (Novikov *et al.*, 1981; Borets, 1986; Harold, 1994).

GENERAL RANGE: Pacific transition zone endemic known from the Philippine Sea, Taiwan, Japan, the Kuril Islands, and the Emperor Seamounts. Engybenthic or benthopelagic at 20–500 m, usually at 80–130 m (Baird, 1971; Borets, 1986; Harold, 1994; Parin *et al.*, 1995).

***Polyipnus nuttingi*** Gilbert

*Polyipnus nuttingi* Gilbert, 1905, p. 609, Pl. 73, approach to Pailolo Channel between Moloka‘i and Maui, Hawaiian Islands.

*Polyipnus nuttingi* Gilbert, 1905: Gilbert (1905), Fowler (1928, 1949), Haig (1955), Gosline & Brock (1960), Baird (1971), Struhsaker (1973a), Borets & Sokolovsky (1978), Novikov *et al.* (1981), Tinker (1982), Harold (1994).

TAXONOMY: Baird (1971), Harold (1994).

HAWAIIAN RECORDS: Hawai‘i Island to Koko Seamount at 384–593 m (Gilbert, 1905; Haig, 1955; Struhsaker, 1973a; Novikov *et al.*, 1981).

GENERAL RANGE: Central North Pacific endemic known from the Hawaiian Islands and southern Emperor Seamounts. Engybenthic or benthopelagic at 384–593 m (Baird, 1971; Struhsaker, 1973a; Harold, 1994).

***Sternoptyx diaphana*** Hermann

*Sternoptyx diaphana* Hermann, 1781, p. 33, Pl. (figs. 1–2), off Panama [“original locality Jamaica”].

*Sternoptyx diaphana* Hermann, 1781: Gilbert (1905), Fowler (1928), Gosline & Brock (1960), Baird (1971), Struhsaker (1973a), Amesbury (1975), Haruta & Kawaguchi (1976), Borets & Sokolovsky (1978), Borodulina (1978), Loeb (1979), Novikov *et al.* (1981), Tinker (1982), Ridge-Cooney (1987).

TAXONOMY: Baird (1971).

HAWAIIAN RECORDS: Hawai‘i Island to Koko Seamount at 275–1200 m, 275–<2915 m fishing depths (Gilbert, 1905; Struhsaker, 1973a; Amesbury, 1975; Haruta & Kawaguchi, 1976; Novikov *et al.*, 1981; Ridge-Cooney, 1987).

GENERAL RANGE: Circumglobal between 55°N–55°S in the tropical to cold-temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans except the eastern tropical Pacific. Mesopelagic at 275–1200 m (Baird, 1971; Borodulina, 1978; Ridge-Cooney, 1987).

COMMENTS: The *Sternoptyx* sp. collected at Johnston Atoll by Boehlert *et al.* (1992) were not identified to species.

***Sternoptyx obscura*** Garman

*Sternoptyx obscura* Garman, 1899, p. 232, Pl. 53 (fig. 1), south of Coiba Island, Panama, at 6°17'N, 82°05'W.  
*Sternoptyx obscura* Garman, 1899: Baird (1971), Borodulina (1978), Ridge-Cooney (1987).

TAXONOMY: Baird (1971).

HAWAIIAN RECORDS: O'ahu at 625–825 m (Ridge-Cooney, 1987).

GENERAL RANGE: Indo-transpacific from east Africa to Indonesia, the Philippines, the Hawaiian Islands, California, and Chile, between 40°N–50°S, usually between 25°N–15°S. A few records from the South Atlantic. Mesopelagic at 625–>1000 m (Baird, 1971; Borodulina, 1978; Ridge-Cooney, 1987).

***Sternoptyx pseudobscura*** Baird

*Sternoptyx pseudobscura* Baird, 1971, p. 72, Fig. 54, western Atlantic at 1°20'S, 27°37'W to 1°26'S, 27°33'W.  
*Sternoptyx pseudobscura* Baird, 1971: Baird (1971), Amesbury (1975), Haruta & Kawaguchi (1976), Borets & Sokolovsky (1978), Borodulina (1978), Loeb (1979), Ridge-Cooney (1987).

TAXONOMY: Baird (1971).

HAWAIIAN RECORDS: O'ahu to the Hancock Seamounts at 350–1150 m (Amesbury, 1975; Haruta & Kawaguchi, 1976; Borodulina, 1978; Ridge-Cooney, 1987).

GENERAL RANGE: Circumglobal between 40°N–40°S in the tropical through temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans, except the eastern Pacific. Meso- and bathypelagic at 350–1500 m (Baird, 1971; Borodulina, 1978; Ridge-Cooney, 1987).

***Valenciennellus tripunctulatus*** (Esmark)

*Maurolicus tripunctulatus* Esmark, 1871, p. 489, Madagascar.  
*Valenciennellus tripunctulatus* (Esmark, 1870): Kawaguchi (1971), Clarke (1974), Amesbury (1975), Borets & Sokolovsky (1978), Loeb (1979), Novikov *et al.* (1981), Paxton *et al.* (1989), Quéro *et al. in* Quéro *et al.* (1990), Boehlert *et al.* (1992), Boehlert & Mundy (1992).

TAXONOMY: Kawaguchi (1971), Paxton *et al.* (1989). No recent review.

HAWAIIAN RECORDS: Johnston Atoll and O'ahu to Koko Seamount at 200–330 m at night and 400–550 m during day (Clarke, 1974; Amesbury, 1975; Novikov *et al.*, 1981; Boehlert *et al.*, 1992).

GENERAL RANGE: Circumglobal in all tropical and subtropical seas. Mesopelagic at 100–550 m (Quéro *et al. in* Quéro *et al.*, 1990).

**Phosichthyoidei****Phosichthyidae — Lightfishes<sup>19</sup>*****Ichthyococcus elongatus*** Imai

*Ichthyococcus elongatus* Imai, 1941, p. 234, Fig. 1, Sagami Bay, Japan.  
*Ichthyococcus elongatus* Imai, 1941: Borets & Sokolovsky (1978), Mukhacheva (1980), Novikov *et al.* (1981), Gon (1987), Boehlert & Mundy (1992).

TAXONOMY: Mukhacheva (1980).

HAWAIIAN RECORDS: Records from the Milwaukee to Koko seamounts (Novikov *et al.*, 1981; Mukhacheva, 1980) indicate that this is the *Ichthyococcus* species at the Hancock Seamounts. The *Ichthyococcus* larvae collected at the Hancock Seamounts (Boehlert & Mundy, 1992) were not identified to species.

GENERAL RANGE: Pacific transition zone endemic from Japan and the Emperor Seamounts to British Columbia and California. Mesopelagic at unspecified depths (Mukhacheva, 1980).

***Ichthyococcus intermedius*** Mukhacheva

*Ichthyococcus intermedius* Mukhacheva, 1980, p. 778, western Pacific north of New Guinea at 1°45'S, 143°49'E.  
*Ichthyococcus ovatus* non (Cocco, 1838): Clarke (1974), Loeb (1979)?, Mukhacheva (1980 — Hawaiian record on distribution map).  
*Ichthyococcus intermedius* Mukhacheva, 1980: Mukhacheva (1980 — text), Gon (1987), Boehlert & Mundy (1992).

TAXONOMY: Mukhacheva (1980). The status of *I. intermedius* and *I. ovatus* in Hawai'i needs verification (Boehlert & Mundy, 1992).

HAWAIIAN RECORDS: O'ahu at 150–260 m at night and 400–590 m during day (Clarke, 1974; Gon, 1987). *Ichthyococcus* larvae collected at Johnston Atoll were not identified to species (Boehlert *et al.*, 1992) but may have been this species.

GENERAL RANGE: Tropical and subtropical Pacific endemic known only from New Guinea, the Caroline Islands, and the Hawaiian Islands. Mesopelagic at 150–590 m (Clarke, 1974; Gon, 1987).

[*Pollichthys maui* (Poll)]

*Yarella maui* Poll, 1953, p. 59, Fig. 24, 30 mi. southwest of Pointe-Noir, Congo, south Atlantic at 5°15'S, 11°29'E.

*Pollichthys* species?: Loeb (1979).

*Pollichthys maui* Poll, 1953: Schaefer *et al.* in Smith & Heemstra (1986), Quéro *et al.* in Quéro *et al.* (1990).

TAXONOMY: Schaefer *et al.* in Smith & Heemstra (1986).

COMMON NAMES: Stareye lightfish (AFS).

HAWAIIAN RECORDS: There are no confirmed records of the genus from the central North Pacific Ocean north of the Line Islands, although Loeb (1979) recorded larval *Pollichthys* sp.? from 28°N, 155°W. The species is included here on the basis of Loeb's (1979) record.

GENERAL RANGE: Circumglobal in the tropical Atlantic, Indian, and Pacific oceans but the exact range needs investigation. Mesopelagic, possibly benthopelagic, at 100–200 m at night and 200–600 m during day (Schaefer *et al.* in Smith & Heemstra, 1986; Quéro *et al.*, 1990). *Pollichthys maui* have been collected at Palmyra Atoll in the Line Islands, south of the Hawaiian Islands (B. Mundy, unpubl. data. Feb. 1992).

*Vinciguerria attenuata* (Cocco)

*Maurolicus attenuatus* Cocco, 1838, p. 193, Pl. 8 (fig. 13), Messina, Italy.

*Vinciguerria attenuata* (Cocco, 1838): Fowler (1928, in part), Borets & Sokolovsky (1978), Novikov *et al.* (1981), Badcock in Whitehead *et al.* (1984), Johnson & Feltes (1984), Boehlert & Mundy (1992).

TAXONOMY: Johnson & Feltes (1984).

HAWAIIAN RECORDS: The Hancock to Milwaukee Seamounts, larvae at 100–200 m (Novikov *et al.*, 1981; Boehlert & Mundy, 1992).

GENERAL RANGE: Circumglobal in all subtropical seas. Mesopelagic at 100–500 m at night, 250–600 m during day (Badcock in Whitehead *et al.*, 1984).

*Vinciguerria nimbaria* (Jordan & Williams)

*Zalarges nimbarius* Jordan & Williams in Jordan & Starks, 1895, p. 793, Pl. 76, "northeast of Hawai'i".

*Vinciguerria attenuata* non (Cocco, 1838) [a valid species that also occurs in the Hawaiian Islands]; Fowler (1928, in part).

*Vinciguerria nimbaria* (Jordan & Williams in Jordan & Starks, 1896): Ahlstrom & Counts (1958), Gosline & Brock (1960), Clarke (1974), Borets & Sokolovsky (1978), Loeb (1979), Novikov *et al.* (1981), Tinker (1982), Badcock in Whitehead *et al.* (1984), Johnson & Feltes (1984), Quéro *et al.* in Quéro *et al.* (1990), Boehlert *et al.* (1992), Boehlert & Mundy (1992).

TAXONOMY: Johnson & Feltes (1984).

HAWAIIAN RECORDS: Johnston Atoll and O'ahu to Koko Seamount at 20–125 m at night, 400–560 m during day (Ahlstrom & Counts, 1958; Clarke, 1974; Novikov *et al.*, 1981; Boehlert *et al.*, 1992).

GENERAL RANGE: Circumglobal between 40°N–40°S in the tropical through temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans, except the eastern tropical and eastern North Pacific. Epi- to abyssopelagic but usually mesopelagic at 20–5000 m, 20–125 m at night, 200–560 m during day (Johnson & Feltes, 1984; Badcock in Whitehead *et al.*, 1984; Quéro *et al.*, 1990).

*Vinciguerria poweriae* (Cocco)

*Gonostomus poweriae* Cocco, 1838, p. 167, Pl. 5 (fig. 2), Messina, Italy.

*Vinciguerria poweriae* (Cocco, 1838): Ahlstrom & Counts (1958), Gosline & Brock (1960), Clarke (1974), Loeb (1979), Tinker (1982), Badcock in Whitehead *et al.* (1984), Johnson & Feltes (1984), Boehlert & Mundy (1992).

TAXONOMY: Johnson & Feltes (1984).

HAWAIIAN RECORDS: O'ahu to the Hancock Seamounts at 100–200 m at night, 300–500 m during day (Ahlstrom & Counts, 1958; Clarke, 1974; Boehlert & Mundy, 1992).

GENERAL RANGE: Circumglobal in all subtropical seas. Epi- and mesopelagic at 50–350 m at night, 300–600 m during day (Badcock *in Whitehead et al.*, 1984).

***Woodsia nonsuchae*** (Beebe)

*Photichthys nonsuchae* Beebe, 1932, p. 61, Fig. 11, 7 mi. south-southwest of Nonsuch Island, Bermuda.

*Woodsia* sp. nov.: Loeb (1979)?

*Woodsia nonsuchae* (Beebe, 1932): Grey (1964), Krefft (1973), Clarke (1974), Paxton *et al.* (1989), Boehlert & Mundy (1992).

TAXONOMY: Krefft (1973).

HAWAIIAN RECORDS: O'ahu to the Hancock Seamounts at 530–620 m at night, 875 m during day (Clarke, 1974; Boehlert & Mundy, 1992).

GENERAL RANGE: Known from isolated locations in the tropical and subtropical Atlantic and Pacific oceans. Probably also in the Indian Ocean. Meso- to bathypelagic at 530–1335 m (Grey, 1964; Krefft, 1973; Clarke, 1974; Paxton *et al.*, 1989). Loeb (1979) recorded *Woodsia* sp. nov. from 28°N, 155°W. This identification needs verification.

**Stomiidae — Dragonfishes<sup>20</sup>**

**“Astronesthinae” — Snaggletooths<sup>21</sup>**

***Astronesthes bilobatus*** Parin & Borodulina

*Astronesthes bilobatus* Parin & Borodulina, 1996, p. 591, Fig. 6, western South Pacific at 15°57'S, 146°52'E.

*Astronesthes bilobatus* Parin & Borodulina, 1996: Parin & Borodulina (1996).

TAXONOMY: Parin & Borodulina (1996).

HAWAIIAN RECORDS: O'ahu at 100–1500 and fishing depths to 4000 m (Parin & Borodulina, 1996).

GENERAL RANGE: Indo-Pacific from South Africa (with waifs in the Agulhas Current found in the south-eastern Atlantic) to southeastern Australia, the Kuroshio Current, Caroline Island in the central South Pacific, and the Hawaiian Islands. Epi- and mesopelagic at 50–2230 m, with fishing depths to 4000 m (Parin & Borodulina, 1996).

[*Astronesthes chrysophekadion* (Bleeker)]

*Stomianodon chrysophekadion* Bleeker, 1849a, p. 10, Boleling, north Bali, Indonesia.

*Astronesthes chrysophekadion* (Bleeker, 1849a): Borets & Sokolovsky (1978)?, Sokolovsky & Sokolovskaya (1981)?, Gibbs & McKinney (1986), Parin & Borodulina (1994).

TAXONOMY: Parin & Borodulina (1994).

HAWAIIAN RECORDS: None. Gibbs & McKinney (1986) listed this species from “Oceania” but specimens from this region were not examined by Parin & Borodulina (1994) although the records were accepted as valid. “*A. chrysophekadion*” was reported from the Hawaiian Ridge and Emperor Seamounts by Borets & Sokolovsky (1978) and from the western North Pacific by Sokolovsky & Sokolovskaya (1981). The latter two citations could refer to misidentifications of *A. lucifer* or to *A. fedorovi*, a species described later.

GENERAL RANGE: Indo-Pacific from northeastern Africa to Indonesia, Australia, Japan, and “Oceania”. Benthopelagic at 80–1120 m, juveniles mesopelagic at 100–120 m (Gibbs & McKinney, 1986; Parin & Borodulina, 1994).

***Astronesthes cyaneus*** (Brauer)

*Bathylychnus cyaneus* Brauer, 1902, p. 289, between Sri Lanka and the Maldives at 4°56'N, 78°15'03"E.

*Astronesthes “cyaneus”* (Brauer, 1902): Clarke (1982).

*Astronesthes cyaneus* (Brauer, 1902): Goodyear & Gibbs (1970, in part), Clarke (1974), Parin & Borodulina (1997).

**TAXONOMY:** Parin & Borodulina (1997). Clarke (1982) expressed uncertainty about the identification of Hawaiian specimens but Parin & Borodulina (1997) confirmed that they are this species. Two related species occur near the Hawaiian region: *Astronesthes dupliglandis* Parin & Borodulina, 1997, to the southeast and *A. indopacificus* Parin & Borodulina, 1997, from both southeast and northwest of the Hawaiian Islands (Parin & Borodulina, 1997).

**HAWAIIAN RECORDS:** O'ahu at 80–152 m at night, 600–700 m during day (Goodyear & Gibbs, 1970; Clarke, 1974; Parin & Borodulina, 1997).

**GENERAL RANGE:** Indo-Pacific from Madagascar and perhaps East Africa to Micronesia, the Hawaiian Islands, and eastward near the equator to 98°W. Mesopelagic at 0–700 m (Goodyear & Gibbs, 1970; Clarke, 1974; Parin & Borodulina, 1997).

#### *Astronesthes fedorovi* Parin & Borodulina

*Astronesthes (Stomianodon) fedorovi* Parin & Borodulina, 1994, p. 462, Fig. 2, North Pacific at 30°53'N, 162°01'E.

*Astronesthes chrysophekadion* non (Bleeker, 1849): Borets & Sokolovsky (1978)?, Sokolovsky & Sokolovskaya (1981).

*Astronesthes lucifer* non Gilbert, 1905: Sokolovsky & Sokolovskaya (1981).

Undescribed *Astronesthes* species similar to *A. chrysophekadion*: Gibbs & McKinney (1986).

Undescribed *Astronesthes* species: Boehlert & Mundy (1992).

*Astronesthidae* type 5: Okiyama (1988).

*Astronesthes fedorovi* Parin & Borodulina, 1994: Parin & Borodulina (1994).

**TAXONOMY:** Parin & Borodulina (1994).

**HAWAIIAN RECORDS:** The Hancock to Koko Seamount at 35–500 m (Boehlert & Mundy, 1992; Parin & Borodulina, 1994).

**GENERAL RANGE:** Western and central North Pacific transition zone endemic from Japan and the Kyushu-Palau Ridge to the Emperor Seamounts and the Hawaiian Ridge and slightly eastward, between 20°–38°N. Epi-, meso- and bathypelagic at 35–500 m (Sokolovsky & Sokolovskaya, 1981; Gibbs & McKinney, 1986; Parin & Borodulina, 1994).

#### *Astronesthes gemmifer* Goode & Bean

*Astronesthes gemmifer* Goode & Bean, 1896, p. 105, Pl. 33 (fig. 124), North Atlantic at 44°25'N, 53°12'W.

*Astronesthes gemmifer* Goode & Bean, 1896: Gibbs (1964), Clarke (1974), Gibbs in Whitehead *et al.* (1984), Parin & Borodulina (2000).

**TAXONOMY:** Parin & Borodulina (2000).

**HAWAIIAN RECORDS:** O'ahu to the Hancock Seamounts at 245 m at night, 58–1150 m during day (Clarke, 1974; R. Gibbs, unpubl. presentation, 1986 ASIH meeting; Parin & Borodulina, 2000).

**GENERAL RANGE:** Circumglobal in the tropical and subtropical Gulf of Mexico, Atlantic, Indian, and Pacific oceans except for the eastern Pacific between 30°N–30°S. Few specimens have been collected outside of the North Atlantic; known only from the Hawaiian Islands in the central Pacific. Epi-, meso-, and bathy-benthopelagic at 58–1900 m, to 3200 m fishing depths (Gibbs, 1964; Clarke, 1974; Gibbs in Whitehead *et al.*, 1984; Parin & Borodulina, 2000).

#### *Astronesthes indicus* Brauer

*Astronesthes indicus* Brauer, 1902, p. 287, between Zanzibar and the Seychelles at 5°12'05"S, 46°32'03"E.

*Astronesthes indicus* Brauer, 1902: Gibbs (1964, in part), Clarke (1974), Amesbury (1975), Borets & Sokolovsky (1978), Novikov *et al.* (1981), Sokolovsky & Sokolovskaya (1981), Gibbs in Smith & Heemstra (1986), Parin & Borodulina (1996).

**TAXONOMY:** Parin & Borodulina (1996).

**HAWAIIAN RECORDS:** O'ahu to Milwaukee Seamount at 30–750 m at night, 500–800 m during day, with fishing depths recorded to 2000 m (Clarke, 1974; Amesbury, 1975; Novikov *et al.*, 1981; Parin & Borodulina, 1996).

**GENERAL RANGE:** Indo-Pacific, primarily tropical but also warm-temperate, from east Africa and the Arabian Gulf to northwestern Australia, southern Japan, the Hawaiian Islands, and the Galapagos Islands. Rare or absent from the central ocean gyres. Records from the Atlantic Ocean and Gulf of



Mexico refer to *A. atlanticus* Parin & Borodulina, 1996. Mesopelagic at 1–1000 m, with fishing depths to 2000 m (Gibbs, 1964, in part; Clarke, 1974; Novikov *et al.*, 1981; Sokolovsky & Sokolovskaya, 1981; Parin & Borodulina, 1996).

[*Astronesthes indopacificus* Parin & Borodulina]

*Astronesthes indopacificus* Parin & Borodulina, 1997, p. 781, Fig. 4, equatorial Pacific at 0°18'N, 150°12'W.

*Astronesthes cyaneus* non (Brauer, 1902): Goodyear & Gibbs (1970, in part), Borets & Sokolovsky (1978) in part?, Sokolovsky & Sokolovskaya (1981) in part?

*Astronesthes indopacificus* Parin & Borodulina, 1997: Parin & Borodulina (1997).

TAXONOMY: Parin & Borodulina (1997; noted that the illustration of this species published in the English translation of its description is actually of *A. dupliglandis*; the correct illustration was published as an erratum in *J. Ichthyol.* 1998, vol. 38, no. 6, p. 490).

HAWAIIAN RECORDS: None but records from 0°18'N, 150°12'W (the type locality) and 29°51'N, 163°58'E (Parin & Borodulina, 1997) indicate that this species can be expected throughout the Hawaiian region.

GENERAL RANGE: Indo-Pacific from the central Indian Ocean southeast of Sri Lanka to the Ryukyus, southeastern Australia, Micronesia and eastward to 29°51'N, 163°58'E and 140°W at the equator. Epi- and mesopelagic from the surface to 1000 m and fishing depths of 3178 m (Parin & Borodulina, 1997).

*Astronesthes lucifer* Gilbert

*Astronesthes lucifer* Gilbert, 1905, p. 605, Pl. 71 (fig. 3), off Kaua'i, Hawaiian Islands.

*Astronesthes ijimai* non Tanaka, 1908 [a valid Japanese endemic species]: Humphreys *et al.* (1984) in part?

*Astronesthes lucifer* Gilbert, 1905: Gilbert (1905), Fowler (1928, 1949), Gosline & Brock (1960), Struhsaker (1973a), Clarke (1974), Borets & Sokolovsky (1978) in part?, Novikov *et al.* (1981) in part?, Tinker (1982), Humphreys *et al.* (1984) in part?, Uchida & Uchiyama (1986), Gibbs & McKinney (1986), Reid *et al.* (1991), Parin & Borodulina (1994).

TAXONOMY: Parin & Borodulina (1994).

HAWAIIAN RECORDS: Hawai'i Island to Kaua'i and perhaps Milwaukee Seamount at 25–195 m at night, 250–704 m during day, to 1867 m fishing depths (Gilbert, 1905; Struhsaker, 1973a; Clarke, 1974; Novikov *et al.*, 1981; Humphreys *et al.*, 1984; Uchida & Uchiyama, 1986; Reid *et al.*, 1991). Records from the northern Hawaiian Ridge and Emperor Seamounts are conflated with records of *A. fedorovi* Parin & Borodulina, 1994.

GENERAL RANGE: Pacific endemic from Australia, Japan, and the Hawaiian Islands. Benthopelagic at 25–704 m (Struhsaker, 1973a; Clarke, 1974; Gibbs & McKinney, 1986; Reid *et al.*, 1991; Parin & Borodulina, 1994).

*Astronesthes luetkeni* Regan & Trewavas

*Astronesthes luetkeni* Regan & Trewavas, 1929, p. 16, Fig. 5, "Indian Ocean".

*Astronesthes luetkeni* Regan & Trewavas, 1929: Fowler (1949), Gibbs (1964), Clarke (1974), Sokolovsky & Sokolovskaya (1981), Parin & Borodulina (1998).

TAXONOMY: Parin & Borodulina (1998).

HAWAIIAN RECORDS: O'ahu at 26–200 m at night, 600–800 m during day (Clarke, 1974; Parin & Borodulina, 1998).

GENERAL RANGE: Indo-Pacific from the Seychelles and northeastern Indian Ocean to the Kuroshio Current east of Japan, Micronesia, the Coral Sea, the Hawaiian Islands and the central tropical Pacific. Perhaps benthopelagic but occasionally epi- and mesopelagic at 26–800 m (Clarke, 1974; Sokolovsky & Sokolovskaya, 1981; Parin & Borodulina, 1998). A similar eastern Pacific endemic species, *A. lampara* Parin & Borodulina, 1998, has been collected south of Hawai'i Island and northeast of the Line Islands (Parin & Borodulina, 1998).

*Astronesthes nigroides* Gibbs & Aron

*Astronesthes nigroides* Gibbs & Aron, 1960, p. 134, Fig. 1, eastern Pacific of California at 38°55'42"N, 137°44'36"W.

*Astronesthes nigroides* Gibbs & Aron, 1960: Sokolovsky & Sokolovskaya (1981), Borodulina (1992).

TAXONOMY: Borodulina (1992).

HAWAIIAN RECORDS: 27°37'N, 174°00'W, north of Lisianski and east of Pearl and Hermes Reef, at surface (Borodulina, 1992). Undoubtedly northward through the Hancock Seamounts.

GENERAL RANGE: Subarctic and subtropical North and South Pacific endemic, perhaps centered in the northern and southern transition zones. Epipelagic (and mesopelagic?) at 1–50 m (Sokolovsky & Sokolovskaya, 1981; Borodulina, 1992).

***Astronesthes quasiindicus* Parin & Borodulina**

*Astronesthes quasiindicus* Parin & Borodulina, 1996, p. 588, Fig. 4, off O'ahu, Hawaiian Islands, at 21°15'N, 158°15'W.

*Astronesthes quasiindicus* Parin & Borodulina, 1996: Parin & Borodulina (1996).

TAXONOMY: Parin & Borodulina (1996).

HAWAIIAN RECORDS: O'ahu at 725–2000 m (Parin & Borodulina, 1996).

GENERAL RANGE: Indo-Pacific, known from disjunct localities near east Africa, the Arabian Gulf, south of India, southeast of Mindanao, north of New Guinea, and at the Hawaiian Islands. Mesopelagic at 100–2000 m (Parin & Borodulina, 1996).

***Astronesthes splendidus* Brauer**

*Astronesthes splendidus* Brauer, 1902, p. 288, Indian Ocean south of Sri Lanka at 4°56'N, 78°15'13"E.

*Astronesthes splendidus* Brauer, 1902: Gibbs (1964), Clarke (1974), Sokolovsky & Sokolovskaya (1981), Parin & Borodulina (2000).

TAXONOMY: Parin & Borodulina (2000).

HAWAIIAN RECORDS: O'ahu at 25–130 m at night, 600–800 m during day (Clarke, 1974).

GENERAL RANGE: Indo-Pacific from South Africa to Ceylon, Indonesia, northern and southeastern Australia, the Ogasawara Islands, Micronesia, New Caledonia, and the Hawaiian Islands, eastward to 6°56'N, 140°32'W. Epi- and mesopelagic at 1–800 m (Gibbs, 1964; Clarke, 1974; Sokolovsky & Sokolovskaya, 1981; Parin & Borodulina, 2000).

[***Astronesthes tchuvasovi* Parin & Borodulina**]

*Astronesthes tchuvasovi* Parin & Borodulina, 1996, p. 587, Fig. 3, eastern Pacific at 2°02'S, 97°01'W.

*Astronesthes tchuvasovi* Parin & Borodulina, 1996: Parin & Borodulina (1996).

TAXONOMY: Parin & Borodulina (1996).

HAWAIIAN RECORDS: None. The O'ahu locality shown on the distribution map of Parin & Borodulina (1996, fig. 8a) is apparently an error. Parin & Borodulina (1996) did not include Hawaiian records in their list of material examined or in their text describing this species range.

GENERAL RANGE: Equatorial Indo-Pacific from the southern Arabian Gulf to Indonesia and the eastern Pacific west of the Galapagos Islands. Epi- and mesopelagic at 65–855 m (Parin & Borodulina, 1996).

***Astronesthes trifibulatus* Gibbs, Amaoka, & Haruta**

*Astronesthes trifibulatus* Gibbs, Amaoka & Haruta, 1984, p. 5, Figs. 1, 2 (C-G), off O'ahu, Hawaiian Islands, at 21°20'N, 158°20'W.

*Astronesthes* sp. (near *similis*) [see next name]: Clarke (1974).

*Astronesthes* "*similis*" non Parr, 1927 [a misspelling of *A. similis* Parr, 1927, a valid species not found in the Hawaiian Islands]: Clarke (1982).

*Astronesthes trifibulatus* Gibbs, Amaoka & Haruta, 1984: Gibbs *et al.* (1984).

TAXONOMY: Gibbs *et al.* (1984).

HAWAIIAN RECORDS: O'ahu at 50–200 m at night, 500–640 m during day (Clarke, 1974).

GENERAL RANGE: Indo-Pacific from South Africa to Taiwan, Vanuatu, the Hawaiian Islands, the Line Islands, and the Marquesas. Mesopelagic at 1–670 m (Gibbs *et al.*, 1984).

***Borostomias pacificus*** (Imai)

*Diplolychnus pacificus* Imai, 1941, p. 235, Figs. 2–3, Suruga Bay, Japan.

*Diplolychnus mononema* non Regan & Trewavas, 1929 [a valid species of *Borostomias* not found in the Hawaiian Islands]: Gibbs (1964).

*Borostomias mononema* non (Regan & Trewavas, 1929): Sokolovsky & Sokolovskaya (1981).

*Borostomias pacificus* (Imai, 1941): Weitzman (1967), Ishii in Masuda *et al.* (1984), Gibbs in Smith & Heemstra (1986).

TAXONOMY: Weitzman (1967). Sokolovsky & Sokolovskaya (1981) considered this species to be a junior synonym of *B. mononema* (Regan & Trewavas, 1929) but Gibbs (*in* Smith & Heemstra, 1986) did not include *B. pacificus* in synonymy with *B. mononema*. Ishii in Masuda *et al.* (1984) argued that the species are distinct.

HAWAIIAN RECORDS: Main Hawaiian Islands to the Hancock Seamounts (R.H. Gibbs, unpubl. paper presented at the 1986 ASIH meeting).

GENERAL RANGE: Western and central North Pacific endemic known from Japan and the Hawaiian Islands. (Circumglobal in the tropical through warm-temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans if *B. mononema* and *B. pacificus* are synonyms.) Meso- and bathypelagic at 350–1400 m (Gibbs, 1964; Ishii in Masuda *et al.*, 1984; Sokolovsky & Sokolovskaya, 1981).

***Heterophotus ophistoma*** Regan & Trewavas

*Heterophotus ophistoma* Regan & Trewavas, 1929, p. 29, Pl. 6 (fig. 1), North Atlantic.

*Heterophotus ophistoma* Regan & Trewavas, 1929: Gibbs (1964), Clarke (1974), Sokolovsky & Sokolovskaya (1981), Clarke (1982), Fujii in Masuda *et al.* (1984), Sutton & Hopkins (1996).

TAXONOMY: Gibbs (1964).

HAWAIIAN RECORDS: O'ahu at 50–200 m at night, 625–1000 m during day (Clarke, 1974; Clarke, 1982).

GENERAL RANGE: Circumtropical and subtropical in the Gulf of Mexico, Atlantic, Indian, and Pacific oceans. Meso- and bathypelagic at 50–1420 m (Gibbs, 1964; Sokolovsky & Sokolovskaya, 1981; Fujii in Masuda *et al.*, 1984; Sutton & Hopkins, 1996).

***Neonesthes capensis*** (Gilchrist & von Bonde)

*Astronesthes capensis* Gilchrist & von Bonde, 1924, p. 5, Off Table Bay, South Africa.

*Neonesthes* sp. [?]: Boehlert & Mundy (1992).

*Neonesthes capensis* (Gilchrist & von Bonde, 1924): Gibbs (1964), Sokolovsky & Sokolovskaya (1981), Gibbs in Smith & Heemstra (1986), Gibbs in Quéro *et al.* (1990), Moser (1996).

TAXONOMY: Gibbs in Smith & Heemstra (1986).

HAWAIIAN RECORDS: Larval *Neonesthes* collected at the Hancock Seamounts and not identified to species by Boehlert & Mundy (1992) were tentatively identified as *N. capensis* by Moser (1996). *N. capensis* has been collected from 38°00'N, 142°15'E at 1085 m (Sokolovsky & Sokolovskaya, 1981) and Gibbs (*in* Quéro *et al.*, 1990) recorded this species from “near Hawaii”. These records suggest that *N. capensis* could occur from the main Hawaiian Islands to the Hancock Seamounts.

GENERAL RANGE: Circumglobal in the Atlantic, Indian, and Pacific oceans. *Neonesthes capensis* occurs primarily in subtropical through temperate regions. Mesopelagic at 70–1650 m (Gibbs, 1964; Gibbs in Smith & Heemstra, 1986).

***Neonesthes microcephalus*** Norman

*Neonesthes microcephalus* Norman, 1930, p. 307, Fig. 16, southeast Atlantic at 15°55'00"S, 10°35'00"E.

*Neonesthes microcephalus* Norman, 1930: Gibbs (1964), Clarke (1974), Gibbs in Smith & Heemstra (1986), Gibbs in Quéro *et al.* (1990).

TAXONOMY: Gibbs (1964), Gibbs in Quéro *et al.* 1990).

HAWAIIAN RECORDS: O'ahu at 640–1600 m (Clarke, 1974).

GENERAL RANGE: Circumglobal in the Atlantic, Indian, and Pacific oceans. Meso- and bathypelagic at 640–1600 m. *Neonesthes microcephalus* is primarily tropical and is absent in the North Atlantic (Clarke, 1974; Gibbs in Smith & Heemstra, 1986).

**“Stomiinae”**  
**“Stomiini” — Scaly dragonfishes**

***Stomias danae* Ege**

*Stomias danae* Ege, 1933, p. 235, East of Samoa at 13°14'S, 169°51'W.

*Stomias danae* Ege, 1933: Gibbs (1969), Clarke (1974), Shcherbachev & Novikova (1976), Clarke (1982), Cowles & Childress (1995).

TAXONOMY: Gibbs (1969), Shcherbachev & Novikova (1976).

HAWAIIAN RECORDS: Hawai'i Island to O'ahu at 100–>400 m (Gibbs, 1969; Clarke, 1974; Cowles & Childress, 1995). The *Stomias* sp. from Hawai'i Island at 869 m (Struhsaker, 1973a) and the “several” species mentioned by Tinker (1982) were not identified.

GENERAL RANGE: Circumglobal but rare and disjunct in the tropical and subtropical southwestern Atlantic, southwestern Indian, central North Pacific, and South Pacific oceans. Absent from the North Atlantic and eastern Pacific. Mesopelagic at 100–2671 m fishing depths (Gibbs, 1969; Clarke, 1974; Shcherbachev & Novikova, 1976).

***Stomias (Macrostomias) longibarbatus* (Brauer)**

*Macrostomias longibarbatus* Brauer, 1902, p. 283, Gulf of Guinea.

*Macrostomias longibarbatus* Brauer, 1902: Morrow (1964), Clarke (1974), Shcherbachev & Novikova (1976).

*Stomias longibarbatus* (Brauer, 1902): Fink & Fink (1986), Paxton *et al.* (1989), Sutton & Hopkins (1996).

TAXONOMY: Shcherbachev & Novikova (1976), Fink & Fink (1986). Clarke (1974) noted that his tentatively identified *S. longibarbatus* (Brauer, 1902) had anal fin ray counts intermediate between that species and *S. pacificus* (Fedorov & Melchikova, 1971), suggesting that the two could be synonymous. Paxton *et al.* (1989) agreed, using evidence from Australian specimens.

HAWAIIAN RECORDS: O'ahu (Clarke, 1974; Shcherbachev & Novikova, 1976).

GENERAL RANGE: Circumglobal in the tropical through temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans. Meso- and bathypelagic at 400–1463 m (Morrow, 1964; Shcherbachev & Novikova, 1976; Paxton *et al.*, 1989; Sutton & Hopkins, 1996).

**[*Stomias nebulosus* Alcock]**

*Stomias nebulosus* Alcock, 1889b, p. 451, Gulf of Manaar, 6°29'N, 79°34'E.

*Stomias nebulosus* Alcock, 1889b: Gibbs (1969), Shcherbachev & Novikova (1976), Borets & Sokolovsky (1978), Novikov *et al.* (1981).

TAXONOMY: Gibbs (1969), Shcherbachev & Novikova (1976).

HAWAIIAN RECORDS: A record from Milwaukee Seamount (Novikov *et al.*, 1981) needs verification.

GENERAL RANGE: Indo-west and South Pacific from South Africa to southern Japan, New Guinea, the Austral Islands, and the Marquesas. Mesopelagic at 100–400 m at night, 900–1000 m during day (Gibbs, 1969; Shcherbachev & Novikova, 1976).

***Stomias (Macrostomias) pacificus* (Fedorov & Melchikova)**

*Macrostomias pacificus* Fedorov & Melchikova, 1971, p. 764, Fig. 2, North Pacific at 37°27'N, 152°00.5'E.

*Macrostomias pacificus* Fedorov & Melchikova, 1971: Shcherbachev & Novikova (1976), Borets & Sokolovsky (1978), Novikov *et al.* (1981).

*Stomias pacificus* (Fedorov & Melchikova, 1971): Fink & Fink (1986).

TAXONOMY: Shcherbachev & Novikova (1976), Fink & Fink (1986). See *S. longibarbatus*.

HAWAIIAN RECORDS: South of the Hancock to Milwaukee Seamount (Shcherbachev & Novikova, 1976; Novikov *et al.*, 1981). Larvae of *S. longibarbatus* or *pacificus* have been collected at the Hancock Seamounts (Boehlert & Mundy, 1992).

GENERAL RANGE: Northwestern Pacific transition zone endemic known from southern Japan to the Emperor Seamounts. Mesopelagic (Shcherbachev & Novikova, 1976).

**“Chauliodontini” — Viperfishes*****Chauliodus sloani* Bloch & Schneider**

*Chauliodus sloani* Bloch & Schneider, 1801, p. 430, Pl. 85, Gibraltar.

*Chauliodus dentatus* Garman, 1899: Fowler (1934, 1949).

*Chauliodus sloani* Bloch & Schneider, 1801: Morrow (1964), Parin & Novikova (1974), Clarke (1974), Amesbury (1975), Borets & Sokolovsky (1978), Loeb (1979), Novikov *et al.* (1981), Tinker (1982), Humphreys *et al.* (1984), Boehlert & Mundy (1992).

TAXONOMY: Indo-Pacific populations differ enough from Atlantic and South Indian and Pacific ocean populations to deserve further taxonomic investigation (Parin & Novikova, 1974).

COMMON NAMES: Sloan's viperfish.

HAWAIIAN RECORDS: O'ahu to Koko Seamount at 45–225 m at night, 450–825 m during day (Clarke, 1974; Amesbury, 1975; Novikov *et al.*, 1981).

GENERAL RANGE: Circumglobal, with gaps where replaced by similar species, in the tropical through temperate regions of all oceans from 50°N–50°S except the eastern tropical and eastern North Pacific. Meso- and bathypelagic from near the surface to 2800 m (Morrow, 1964; Parin & Novikova, 1974).

**“Melanostomiinae” — Scaleless black dragonfishes*****Bathophilus altipinnis* Beebe**

*Bathophilus altipinnis* Beebe, 1933b, p. 162, Fig. 2, 8 mi. south of Nonsuch Island, Bermuda.

*Bathophilus* cf. *altipinnis*? Beebe, 1933b: Clarke (1974).

*Bathophilus altipinnis* Beebe, 1933b: Morrow & Gibbs (1964), Barnett & Gibbs (1968), Sutton & Hopkins (1996).

TAXONOMY: Barnett & Gibbs (1968). Hawaiian Islands specimens were only tentatively identified as this species (Clark, 1974).

HAWAIIAN RECORDS: O'ahu at 170–265 m at night, 640 m during day (Clarke, 1974).

GENERAL RANGE: Known only from the Gulf of Mexico, western North Atlantic and the Hawaiian Islands. Meso- and bathypelagic at 170–1463 m (Morrow & Gibbs, 1964; Barnett & Gibbs, 1968; Clarke, 1974; Sutton & Hopkins, 1996).

COMMENTS: The *Bathophilus* larvae collected at the Hancock Seamounts could not be identified to species (Boehlert & Mundy, 1992).

***Bathophilus brevis* Regan & Trewavas**

*Bathophilus brevis* Regan & Trewavas, 1930, p. 66, Pl. 3 (fig. 1), “North Atlantic”.

*Bathophilus brevis* Regan & Trewavas, 1930: Morrow & Gibbs (1964), Barnett & Gibbs (1968), Clarke (1974).

TAXONOMY: Barnett & Gibbs (1968).

HAWAIIAN RECORDS: O'ahu to the Hancock Seamounts at 200–225 m at night (Clarke, 1974; NMFS, unpubl. data).

GENERAL RANGE: Circumglobal in the tropical through temperate Atlantic, Indian, and Pacific oceans. Meso- and bathypelagic at 75–1650 m (Morrow & Gibbs, 1964; Barnett & Gibbs, 1968).

***Bathophilus digitatus* (Welsh)**

*Dactylostomias digitatus* Welsh, 1923, p. 9, Fig. 9, 225 mi. west of Bermuda.

*Bathophilus digitatus* (Welsh, 1923): Morrow & Gibbs (1964), Barnett & Gibbs (1968), Clarke (1974), Sutton & Hopkins (1996).

TAXONOMY: Barnett & Gibbs (1968).

HAWAIIAN RECORDS: O'ahu at 125–175 m at night, 520–550 m during day (Clarke, 1974).

GENERAL RANGE: Circumglobal in the tropical and subtropical Gulf of Mexico, Atlantic, Indian, and Pacific oceans. Mesopelagic at 75–550 m (Morrow & Gibbs, 1964; Barnett & Gibbs, 1968; Clarke, 1974; Sutton & Hopkins, 1996).

***Bathophilus kingi* Barnett & Gibbs**

*Bathophilus kingi* Barnett & Gibbs, 1968, p. 830, Pacific Ocean at 1°34'S, 133°27.5'W to 1°44.9'S, 133°44'W.  
*Bathophilus kingi* Barnett & Gibbs, 1968: Barnett & Gibbs (1968), Clarke (1974).

TAXONOMY: Barnett & Gibbs (1968).

HAWAIIAN RECORDS: O'ahu to north of French Frigate at 50–225 m at night, 590–1100 m during day (Barnett & Gibbs, 1968; Clarke, 1974).

GENERAL RANGE: Pacific Plate endemic known from the Hawaiian Islands in the central North Pacific to the eastern South Pacific. Mesopelagic at 1–1100 m (Barnett & Gibbs, 1968; Clarke, 1974).

***Bathophilus longipinnis* (Pappenheim)**

*Melanostomias longipinnis* Pappenheim, 1914, p. 170, Fig. 1, North Atlantic northwest of Cape Verde at 24°41'N, 32°21'W.

*Bathophilus longipinnis* (Pappenheim, 1914): Morrow & Gibbs (1964), Barnett & Gibbs (1968), Clarke (1974), Paxton *et al.* (1989), Sutton & Hopkins (1996).

TAXONOMY: Barnett & Gibbs (1968).

HAWAIIAN RECORDS: O'ahu at 100–1175 m (Clarke, 1974).

GENERAL RANGE: Circumglobal in the tropical Gulf of Mexico, Atlantic, Indian, and Pacific oceans. Meso- and bathypelagic at 20–1646 m (Morrow & Gibbs, 1964; Barnett & Gibbs, 1968; Clarke, 1974; Paxton *et al.*, 1989; Sutton & Hopkins, 1996).

***Bathophilus pawneeii* Parr**

*Bathophilus pawneeii* Parr, 1927, p. 88, Fig. 51, off the Bahamas.

*Bathophilus pawneeii* Parr, 1927: Morrow & Gibbs (1964), Barnett & Gibbs (1968), Clarke (1974), Paxton *et al.* (1989), Sutton & Hopkins (1996).

TAXONOMY: Barnett & Gibbs (1968).

HAWAIIAN RECORDS: O'ahu at 40–195 m at night, 690 m during day (Clarke, 1974).

GENERAL RANGE: Circumglobal in the tropical through subtropical Gulf of Mexico, Atlantic, Indian, and Pacific oceans. Meso- and bathypelagic at 40–1500 m (Morrow & Gibbs, 1964; Barnett & Gibbs, 1968; Clarke, 1974; Paxton *et al.*, 1989; Sutton & Hopkins, 1996).

***Bathophilus schizochirus* Regan & Trewavas**

*Bathophilus schizochirus* Regan & Trewavas, 1930, p. 67, Pl. 4 (fig. 2), near the Bahamas at 25°50'N, 76°55'W.

*Bathophilus schizochirus* Regan & Trewavas, 1930: Barnett & Gibbs (1968), Clarke (1974), Sutton & Hopkins (1996).

TAXONOMY: Barnett & Gibbs (1968).

HAWAIIAN RECORDS: O'ahu at 265 m (Clarke, 1974).

GENERAL RANGE: Circumglobal in the Gulf of Mexico, Atlantic, Indian, and Pacific oceans. Mesopelagic at ca. 265 m (Barnett & Gibbs, 1968; Clarke, 1974; Sutton & Hopkins, 1996).

***Echiostoma barbatum* Lowe**

*Echiostoma barbatum* Lowe, 1843, p. 88, off Madeira.

*Echiostoma barbatum* Lowe, 1843: Krueger & Gibbs (1966), Clarke (1974), Borets & Sokolovsky (1978), Novikov *et al.* (1981), Paxton *et al.* (1989), Smith *et al.* (1992).

TAXONOMY: Krueger & Gibbs (1966).

HAWAIIAN RECORDS: O'ahu to Koko Seamount; juveniles at 30–185 m at night, 800 m during day (Clarke, 1974; Novikov *et al.*, 1981).

GENERAL RANGE: Circumglobal in the tropical through temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans. Meso- to abyssopelagic at 30–4200 m (Clarke, 1974; Paxton *et al.*, 1989; Smith *et al.*, 1992).

***Eustomias albibulbus* Clarke**

*Eustomias albibulbus* Clarke, 2001, p. 695, Fig. 4C, near southwest O'ahu, Hawaiian Islands, at 21°10'–30'N, 158°10'–30'W.

*Eustomias albibulbus* Clarke, 2001: Clarke (2001).

TAXONOMY: Clarke (2001).

HAWAIIAN RECORDS: O'ahu at 0–350 m fishing depths (Clarke, 2001).

GENERAL RANGE: Hawaiian Islands endemic known only from near southwest O'ahu. Epi- and mesopelagic at 0–350 m fishing depths (Clarke, 2001).

COMMENTS: Despite the large number of species described from the Hawaiian Islands and elsewhere by Clarke in his series of papers, Clarke (2001, p. 698) stated that his “own unpublished data and notes of the late R.H. Gibbs Jr. indicate that there are also undescribed species” in the genus *Eustomias*. Clearly, more work remains to be done on the taxonomy of this genus.

***Eustomias bibuloides*** Gibbs, Clarke, & Gomon

*Eustomias bibuloides* Gibbs, Clarke & Gomon, 1983, p. 28, Fig. 5g, off O'ahu, Hawaiian Islands at 21°20'N, 158°20'W.

*Eustomias bibulbosus* non Parr, 1927 [a valid species not recorded from the Hawaiian Islands]: Clarke (1974, in part), Parin & Pokhilskaya (1974, in part).

*Eustomias bibuloides* Gibbs, Clarke & Gomon, 1983: Gibbs *et al.* (1983).

TAXONOMY: Gibbs *et al.* (1983).

HAWAIIAN RECORDS: O'ahu at 75–300 m at night, 600–960 m during day (Clarke, 1974; Parin & Pokhilskaya, 1974).

GENERAL RANGE: Pacific Plate endemic known only from the Hawaiian Islands and oceanic locations in the central and eastern South Pacific. Mesopelagic at 75–960 m (Clarke, 1974; Gibbs *et al.*, 1983).

***Eustomias bifilis*** Gibbs

*Eustomias bifilis* Gibbs, 1960, p. 202, Fig. 1 (right), eastern Pacific off Baja California at 24°35.5'N, 121°17'W. *Eustomias bifilis* Gibbs, 1960: Gibbs (1960), Parin & Pokhilskaya (1974), Clarke (1974, 1982), Gibbs *et al.* (1983), Fujii *in* Masuda *et al.* (1984).

TAXONOMY: Gibbs *et al.* (1983).

HAWAIIAN RECORDS: O'ahu at 15–200 m at night, 635–800 m during day (Parin & Pokhilskaya, 1974; Clarke, 1974).

GENERAL RANGE: Indo-Pacific from the Arabian Sea to northeastern Australia, Japan, Vanuatu, the Hawaiian Islands, and east to Baja California. Mesopelagic at 15–800 m (Gibbs, 1960; Clarke, 1974; Parin & Pokhilskaya, 1974; Fujii *in* Masuda *et al.*, 1984).

***Eustomias bigelowi*** Welsh

*Eustomias bigelowi* Welsh, 1923, p. 6, Figs. 5–6, 170 mi southeast of Cape Hatteras, North Carolina, at 34°03'N, 73°30'W.

*Eustomias bigelowi* Welsh, 1923: Gibbs (1971), Parin & Pokhilskaya (1974), Gibbs *et al.* (1983), Clarke (1987, 2000, 2001), Gibbs & Barnett *in* Quéro *et al.* (1990).

TAXONOMY: Clarke (2000).

HAWAIIAN RECORDS: The vicinity of Cross Seamount to O'ahu and waters north of Kaua'i at unspecified depths (Clarke, 2000, 2001).

GENERAL RANGE: Probably circumglobal primarily in tropical and subtropical waters with records from the Gulf of Mexico, North and South Atlantic from 37°N–25°S, Indian Ocean, Kuroshio Current east of Japan, the Hawaiian Islands, and the southeastern Pacific. Mesopelagic at 150–400 m (Gibbs, 1971; Parin & Pokhilskaya, 1974; Gibbs & Barnett *in* Quéro *et al.*, 1990; Clarke, 2000).

***Eustomias bimargaritoides*** Gibbs, Clarke, & Gomon

*Eustomias bimargaritoides* Gibbs, Clarke & Gomon, 1983, p. 58, Figs. 12(c, e), 13a, North Pacific at 27°28'N, 155°26'W.

*Eustomias bibulbosus* non Parr, 1927 [a valid species not recorded from the Hawaiian Islands]: Clarke (1974, in part).

*Eustomias bimargaritoides* Gibbs, Clarke & Gomon, 1983: Gibbs *et al.* (1983).

TAXONOMY: Gibbs *et al.* (1983).

HAWAIIAN RECORDS: O'ahu at 75–300 m at night, 600–960 m during day (Clarke, 1974).

GENERAL RANGE: Central Pacific endemic known from the Hawaiian Islands and the Marquesas. Mesopelagic at 1–1200 m fishing depths (Gibbs *et al.*, 1983).

***Eustomias bituberoides*** Gibbs, Clarke, & Gomon

*Eustomias bituberoides* Gibbs, Clarke & Gomon, 1983, p. 36, Fig. 4e, off O'ahu, Hawaiian Islands, at 21°30'N, 158°20'W.

*Eustomias bibulbosus* non Parr, 1927 [a valid species not recorded from the Hawaiian Islands]: Clarke (1974, in part).

*Eustomias bituberoides* Gibbs, Clarke & Gomon, 1983: Gibbs *et al.* (1983).

TAXONOMY: Gibbs *et al.* (1983).

HAWAIIAN RECORDS: O'ahu at 75–300 m at night, 600–960 m during day (Clarke, 1974).

GENERAL RANGE: Central Pacific endemic known from the Hawaiian Islands and the eastern South Pacific. Epi- and mesopelagic at 1–1050 fishing depths (Gibbs *et al.*, 1983).

***Eustomias bulbiramis*** Clarke

*Eustomias bulbiramis* Clarke, 2001, p. 692, Fig. 3D, near southwest O'ahu, Hawaiian Islands, at 21°10–30'N, 158°10–30'W.

*Eustomias bulbiramis* Clarke, 2001: Clarke (2001).

TAXONOMY: Clarke (2001).

HAWAIIAN RECORDS: O'ahu at 0–396 m fishing depths (Clarke, 2001).

GENERAL RANGE: Hawaiian endemic known only from near southwest O'ahu, but Clarke (2001, p. 693) suggested “That this species was taken so infrequently but once in large numbers in an area that was heavily sampled between the late 1960s and mid-1970s indicates that it may normally occur elsewhere in the North Pacific and only occasionally near Hawaii.” Epi- and mesopelagic at 0–396 m fishing depths (Clarke, 2001).

***Eustomias cancriensis*** Gibbs, Clarke, & Gomon

*Eustomias cancriensis* Gibbs, Clarke & Gomon, 1983, p. 93, Figs. 27c-d, western Pacific at 25°13'N, 128°32'E.

*Eustomias patulus* non Regan & Trewavas, 1930 [a valid Atlantic species]: Johnson & Rosenblatt (1971, in part).

*Eustomias cancriensis* Gibbs, Clarke & Gomon, 1983: Gibbs *et al.* (1983).

TAXONOMY: Gibbs *et al.* (1983).

HAWAIIAN RECORDS: West of Midway at 1–1500 m fishing depths (Johnson & Rosenblatt, 1971).

GENERAL RANGE: Western and central North Pacific transition zone endemic known from Japan to Midway. Mesopelagic at 1–1500 m fishing depths (Johnson & Rosenblatt, 1971; Gibbs *et al.*, 1983).

***Eustomias cryptobulbus*** Clarke

*Eustomias cryptobulbus* Clarke, 2001, p. 693, Fig. 4A, near southwest O'ahu, Hawaiian Islands, at 21°10–30'N, 158°10–30'W.

*Eustomias cryptobulbus* Clarke, 2001: Clarke (2001).

TAXONOMY: Clarke (2001).

HAWAIIAN RECORDS: O'ahu to Laysan and the vicinity of Johnston Atoll at 0–975 m fishing depths but with most captures above 225 m fishing depths (Clarke, 2001).

GENERAL RANGE: Circumsubtropical except perhaps the eastern North and tropical Pacific Ocean; in the Pacific Ocean from southeastern Australia, Sulawesi, and the Philippines to Micronesia, the Hawaiian Islands, the vicinity of the Austral Islands, and the Sala-y-Gomez/Nazca Ridges. Epi- and mesopelagic at 0–975 m fishing depths but with most captures above 225 m fishing depths (Clarke, 2001).

***Eustomias curtatus*** Gibbs, Clarke, & Gomon

*Eustomias curtatus* Gibbs, Clarke & Gomon, 1983, p. 114, Fig. 32 (d, e), off O'ahu, Hawaiian Islands, at 21° 20'N, 158°20'W.

*Eustomias longibarba* non Parr, 1927 [a valid Atlantic species]: Clarke (1982).

*Eustomias curtatus* Gibbs, Clarke & Gomon, 1983: Gibbs *et al.* (1983).

TAXONOMY: Gibbs *et al.* (1983).

HAWAIIAN RECORDS: Hawai'i Island to O'ahu at 1–1000 m fishing depths (Clarke, 1982; Gibbs *et al.*, 1983).

GENERAL RANGE: Perhaps a central North Pacific endemic, known only from the Hawaiian Islands. Mesopelagic at 1–1000 m fishing depths (Clarke, 1982; Gibbs *et al.*, 1983).



***Eustomias deofamiliaris*** Gibbs, Clarke, & Gomon

*Eustomias deofamiliaris* Gibbs, Clarke & Gomon, 1983, p. 40, Fig. 5a, off O'ahu, Hawaiian Islands, at 21°20'–21°30'N, 158°20'–158°30'W.

*Eustomias deofamiliaris* Gibbs, Clarke & Gomon, 1983: Gibbs *et al.* (1983).

TAXONOMY: Gibbs *et al.* (1983).

HAWAIIAN RECORDS: O'ahu at 1–70 m (Gibbs *et al.*, 1983).

GENERAL RANGE: Perhaps a central North Pacific endemic, known only from the holotype. Epipelagic at 1–70 m (Gibbs *et al.*, 1983).

***Eustomias dinema*** Clarke

*Eustomias dinema* Clarke, 1999, p. 1005, Fig. 1A, off O'ahu, Hawaiian Islands.

*Eustomias dinema* Clarke, 1999: Clarke (1999).

TAXONOMY: Clarke (1999).

HAWAIIAN RECORDS: O'ahu at 65–195 m and fishing depths of 0–260 m (Clarke, 1999).

GENERAL RANGE: Known only from the Hawaiian Islands, perhaps a central North Pacific endemic, although similar specimens are known from the Line Islands and New Caledonia. Epi- and mesopelagic at 65–195 m (Clarke, 1999).

***Eustomias elongatus*** Clarke

*Eustomias elongatus* Clarke, 2001, p. 691, Figs. 1, 3C, near southwest O'ahu, Hawaiian Islands, at 21°10'–30'N, 158°10'–30'W.

*Eustomias elongatus* Clarke, 2001: Clarke (2001).

TAXONOMY: Clarke (2001).

HAWAIIAN RECORDS: O'ahu at 0–370 m fishing depths (Clarke, 2001).

GENERAL RANGE: Pacific endemic from north of the Ogasawara Islands, near Minami Tori Shima (Marcus Island), and the Hawaiian Islands. Epi- and mesopelagic at 0–370 m fishing depths (Clarke, 2001).

***Eustomias enbarbatus*** Welsh

*Eustomias enbarbatus* Welsh, 1923, p. 7, Figs. 7–8, 185 mi. west of Bermuda.

*Eustomias enbarbatus* Welsh, 1923: Gibbs (1971), Parin & Pokhilskaya (1974), Clarke (1982), Gibbs *et al.* (1983), Sutton & Hopkins (1996).

TAXONOMY: Gibbs *et al.* (1983).

HAWAIIAN RECORDS: O'ahu (Clarke, 1982).

GENERAL RANGE: Circumglobal in the tropical and subtropical Gulf of Mexico, Atlantic, Indian, and Pacific oceans except the eastern Pacific. Mesopelagic at 1–800 m (Gibbs, 1971; Parin & Pokhilskaya, 1974; Sutton & Hopkins, 1996).

***Eustomias fissibarbis*** (Pappenheim)

*Neostomias fissibarbis* Pappenheim, 1914, p. 175, Figs. 4–5, northwest of Cape Verde Islands at 24°41'N, 32°21'W.

*Eustomias fissibarbis* (Pappenheim, 1914): Clarke (2000).

TAXONOMY: Clarke (2000).

HAWAIIAN RECORDS: O'ahu at unspecified depths (Clarke, 2000).

GENERAL RANGE: Probably circumglobal primarily in tropical and subtropical waters with records from the North and South Atlantic between 35°N and 27°S, the southwestern Indian Ocean, the western Pacific, the Hawaiian Islands, and just south of the equator in the eastern Pacific. Mesopelagic at unspecified depths (Clarke, 2000).

***Eustomias gibbsi*** Johnson & Rosenblatt

*Eustomias gibbsi* Johnson & Rosenblatt, 1971, p. 307, Fig. 1, Philippine Sea at 17°47.7'–50.7'N, 143°41.2'–50.0'E.

*Eustomias gibbsi* Johnson & Rosenblatt, 1971: Johnson & Rosenblatt (1971), Clarke (1974), Parin & Pokhilskaya (1974), Gibbs *et al.* (1983).

TAXONOMY: Gibbs *et al.* (1983).

HAWAIIAN RECORDS: Hawai'i Island to O'ahu at 50–200 m at night, 680–800 m during day (Johnson & Rosenblatt, 1971; Clarke, 1974).

GENERAL RANGE: Antitropical central North and South Pacific endemic; in the North Pacific from the Philippines to the Hawaiian Islands. Mesopelagic at 50–800 m (Clarke, 1974; Parin & Pokhilskaya, 1974; Gibbs *et al.*, 1983).

***Eustomias inconstans*** Gibbs, Clarke, & Gomon

*Eustomias inconstans* Gibbs, Clarke & Gomon, 1983, p. 37, Figs. 5b-d, off O'ahu, Hawaiian Islands, at 21°20'N, 158°20'W.

*Eustomias patulus* non Regan & Trewavas, 1930 [a valid Atlantic species]: Johnson & Rosenblatt (1971, in part).  
*Eustomias inconstans* Gibbs, Clarke & Gomon, 1983: Gibbs *et al.* (1983).

TAXONOMY: Gibbs *et al.* (1983).

HAWAIIAN RECORDS: Known only from O'ahu at 1–1100 m fishing depths (Johnson & Rosenblatt, 1971; Gibbs *et al.*, 1983).

GENERAL RANGE: Perhaps a central North Pacific endemic but known only from the Hawaiian Islands. Mesopelagic at 1–1100 m fishing depths (Johnson & Rosenblatt, 1971; Gibbs *et al.*, 1983).

***Eustomias ioani*** Parin & Pokhilskaya

*Eustomias ioani* Parin & Pokhilskaya, 1974, p. 352, Fig. 18, northwestern Pacific north of Marcus Island (Minami Tori Shima) at 31°02'N, 150°31'E.

*Eustomias ioani* Parin & Pokhilskaya, 1974: Parin & Pokhilskaya (1974), Gomon & Gibbs (1985).

TAXONOMY: Gomon & Gibbs (1985).

HAWAIIAN RECORDS: Vicinity of the Hancock Seamounts at 1–800 m fishing depth (Parin & Pokhilskaya, 1974).

GENERAL RANGE: Western and central North Pacific transition zone endemic from Japan to the Emperor Seamounts. Mesopelagic at 1–800 m fishing depths (Gomon & Gibbs, 1985).

***Eustomias longiramis*** Clarke

*Eustomias longiramis* Clarke, 2001, p. 691, Fig. 3B, near southwest O'ahu, Hawaiian Islands, at 21°10–30'N, 158°10–30'W.

*Eustomias longiramis* Clarke, 2001: Clarke (2001).

TAXONOMY: Clarke (2001).

HAWAIIAN RECORDS: O'ahu to Gardner Pinnacles at 0–875 m fishing depths (Clarke, 2001).

GENERAL RANGE: Central Pacific endemic known from the Hawaiian Islands and the equator at 143°W. Epi- and mesopelagic at 0–875 m fishing depths (Clarke, 2001).

***Eustomias macronema*** Regan & Trewavas

*Eustomias macronema* Regan & Trewavas, 1930, p. 101, Fig. 91, North Atlantic at 30°17'N, 20°44'W.

*Eustomias macronema* Regan & Trewavas, 1930: Clarke (2000).

TAXONOMY: Clarke (2000).

HAWAIIAN RECORDS: O'ahu at unspecified depths (Clarke, 2000).

GENERAL RANGE: Probably circumglobal in tropical and subtropical waters with records from the Gulf of Mexico, North and South Atlantic, Indian Ocean, the Hawaiian Islands, and elsewhere in the Pacific. Mesopelagic at unspecified depths (Clarke, 2000).

***Eustomias magnificus*** Clarke

*Eustomias magnificus* Clarke, 2001, p. 690, Fig. 3A, near southwest O'ahu, Hawaiian Islands, at 21°10–30'N, 158°10–30'W.

*Eustomias magnificus* Clarke, 2001: Clarke (2001).

TAXONOMY: Clarke (2001).

HAWAIIAN RECORDS: O'ahu at 0–775 m fishing depths (Clarke, 2001).

GENERAL RANGE: Hawaiian endemic known only from collections near southwest O'ahu. Epi- and mesopelagic at 0–775 m (Clarke, 2001).

***Eustomias medusa*** Gibbs, Clarke, & Gomon

*Eustomias medusa* Gibbs, Clarke & Gomon, 1983, p. 73, Fig. 19, off O'ahu, Hawaiian Islands, at 21°20'N, 158°20'W.

*Eustomias medusa* Gibbs, Clarke & Gomon, 1983: Gibbs *et al.* (1983).

TAXONOMY: Gibbs *et al.* (1983).

HAWAIIAN RECORDS: O'ahu at 1–710 m fishing depths (Gibbs *et al.*, 1983).

GENERAL RANGE: North Pacific endemic known only from the northern Marianas Islands and the Hawaiian Islands. Mesopelagic at 1–710 m fishing depths (Gibbs *et al.*, 1983).

***Eustomias melanostigmoides*** Gibbs, Clarke, & Gomon

*Eustomias melanostigmoides* Gibbs, Clarke & Gomon, 1983, p. 71, Fig. 18e-f, off O'ahu, Hawaiian Islands, at 21°30'N, 158°20'W.

*Eustomias melanostigmoides* Gibbs, Clarke & Gomon, 1983: Gibbs *et al.* (1983).

TAXONOMY: Gibbs *et al.* (1983).

HAWAIIAN RECORDS: O'ahu at 1–900 m (Gibbs *et al.*, 1983).

GENERAL RANGE: Perhaps a central North Pacific endemic, known only from the Hawaiian Islands and vicinity. Mesopelagic at 1–900 m fishing depths (Gibbs *et al.*, 1983).

***Eustomias pacificus*** Gibbs, Clarke, & Gomon

*Eustomias pacificus* Gibbs, Clarke & Gomon, 1983, p. 94, Fig. 27a, off O'ahu, Hawaiian Islands, at 21°20'N, 158°20'W.

*Eustomias pacificus* Gibbs, Clarke & Gomon, 1983: Gibbs *et al.* (1983).

TAXONOMY: Gibbs *et al.* (1983).

HAWAIIAN RECORDS: O'ahu at 1–1000 m fishing depths (Gibbs *et al.*, 1983).

GENERAL RANGE: North Pacific endemic known from the Hawaiian Islands and west of the Marianas Islands. Mesopelagic at 1–1000 m fishing depths (Gibbs *et al.*, 1983).

***Eustomias parini*** Clarke

*Eustomias parini* Clarke, 2001, p. 688, Fig. 2C, near southwest O'ahu, Hawaiian Islands, at 21°10–30'N, 158°10–30'W.

*Eustomias parini* Clarke, 2001: Clarke (2001).

TAXONOMY: Clarke (2001).

HAWAIIAN RECORDS: O'ahu at 0–800 m fishing depths (Clarke, 2001).

GENERAL RANGE: Pacific endemic from the northern Coral Sea, the Philippines and south of the Ryukyu Islands to New Ireland, Yap, the northern Marianas, the Line Islands, and the Hawaiian Islands. Epi- and mesopelagic at 0–800 m fishing depths (Clarke, 2001).

***Eustomias problematicus*** Clarke

*Eustomias problematicus* Clarke, 2001, p. 695, Fig. 4D, near southwest O'ahu, Hawaiian Islands, at 21°10–30'N, 158°10–30'W.

*Eustomias problematicus* Clarke, 2001: Clarke (2001).

TAXONOMY: Clarke (2001). Clarke (2001, p. 696–697) also discussed 20 *Eustomias* specimens from the Hawaiian Islands, the Indian Ocean, the Philippines, Minami Tori Shima, and the central equatorial Pacific that resembled *E. problematicus* but "... are not assignable to *E. problematicus*, and too few of them are similar enough to each other to warrant species rank." This indicates that more work is needed on the taxonomy of this species.

HAWAIIAN RECORDS: Vicinity of Cross Seamount and O'ahu at 0–800 m fishing depths (Clarke, 2001).

GENERAL RANGE: Central North Pacific endemic known only from the Hawaiian Islands, but see taxonomic comment. Epi- and mesopelagic at 0–800 m fishing depths (Clarke, 2001).

***Eustomias satterleei*** Beebe

*Eustomias satterleei* Beebe, 1933b, p. 164, Fig. 3, 8 mi. south of Nonsuch Island, Bermuda.

*Eustomias silvescens* non Regan & Trewavas, 1930 [a valid species not found in Hawai'i]: Morrow & Gibbs (1964, in part).

*Eustomias "silvescens"* non Regan & Trewavas, 1930: Clarke (1974, 1982).

*Eustomias satterleei* Beebe, 1933b: Gibbs *et al.* (1983), Paxton *et al.* (1989), Clarke (2000).

TAXONOMY: Morrow & Gibbs (1964) synonymized *E. satterleei* with *E. silvescens*. Gibbs *et al.* (1983) and Clarke (2000) recognized both as valid with *E. silvescens* known only from the Caribbean Sea and recorded only *E. satterleei* from the Hawaiian Islands. Clarke (2000) stated that his earlier (1974, 1982) records of *E. "silvescens"* were of *E. satterleei*.

HAWAIIAN RECORDS: The vicinity of Cross Seamount to O'ahu and waters north of Kaua'i at unspecified depths (Clarke, 1974, 2000, 2001).

GENERAL RANGE: Circumglobal in the subtropical and temperate Atlantic, Indian, and Pacific oceans. Meso- and bathypelagic to 1829 m (Morrow & Gibbs, 1964; Paxton *et al.*, 1989; Clarke, 2000).

### *Eustomias schmidti* Regan & Trewavas

*Eustomias schmidti* Regan & Trewavas, 1930, p. 100, Pl. 9 (fig. 3); Figs. 89–90, "North Atlantic".

*Eustomias schmidti* Regan & Trewavas, 1930: Gibbs (1971), Parin & Pokhilskaya (1974), Gibbs *et al.* (1983), Gibbs & Barnett in Quéro *et al.* (1990), Clarke (2000).

TAXONOMY: Gibbs *et al.* (1983), Clarke (2000).

HAWAIIAN RECORDS: O'ahu at unspecified depths (Clarke, 2000).

GENERAL RANGE: Antitropical and perhaps circumglobal in the subtropical through temperate Gulf of Mexico, Atlantic, and Pacific oceans. Epi- and mesopelagic at 50–150 m (Gibbs, 1971; Parin & Pokhilskaya, 1974; Gibbs & Barnett in Quéro *et al.*, 1990; Clarke, 2000).

### *Eustomias similis* Parin

*Eustomias similis* Parin, 1978, p. 158, Fig. 2, the Coral Sea at 16°15.5'S, 153°50'E.

*Eustomias similis* Parin, 1978: Clarke (2001).

TAXONOMY: Clarke (2001).

HAWAIIAN RECORDS: O'ahu at unspecified depths (Clarke, 2001).

GENERAL RANGE: Pacific endemic from the Coral Sea, near Minami Tori Shima, and the Hawaiian Islands. Epi- and mesopelagic at unspecified depths (Clarke, 2001).

### *Eustomias tomentosus* Clarke

*Eustomias tomentosus* Clarke, 1998, p. 681, Fig. 1C, off O'ahu, Hawaiian Islands, at 21°10'–30'N, 158°10'–15'W.

*Eustomias tomentosus* Clarke, 1998: Clarke (1998).

TAXONOMY: Clarke (1998).

HAWAIIAN RECORDS: O'ahu at 125–730 m and 0–1200 m fishing depths (Clarke, 1998).

GENERAL RANGE: Known only from the Hawaiian Islands, perhaps a central North Pacific endemic species. Mesopelagic at 125–730 m (Clarke, 1998). A related species, *E. woolardi* Clarke, 1998, is known only from the central North Pacific at 9°–13°25'N, 144°48'–150°03'W and might be expected in the southern portion of the 200-nmi EEZ (Clarke, 1998).

### [*Eustomias uniramis* Clarke]

*Eustomias uniramis* Clarke, 1999, p. 1010, Fig. 2C, north of the Line Islands at 8°40'N, 158°01'W.

*Eustomias uniramis* Clarke, 1999: Clarke (1999).

TAXONOMY: Clarke (1999).

HAWAIIAN RECORDS: None, but the central North Pacific range of this species makes it likely that it could occur at Hawai'i Island (Clarke, 1999).

GENERAL RANGE: A central North Pacific endemic known only from an area between the Hawaiian and Line Islands at 8°40'–12°10'N, 150°03'–158°06'W. Epi- and mesopelagic at 0–340 m fishing depths (Clarke, 1999).

### *Eustomias vulgaris* Clarke

*Eustomias vulgaris* Clarke, 2001, p. 687, Fig. 2A, near southwest O'ahu, Hawaiian Islands, at 21°10'–30'N, 158°10'–30'W.

*Eustomias vulgaris* Clarke, 2001: Clarke (2001).

TAXONOMY: Clarke (2001).

HAWAIIAN RECORDS: O'ahu at 0–750 m fishing depths, with most caught in nets fishing above 160 m (Clarke, 2001).

GENERAL RANGE: Pacific endemic from southeastern Australia and Sulawesi to New Caledonia, Chuuk (Truk), and the Hawaiian Islands. Epi- and mesopelagic at 0–750 m fishing depths with most caught in nets fishing above 160 m (Clarke, 2001).

COMMENTS: Other records of *Eustomias* sp. in Hawaiian waters include those of Borets & Sokolovsky (1978), and Novikov *et al.* (1981). The *Eustomias* larvae collected at Johnston Atoll and the Hancock Seamounts were not identified to species (Boehlert *et al.* 1992; Boehlert & Mundy, 1992).

### *Flagellostomias boureei* (Zugmayer)

*Eustomias boureei* Zugmayer, 1913, p. 3, southwest of the Azores at 38°55'N, 34°07'30"W.

*Flagellostomias boureei* (Zugmayer, 1913); Morrow & Gibbs (1964), Clarke (1974), Novikov *et al.* (1981), Gibbs *in Whitehead et al.* (1984), Gibbs *in Smith & Heemstra* (1986), Paxton *et al.* (1989), Sutton & Hopkins (1996).

TAXONOMY: Gibbs *in Smith & Heemstra* (1986) except for their mistaken attribution of Parr as the species' author.

HAWAIIAN RECORDS: O'ahu at 500–750 m (Clarke, 1974).

GENERAL RANGE: Circumglobal in the tropical through temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans. Meso- and bathypelagic at 75–1825 m (Morrow & Gibbs, 1964; Clarke, 1974; Gibbs *in Whitehead et al.*, 1984; Paxton *et al.*, 1989; Sutton & Hopkins, 1996).

### *Leptostomias macronema* Gilbert

*Leptostomias macronema* Gilbert, 1905, p. 607, Pl. 72 (fig. 3), off Ni'ihau, Hawaiian Islands.

*Leptostomias* sp.: Clarke (1974) in part?

*Leptostomias macronema* Gilbert, 1905; Gilbert (1905), Fowler (1928, 1949), Gosline & Brock (1960), Morrow & Gibbs (1964), Tinker (1982).

TAXONOMY: Morrow & Gibbs (1964). As the earliest described species and type of the genus, *L. macronema* is a valid species, but this genus is in need of revision (Gibbs *in Whitehead et al.*, 1984; Gibbs *in Smith & Heemstra*, 1986; Gibbs *in Quéro et al.*, 1990).

HAWAIIAN RECORDS: Ni'ihau at 583–825 m (Gilbert, 1905). The *Leptostomias* sp. collected off O'ahu at 100–625 m were not identified to species (Clarke, 1974). Another valid *Leptostomias* species, *L. gladiator* (Zugmayer, 1913), has also been recorded from the North Pacific transition zone, and might be anticipated in Hawaiian waters (Parin *et al.*, 1995).

GENERAL RANGE: Perhaps a central North Pacific endemic. Known with certainty only from the Hawaiian Islands but there is no review of this genus. Mesopelagic at 100–825 m (Gilbert, 1905; Morrow & Gibbs, 1964; Clarke, 1974).

### [*Melanostomias macrophotus* Regan & Trewavas]

*Melanostomias macrophotus* Regan & Trewavas, 1930, p. 115, Fig. 111b, "Caribbean Sea".

*Melanostomias pauciradius* Matsubara, 1938; Parin & Pokhilskaya (1978), Paxton *et al.* (1989).

*Melanostomias macrophotus* Regan & Trewavas, 1930; Gibbs *in Whitehead et al.* (1984), Gibbs & Barnett *in Quéro et al.* (1990).

TAXONOMY: Gibbs & Barnett *in Quéro et al.* (1990).

HAWAIIAN RECORDS: Although this species has not been taken in Hawaiian waters, Parin & Pokhilskaya (1978) recorded it from west of the Hancock Seamounts.

GENERAL RANGE: Circumglobal in the tropical and subtropical Gulf of Mexico, Atlantic, Indian, and Pacific oceans. In the Pacific from Australia, New Guinea and central Japan east to the Emperor Seamounts. Mesopelagic (Parin & Pokhilskaya, 1978; Gibbs *in Whitehead et al.*, 1984; Paxton *et al.*, 1989; Gibbs & Barnett *in Quéro et al.*, 1990).

### *Melanostomias melanops* Brauer

*Melanostomias melanops* Brauer, 1902, p. 284, off the northwestern coast of Sumatra, Indonesia, at 5°23'02"N, 94°48'01"W.

*Melanostomias melanops* Brauer, 1902: Morrow & Gibbs (1964), Parin & Pokhilskaya (1978), Gibbs in Whitehead *et al.* (1984), Gibbs & Barnett in Quéro *et al.* (1990).

TAXONOMY: Morrow & Gibbs (1964), Parin & Pokhilskaya (1978).

HAWAIIAN RECORDS: The Hancock Seamounts (Parin & Pokhilskaya, 1978). *Melanostomias* species collected off O'ahu at 50–250 m at night, 520–800 m during day, were not identified to species (Clarke, 1974).

GENERAL RANGE: Circumglobal in the tropical through subtropical Gulf of Mexico, Atlantic, Indian, and Pacific oceans except the eastern Pacific. Mesopelagic at 350–1024 m (Morrow & Gibbs, 1964; Parin & Pokhilskaya, 1978; Gibbs in Whitehead *et al.*, 1984; Gibbs & Barnett in Quéro *et al.*, 1990).

[*Melanostomias valdiviae* Brauer]

*Melanostomias valdiviae* Brauer, 1902, p. 285, off the west coast of Sumatra, Indonesia, at 0°15'02"N, 98°08'08"E.

*Melanostomias valdiviae* Brauer, 1902: Gibbs (1960), Morrow & Gibbs (1964), Parin & Pokhilskaya (1978), Tinker (1982, perhaps based on Gibbs 1960), Gibbs in Whitehead *et al.* (1984), Fujii in Masuda *et al.* (1984), Paxton *et al.* (1989), Gibbs & Barnett in Quéro *et al.* (1990), Sutton & Hopkins (1996).

TAXONOMY: Morrow & Gibbs (1964), Parin & Pokhilskaya (1978).

HAWAIIAN RECORDS: This species was collected from northeast of the Hawaiian Islands (31°40'N, 152°13'W) at a fishing depth of 1–3274 m (Gibbs, 1960). Parin & Pokhilskaya (1978) did not include the North Pacific in its range, apparently having missed Gibbs' (1960) record.

GENERAL RANGE: Isolated records from the Gulf of Mexico, Atlantic, Pacific, and Indian oceans. In the Pacific from Australia, New Guinea, and the Marianas to the equatorial central Pacific, and north of the Hawaiian Islands. Meso- or bathypelagic at 40–1600 m (Gibbs, 1960; Morrow & Gibbs, 1964; Parin & Pokhilskaya, 1978; Gibbs in Whitehead *et al.*, 1984; Fujii in Masuda *et al.*, 1984; Paxton *et al.*, 1989; Gibbs & Barnett in Quéro *et al.*, 1990; Sutton & Hopkins, 1996).

*Opostomias mitsuui* Imai

*Opostomias mitsuui* Imai, 1941, p. 239, Figs. 5–7, Sagami Sea off Manazura, Japan.

*Opostomias mitsuui* Imai, 1941: Parin & Sokolovsky (1976), Borets & Sokolovsky (1978), Novikov *et al.* (1981), Fujii in Masuda *et al.* (1984), Boehlert & Mundy (1992).

TAXONOMY: Parin & Sokolovsky (1976).

HAWAIIAN RECORDS: The Hancock Seamounts in winter only, larvae at 1–150 m (Boehlert & Mundy, 1992).

GENERAL RANGE: Western and central North Pacific transition zone endemic from Japan to the Emperor Seamounts. Mesopelagic at unspecified depths (Parin & Sokolovsky, 1976; Fujii in Masuda *et al.*, 1984).

*Pachystomias microdon* (Günther)

*Echiostoma microdon* Günther, 1878, p. 180, off northwest coast of Australia.

*Pachystomias microdon* (Günther, 1878): Morrow & Gibbs (1964), Clarke (1974), Borets & Sokolovsky (1978), Novikov *et al.* (1981), Fujii in Masuda *et al.* (1984), Gibbs in Smith & Heemstra (1986), Paxton *et al.* (1989), Sutton & Hopkins (1996).

TAXONOMY: Gibbs in Smith & Heemstra (1986).

HAWAIIAN RECORDS: O'ahu at 660 m (Clarke, 1974).

GENERAL RANGE: Circumglobal in the tropical Gulf of Mexico, Atlantic, Indian, and Pacific oceans. Meso- and bathypelagic at 660–2440 m fishing depths (Morrow & Gibbs, 1964; Fujii in Masuda *et al.*, 1984; Paxton *et al.*, 1989; Sutton & Hopkins, 1996).

*Photonectes achirus* Regan & Trewavas

*Photonectes achirus* Regan & Trewavas, 1930, p. 122, Fig. 116a, "Caribbean Sea".

*Photonectes achirus* Regan & Trewavas, 1930: Morrow & Gibbs (1964), Clarke (1974), Gibbs & Barnett in Quéro *et al.* (1990), Sutton & Hopkins (1996).

TAXONOMY: Gibbs & Barnett in Quéro *et al.* (1990) suggested that this species might be a junior synonym of *Photonectes caeruleus* Regan & Trewavas, 1930.

HAWAIIAN RECORDS: O'ahu at 125–225 m at night, 400–1400 m during day (Clarke, 1974).

GENERAL RANGE: Recorded only from the Gulf of Mexico, western North Atlantic and the Hawaiian Islands. Meso- and bathypelagic at 75–1400 m (Morrow & Gibbs, 1964; Clarke, 1974; Gibbs & Barnett in Quéro *et al.*, 1990; Sutton & Hopkins, 1996).

COMMENTS: The *Photonectes* larvae collected at Johnston Atoll and the Hancock Seamounts could not be identified to species (Boehlert *et al.*, 1992; Boehlert & Mundy, 1992).

***Photonectes albipennis*** (Döderlein)

*Lucifer albipennis* Döderlein, 1882, p. 26, Pl. 3 (figs. 1–6), off Enoshima, Japan.

*Photonectes albipennis* (Döderlein, 1882): Morrow & Gibbs (1964), Clarke (1974), Borets & Sokolovsky (1978), Novikov *et al.* (1981), Fujii in Masuda *et al.* (1984), Paxton *et al.* (1989).

TAXONOMY: Morrow & Gibbs (1964).

HAWAIIAN RECORDS: O'ahu to Milwaukee Seamount at 60–165 m at night, 620 m during day (Clarke, 1974; Novikov *et al.*, 1981).

GENERAL RANGE: Tropical Indo-west-central Pacific. Mesopelagic at 60–620 m (Fujii in Masuda *et al.*, 1984; Paxton *et al.*, 1989).

***Photonectes caeruleus*** Regan & Trewavas

*Photonectes caeruleus* Regan & Trewavas, 1930, p. 122, Pl. 12 (fig. 2); Fig. 116b, south of St. Croix, Virgin Islands, Caribbean Sea.

*Photonectes caeruleus* Regan & Trewavas, 1930: Morrow & Gibbs (1964), Clarke (1974), Paxton *et al.* (1989), Gibbs & Barnett in Quéro *et al.* (1990).

TAXONOMY: Morrow & Gibbs (1964).

HAWAIIAN RECORDS: O'ahu at 800 m (Clarke, 1974).

GENERAL RANGE: Perhaps circumglobal with a disjunct distribution in the tropical Atlantic, Indian, and Pacific oceans except the eastern Pacific. Known in the Pacific from Australia and the Hawaiian Islands. Mesopelagic at ca. 800 m (Paxton *et al.*, 1989; Gibbs & Barnett in Quéro *et al.*, 1990).

***Photonectes cf. margarita*** (Goode & Bean)

*Echiostoma margarita* Goode & Bean, 1896, p. 109, Pl. 35 (fig. 131), Gulf of Mexico at 28°38'30"N, 87°02'00"W.

*Photonectes cf. margarita* (Goode & Bean, 1896): Clarke (1974).

*Photonectes margarita* (Goode & Bean, 1896): Morrow & Gibbs (1964), Fujii in Masuda *et al.* (1984), Gibbs & Barnett in Quéro *et al.* (1990).

TAXONOMY: Morrow & Gibbs (1964). Clarke (1974) noted that two of his *Photonectes* specimens were similar to, but not identical with *P. margarita*.

HAWAIIAN RECORDS: O'ahu at 490–650 m (Clarke, 1974).

GENERAL RANGE: Circumglobal from disjunct locations in the tropical and warm-temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans. Mesopelagic at 490–1000 m (Morrow & Gibbs, 1964; Clarke, 1974; Fujii in Masuda *et al.*, 1984; Gibbs & Barnett in Quéro *et al.*, 1990).

***Photonectes parvimanus*** Regan & Trewavas

*Photonectes parvimanus* Regan & Trewavas, 1930, p. 124, Figs. 118–119, “North Atlantic”.

*Photonectes fimbria* Regan & Trewavas, 1930: Clarke (1974).

*Photonectes parvimanus* Regan & Trewavas, 1930: Morrow & Gibbs (1964), Gibbs in Smith & Heemstra (1986), Paxton *et al.* (1989), Sutton & Hopkins (1996).

TAXONOMY: Gibbs in Smith & Heemstra (1986).

HAWAIIAN RECORDS: O'ahu at 620 m (Clarke, 1974).

GENERAL RANGE: Circumglobal in the tropical Gulf of Mexico, Atlantic, Indian, and Pacific oceans except the eastern Pacific. Meso- and bathypelagic from the surface to 1463 m (Morrow & Gibbs, 1964; Paxton *et al.*, 1989; Sutton & Hopkins, 1996).

***Thysanactis dentex*** Regan & Trewavas

*Thysanactis dentex* Regan & Trewavas, 1930, p. 58, Pl. 2 (fig. 1); Figs. 35–36, “Caribbean Sea” and “western North Atlantic”.

*Thysanactis dentex* Regan & Trewavas, 1930: Morrow & Gibbs (1964), Clarke (1974), Amesbury (1975), Parin & Sokolovsky (1976), Fujii in Masuda *et al.* (1984), Paxton *et al.* (1989).

TAXONOMY: Parin & Sokolovsky (1976).

HAWAIIAN RECORDS: O'ahu at 75–200 m at night, 600–800 m during day (Clarke, 1974; Amesbury, 1975).

GENERAL RANGE: Perhaps circumglobal except in the eastern Pacific; disjunct records from the tropical Atlantic, Australia, and the Hawaiian Islands. Mesopelagic at ca. 100–1000 m (Morrow & Gibbs, 1964; Fujii in Masuda *et al.*, 1984; Paxton *et al.*, 1989).

### “Idiacanthinae” — Black dragonfishes

#### *Idiacanthus fasciola* Peters

*Idiacanthus fasciola* Peters, 1877, p. 847, north of Australia at 177°E and Pacific Ocean north of New Guinea at 1°04'05"N, 136°03'06"E.

*Idiacanthus* sp.: Struhsaker (1973a), Boehlert *et al.* (1992)?, Boehlert & Mundy (1992)?

*Idiacanthus fasciola* Peters, 1877: Fowler (1928, 1949), Gibbs (1964), Novikova (1967), Clarke (1974), Borets & Sokolovsky (1978), Loeb (1979), Novikov *et al.* (1981), Tinker (1982), Hulley in Smith & Heemstra (1986), Krueger in Quéro *et al.* (1990), Sutton & Hopkins (1996).

TAXONOMY: Novikova (1967), Hulley in Smith & Heemstra (1986). *Idiacanthus antrostomus* Gilbert, 1890, is a related, boundary current species that does not occur in Hawaiian waters. It has been found in equatorial waters (Novikova, 1967) and could be expected at Johnston Atoll. The northern known limit of *I. fasciola* in the region is Milwaukee Seamount (32°N) and the southern known limit of *I. antrostomus* is Jingu Seamount (37°N) but *I. antrostomus* could occur at the Hancock Seamounts in winter.

HAWAIIAN RECORDS: O'ahu to Maui at 30–300 m at night, 550–800 m during day (Struhsaker, 1973a; Clarke, 1974). Possibly to Johnston Atoll and the Hancock Seamounts (Boehlert *et al.*, 1992; Boehlert & Mundy, 1992; see Taxonomy).

GENERAL RANGE: Circumglobal in the tropical through temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans, east to 20°N, 120°W. Meso- and bathypelagic from the surface to 2000 m (Gibbs, 1964; Novikova, 1967; Krueger in Quéro *et al.*, 1990; Sutton & Hopkins, 1996).

### “Malacosteinae” — Loosejaws<sup>22</sup>

#### *Aristostomias grimaldii* Zugmayer

*Aristostomias grimaldii* Zugmayer, 1913, p. 1, “Atlantic Ocean”.

*Aristostomias grimaldii* Zugmayer, 1913: Morrow (1964), Clarke (1974), Goodyear in Quéro *et al.* (1990), Sutton & Hopkins (1996).

TAXONOMY: Morrow (1964), Goodyear in Quéro *et al.* (1990).

HAWAIIAN RECORDS: O'ahu at 100–500 m at night, 690–750 m during day (Clarke, 1974).

GENERAL RANGE: Perhaps circumtropical and subtropical except in the eastern Pacific. Known from the Gulf of Mexico and Atlantic Ocean between 34°N–35°S, Indian Ocean north of 15°S, New Guinea, and the Hawaiian Islands. Mesopelagic at 25–800 m (Morrow, 1964; Clarke, 1974; Goodyear in Quéro *et al.*, 1990; Sutton & Hopkins, 1996).

#### *Aristostomias lunifer* Regan & Trewavas

*Aristostomias lunifer* Regan & Trewavas, 1930, p. 138, Pl. 13 (fig. 2); Fig. 132, “Caribbean Sea” and “North Atlantic”.

*Aristostomias lunifer* Regan & Trewavas, 1930: Clarke (1974), Goodyear & Gibbs in Smith & Heemstra (1986), Goodyear in Quéro *et al.* (1990), Sutton & Hopkins (1996).

TAXONOMY: Goodyear & Gibbs in Smith & Heemstra (1986).

HAWAIIAN RECORDS: O'ahu at 120–260 m (Clarke, 1974).

GENERAL RANGE: Perhaps circumglobal in the tropical and subtropical Atlantic, Indian, and Pacific oceans except the eastern Pacific. Recorded from the Gulf of Mexico and Atlantic Ocean between 36°N–27°S, Indian Ocean between 5°N–12°S, the South China Sea, New Guinea, and the Hawaiian



Islands. Mesopelagic at 120–260 m (Clarke, 1974; Goodyear *in* Quéro *et al.*, 1990; Sutton & Hopkins, 1996).

***Aristostomias polydactylus* Regan & Trewavas**

*Aristostomias polydactylus* Regan & Trewavas, 1930, p. 141, Pl. 14 (fig. 3); Fig. 136c–137, “Caribbean Sea” and “North Atlantic”.

*Aristostomias polydactylus* Regan & Trewavas, 1930: Morrow (1964), Clarke (1974), Goodyear & Gibbs *in* Smith & Heemstra (1986), Goodyear *in* Quéro *et al.* (1990).

TAXONOMY: Goodyear & Gibbs *in* Smith & Heemstra (1986).

HAWAIIAN RECORDS: O‘ahu at 100–590 m at night, 625–1100 m during day (Clarke, 1974).

GENERAL RANGE: Circumglobal in the tropical through temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans except the eastern Pacific. Mesopelagic at ca. 25–1100 m (Morrow, 1964; Clarke, 1974; Goodyear *in* Quéro *et al.*, 1990).

***Aristostomias tittmanni* Welsh**

*Aristostomias tittmanni* Welsh, 1923, p. 3, Fig. 2, ca. 115 mi. east of Cape Hatteras, North Carolina, U.S.A.

*Aristostomias tittmanni* Welsh, 1923: Morrow (1964), Clarke (1974), Gibbs *in* Whitehead *et al.* (1984), Sutton & Hopkins (1996).

Undescribed *Aristostomias* species: Goodyear *in* Quéro *et al.* (1990).

TAXONOMY: Morrow (1964). The Hawaiian specimens may represent an undescribed species (Goodyear *in* Quéro *et al.*, 1990; see general range).

HAWAIIAN RECORDS: O‘ahu at 15–250 m (Clarke, 1974).

GENERAL RANGE: Perhaps circumglobal in the tropical Atlantic, Indian, and Pacific oceans. Records from the Gulf of Mexico, Caribbean, Azores, eastern North Atlantic, and off Chile (Gibbs *in* Whitehead *et al.*, 1984; Sutton & Hopkins, 1996). Goodyear *in* Quéro *et al.* (1990) stated that an undescribed species identified as *A. tittmanni* occurs in the Atlantic between 10°N–10°S, in the Indian Ocean between 6°N–17°S, near Hawai‘i, and in the equatorial Pacific from 12°N–6°S, 143°W–160°E. Meso- and bathypelagic at 15–2000 m (Morrow, 1964; Clarke, 1974).

***Malacosteus niger* Ayres**

*Malacosteus niger* Ayres, 1848, p. 69, southeast of Nova Scotia, Canada, at 42°N, 50°W.

*Malacosteus danae* Regan & Trewavas, 1930: Amesbury (1975).

*Malacosteus niger* Ayres, 1848: Morrow (1964), Clarke (1974), Borets & Sokolovsky (1978), Novikov *et al.* (1981), Goodyear & Gibbs *in* Smith & Heemstra (1986), Paxton *et al.* (1989), Goodyear *in* Quéro *et al.* (1990), Sutton & Hopkins (1996).

TAXONOMY: Goodyear & Gibbs *in* Smith & Heemstra (1986).

HAWAIIAN RECORDS: O‘ahu to Milwaukee Seamount at 500–900 m (Clarke, 1974; Amesbury, 1975; Novikov *et al.*, 1981).

GENERAL RANGE: Nearly cosmopolitan in the subtropical through cold-temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans. Meso- and bathypelagic from the surface to 3886 m fishing depths (Morrow 1964, Paxton *et al.*, 1989; Goodyear *in* Quéro *et al.*, 1990; Sutton & Hopkins, 1996).

***Photostomias* sp. (2)**

*Photostomias guernei* non Collett, 1889 [a valid species that does not occur in Hawai‘i]; Morrow (1964), Amesbury (1975), Borets & Sokolovsky (1978).

*Photostomias guernei*, large form: Clarke (1974).

*Photostomias guernei*, small form: Clarke (1974).

Undescribed *Photostomias* species: Clarke (1982), Goodyear *in* Quéro *et al.* (1990).

TAXONOMY: The genus is in need of revision. Clarke (1982) stated that there are two undescribed species in Hawaiian waters that are equivalent to the large and small forms of *P. guernei* of Clarke (1974).

HAWAIIAN RECORDS: O‘ahu at 15–300 m at night, 350–800 m during day (Clarke, 1974; Amesbury, 1975).

GENERAL RANGE: Goodyear *in* Quéro *et al.* (1990) gives the range of one undescribed species as circumglobal in the tropical and subtropical Atlantic, Indian, and Pacific oceans except the eastern Pacific.

Mesopelagic at 15–800 m; the genus has been taken in nets sampling to 3100 m fishing depths (Morrow, 1964; Clarke, 1974; Goodyear *in* Quéro *et al.*, 1990).

### Ateleopodiformes

#### Ateleopodidae — Jellynose fishes

##### *Ijimaia plicatellus* (Gilbert)

*Ateleopus plicatellus* Gilbert, 1905, p. 653, Fig. 253, Pailolo Channel between Moloka'i and Maui, Hawaiian Islands.

*Ateleopus plicatellus* Gilbert, 1905: Gilbert (1905), Fowler (1928, 1949), Gosline & Brock (1960).

*Parateleops*: Smith *in* Smith & Heemstra (1986).

*Ijimaia plicatellus* (Gilbert, 1905): Clarke (1972), Struhsaker (1973a), Tinker (1982), Chave & Mundy (1994).

TAXONOMY: No recent review (Paxton *et al.* 1989) but see Struhsaker (1973a) for generic placement. Eschmeyer (1998) commented that *Ijimaia* might be based on the large adult of *Ateleopus*, however. Smith (*in* Smith & Heemstra, 1986) stated that the genus *Parateleopus*, as *Parateleops* [sic], is known only from the Hawaiian Islands. She probably meant *I. plicatellus* because *Parateleopus* was described from an area between Indonesia and the Philippines and is unknown from the Hawaiian Islands.

COMMON NAMES: Jellynose.

HAWAIIAN RECORDS: Cross Seamount and Hawai'i Island to O'ahu at 265–500 m, to 1250 m fishing depths (Gilbert, 1905; Struhsaker, 1973a; Chave & Mundy, 1994).

GENERAL RANGE: Hawaiian endemic. Engyobenthic at 265–500 m and to 1250 m fishing depths (Gilbert, 1905; Chave & Mundy, 1994).

### Aulopiformes

#### Giganturoidei

#### Giganturidae — Giganturas, Telescopefishes

##### *Gigantura indica* Brauer

*Gigantura chuni* f. *indica* Brauer, 1901, p. 129, Indian Ocean from either 4°05'08"S, 78°24'08"E or 2°38'07"S, 65°59'02"E.

*Bathyleptus lisae* Walters, 1961: Struhsaker (1973a), Amesbury (1975), Clarke & Wagner (1976), Loeb (1979), Tinker (1982).

*Gigantura indica* Brauer, 1901: Johnson & Bertelsen (1991).

TAXONOMY: Johnson & Bertelsen (1991).

COMMON NAMES: Telescopefish (AFS).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to the Hancock Seamounts at 500–1000 m (Struhsaker, 1973a; Amesbury, 1975; Clarke & Wagner, 1976; Johnson & Bertelsen, 1991).

GENERAL RANGE: Circumglobal in the tropical and subtropical Atlantic, Indian, and Pacific oceans from 35°N–45°S, but usually between 30°N–30°S. Meso- and bathypelagic at 17–2100 m, usually at 500–2000 m (Johnson & Bertelsen, 1991).

### Aulopoidei<sup>23</sup>

#### Aulopodidae — Aulopus

##### *Hime japonica* (Günther)

*Aulopus japonicus* Günther, 1877b, p. 444, Yokohama market, Japan.

*Hime japonicus* (Günther, 1877): Strasburg (1966), Tinker (1982, text).

Undescribed *Aulopus* species: Struhsaker (1973a), Randall (1976a, 1981a), Tinker (1982, appendix).

*Aulopus japonicus* Günther, 1877b: Lee & Chao (1994), Baldwin & Johnson (1996).

*Hime japonica* (Günther, 1877b): Borets (1986), Parin & Kotylar (1989), Boehlert & Mundy (1992), Chave & Mundy (1994), Thompson (1998).

**TAXONOMY:** The identity of Hawaiian aulopodids has been controversial. Randall (1976a) mentioned unpublished work by Struhsaker and Hubbs, stating that Strasburg's (1966) specimen was an undescribed species and that a second undescribed species was even more abundant in Hawaiian waters. His reference to two species may refer to sexual dimorphism mentioned by Struhsaker (1973a).

Parin & Kotlyar (1989) resurrected *Hime* for Pacific species in this family and identified specimens from Hancock as *H. japonica*. They also discussed variability in this species and identified Strasburg's (1966) specimens as *H. japonica*. The variability discussed by Parin & Kotlyar (1989) may have contributed to uncertainties about the taxonomic status of Hawaiian *Hime*. Recognition of *Hime* as distinct from *Aulopus* was rejected by Lee & Chao (1994) and Baldwin & Johnson (1996) but was supported with several characters by Thompson (1998).

**HAWAIIAN RECORDS:** Cross Seamount and Hawai'i Island to the Hancock Seamounts at 85–510 m (Strasburg, 1966; Struhsaker, 1973a; Borets, 1986; Boehlert & Mundy, 1992; Chave & Mundy, 1994).

**GENERAL RANGE:** Antiequatorial western and central Pacific endemic, from Japan and Taiwan to southeastern Australia and the Hawaiian Islands. Benthic at 85–510 m (Parin & Kotlyar, 1989; Chave & Mundy, 1994; Lee & Chao, 1994).

## Chlorophthalmoidei

### Chlorophthalmidae — Greeneyes<sup>24</sup>

[*Chlorophthalmus agassizi* Bonaparte]

*Chlorophthalmus agassizi* Bonaparte, 1840, fasc. 28, punt. 144, pl. 121, "Italy".

*Chlorophthalmus agassizi* Bonaparte, 1840: Mead (1966), Novikov *et al.* (1981), Sulak *in* Whitehead *et al.* (1984), Paxton *et al.* (1989), Sato & Nakabo (2002).

**TAXONOMY:** Mead (1966).

**COMMON NAMES:** Shortnose greeneye (AFS).

**HAWAIIAN RECORDS:** Milwaukee Seamount (Novikov *et al.*, 1981) but this record may refer to another nominal species in this complex. Gosline & Brock's (1960) and Tinker's (1982) records of *C. agassizi* were based on *C. proridens*, which they considered synonyms. Struhsaker (1973a) did not accept this synonymy; he collected only *C. proridens* in the main Hawaiian Islands.

**GENERAL RANGE:** Atlantic and Indo-west Pacific; recorded from the Mediterranean, Gulf of Mexico, temperate to tropical Atlantic, Indian Ocean, and west Pacific to northwestern Australia. Benthic at 50–1000 m (Mead, 1966; Sulak *in* Whitehead *et al.*, 1984; Paxton *et al.*, 1989).

[*Chlorophthalmus albatrossis* Jordan & Starks]

*Chlorophthalmus albatrossis* Jordan & Starks, 1904b, p. 579, Pl. 1 (fig. 1), Sagami Bay, Japan.

*Chlorophthalmus albatrossis* Jordan & Starks, 1904b: Okamura *in* Okamura & Kitajima (1984), Okamura *in* Masuda *et al.* (1984), Humphreys *et al.* (1984)?, Sato & Nakabo (2002).

**TAXONOMY:** Okamura *in* Masuda *et al.* (1984). Merrett *in* Whitehead *et al.* (1990) questioned whether *C. albatrossis* might be a synonym of *C. agassizi*.

**HAWAIIAN RECORDS:** Milwaukee Seamount (Humphreys *et al.*, 1984)?

**GENERAL RANGE:** Western Pacific endemic from Japan to the Philippines and East China Sea, perhaps the Emperor Seamounts. Benthic at "some 100 meters deep" to 620 m (Okamura *in* Okamura & Kitajima, 1984; Okamura *in* Masuda *et al.*, 1984; Humphreys *et al.*, 1984).

***Chlorophthalmus proridens* Gilbert & Cramer**

*Chlorophthalmus proridens* Gilbert & Cramer, 1897, p. 406, Pl. 36 (fig. 2), Penguin Banks, Moloka'i, Hawaiian Islands at 21°08–09'N, 157°43–53'W.

*Chlorophthalmus agassizi* non Bonaparte, 1840 [a valid species that probably does not occur in the main Hawaiian Islands]: Gosline & Brock (1960), Tinker (1982).

*Chlorophthalmus proridens* Gilbert & Cramer, 1897: Gilbert & Cramer (1897), Gilbert (1905), Jordan & Evermann (1905), Fowler (1928, 1934), Mead (1966), Struhsaker (1973a), Borets & Sokolovsky (1978), Novikov *et al.* (1981), Borets (1986), Chave & Mundy (1994), Sato & Nakabo (2002).

TAXONOMY: Mead (1966), Struhsaker (1973a).

HAWAIIAN RECORDS: Hawai'i Island to Koko Seamount at 185–644 m (Gilbert & Cramer, 1897; Gilbert, 1905; Struhsaker, 1973a; Novikov *et al.*, 1981; Borets, 1986; Chave & Mundy, 1994).

GENERAL RANGE: Hawaiian Archipelago and southern Emperor Seamounts endemic. Benthic at 185–644 m (Chave & Mundy, 1994).

[*Paraulopus filamentosus* (Okamura)]

*Chlorophthalmus filamentosus* Okamura in Okamura *et al.*, 1982, p. 93, Pl. 55, Kyushu-Palau Ridge at 26°05.0'N, 135°50.2'E.

*Chlorophthalmus filamentosus* Okamura, 1982: Okamura in Okamura *et al.* (1982), Okamura in Masuda *et al.* (1984), Borets (1986).

*Paraulopus filamentosus* (Okamura, 1982): Sato & Nakabo (2002a, 2003).

TAXONOMY: Okamura in Okamura *et al.* (1982), Sato & Nakabo (2003).

HAWAIIAN RECORDS: Milwaukee Seamount at 270–450 m (Borets, 1986), and unspecified locations in the Emperor Seamounts (Sato & Nakabo, 2003). It seems likely that *Paraulopus* specimens collected at the Hancock Seamounts are this species, although this has not been verified (B. Mundy, pers. observ.).

GENERAL RANGE: Western North Pacific endemic from the Kyushu-Palau Ridge and the Emperor Seamounts. Benthic at 270–450 m (Okamura in Okamura *et al.*, 1982; Okamura in Masuda *et al.*, 1984; Borets, 1986; Sato & Nakabo, 2003).

[*Paraulopus japonicus* (Kamohara)]

*Chlorophthalmus japonicus* Kamohara, 1956, p. 1, Fig. 1, off Okitsu, Kochi Prefecture, Japan.

*Chlorophthalmus japonicus* Kamohara, 1956: Borets & Sokolovsky (1978), Novikov *et al.* (1981)?, Okamura in Masuda *et al.* (1984).

*Paraulopus japonicus* (Kamohara, 1956): Sato & Nakabo (2002a, 2003).

TAXONOMY: Okamura in Masuda *et al.* (1984), Sato & Nakabo (2003).

HAWAIIAN RECORDS: Milwaukee Seamount (Novikov *et al.*, 1981)? Sato & Nakabo (2003) did not include the Emperor Seamounts within the range of this species and its occurrence there needs verification. The Hawai'i Undersea Research Laboratory of the University of Hawai'i has recently identified a barred chlorophthalmid or paraulopid species from the Hawaiian Islands as this species from visual sightings and videotaped submersible observations. These identifications also need verification.

GENERAL RANGE: Western Pacific endemic from Tosa Bay, Japan, and perhaps the Emperor Seamounts and Hawaiian Islands. Benthic at ca. 300 m (Novikov *et al.*, 1981; Okamura in Masuda *et al.*, 1984).

[*Paraulopus oblongus* (Kamohara)]

*Chlorophthalmus oblongus* Kamohara, 1953b, p. 2, Fig. 1, Mimase fish market, Kochi Prefecture, Japan.

*Chlorophthalmus oblongus* Kamohara, 1953b: Kamohara (1953b), Okamura in Masuda *et al.* (1984), Humphreys *et al.* (1984)?

*Paraulopus oblongus* (Kamohara, 1953b): Sato & Nakabo (2002a, 2003).

TAXONOMY: Okamura in Masuda *et al.* (1984), Sato & Nakabo (2003).

HAWAIIAN RECORDS: The Hancock Seamounts (Humphreys *et al.*, 1984)? Sato & Nakabo (2003) did not include the Emperor Seamounts or Hawaiian Ridge within the range of this species and its occurrence there needs verification.

GENERAL RANGE: Western Pacific endemic from Tosa Bay (Japan), the South China Sea, southern Indonesia, and perhaps the northern Hawaiian Ridge. Benthic at ca. 100–200 m (Kamohara, 1953b; Okamura in Masuda *et al.*, 1984; Humphreys *et al.*, 1984; Sato & Nakabo, 2003).

## Ipnopidae<sup>25</sup>

***Bathymicrops regis* Hjort & Koefoed**

*Bathymicrops regis* Hjort & Koefoed in Murray & Hjort, 1912, p. 88, Fig. 305, North Atlantic west of the Canary Islands at 28°54'N, 24°14'W.

*Bathymicrops* species: Okiyama (1984).

*Bathymicrops regis* Hjort & Koefoed, 1912: Nielsen & Merrett (1992).

TAXONOMY: Nielsen & Merrett (1992).

HAWAIIAN RECORDS: O'ahu to the Hancock Seamounts; known only from larvae collected at the surface (Okiyama, 1984; Nielsen & Merrett, 1992; B. Mundy, unpubl. data).

GENERAL RANGE: Circumglobal in the tropical through warm-temperate Atlantic, Indian, and Pacific oceans except the eastern Pacific. Benthic at 3300–5782 m (Nielsen & Merrett, 1992).

***Bathypterois atricolor*** Alcock

*Bathypterois atricolor* Alcock, 1896, p. 306, Laccadive Sea off India (Indian Ocean).

*Bathypterois antennatus* Gilbert, 1905: Gilbert (1905), Gosline & Brock (1960), Tinker (1982).

*Bathypterois*: Jordan & Evermann (1905).

*Bathypterois atricolor* Alcock, 1896: Sulak (1977), Wilson *et al.* (1985), Jones & Sulak (1990), Chave & Mundy (1994).

TAXONOMY: Sulak (1977).

HAWAIIAN RECORDS: Hawai'i Island to French Frigate at 572–2403 m (Gilbert, 1905; Jones & Sulak, 1990; Chave & Mundy, 1994).

GENERAL RANGE: Circumglobal in the tropical and subtropical Atlantic, Indian, and Pacific oceans except the northeastern and western Atlantic. Benthic at 258–5150 m (Sulak, 1977).

***Bathypterois grallator*** (Goode & Bean)

*Benthosaurus grallator* Goode & Bean, 1886, p. 168, Gulf of Mexico off northern Florida at 24°33'N, 84°23'W.

*Bathypterois grallator* (Goode & Bean, 1886): Sulak (1977), Jones & Sulak (1990), Chave & Mundy (1994).

TAXONOMY: Sulak (1977).

HAWAIIAN RECORDS: Hawai'i Island to Maui at 1140–1460 m (Jones & Sulak, 1990; Chave & Jones, 1991; Chave & Mundy, 1994). The capture of a *Bathypterois* larva off Kailua-Kona with meristics unlike those of any described species indicates that an undescribed *Bathypterois* species may exist in the Hawaiian Islands (B. Mundy, unpubl. data). The records of *B. grallator* are based on photographs. Collection of more *Bathypterois* specimens will be necessary to resolve the taxonomy of this genus in the archipelago.

GENERAL RANGE: Circumglobal in all tropical through temperate oceans except the Red Sea, central South Pacific, and eastern Pacific. Benthic at 878–4720 m (Jones & Sulak, 1990).

[*Bathypterois longipes* Günther]

*Bathypterois longipes* Günther, 1878, p. 184, off Uruguay, South Atlantic, at 36°44'S, 46°16'W.

*Bathypterois longipes* Günther, 1878: Sulak (1977), Kaufman *et al.* (1989).

TAXONOMY: Sulak (1977).

HAWAIIAN RECORDS: None but this species has been collected to the southwest and northeast of the Hawaiian Islands (Sulak, 1977; Kaufman *et al.*, 1989) indicating that it could occur in Hawaiian waters.

GENERAL RANGE: Probably circumglobal, but known only from the tropical through temperate northeastern, northwestern, and southwestern Atlantic, and the eastern North and central North Pacific including the Mid-Pacific Seamounts. Benthic at 2615–5610 m (Sulak, 1977; Kaufman *et al.*, 1989).

***Bathytrophops marionae*** Mead

*Bathytrophops marionae* Mead, 1958, p. 370, Fig. 4, Caribbean Sea at 16°48'N, 82°33'W.

*Bathytrophops marionae* Mead, 1958: Hughes & Iwai (1978), Merrett (1980).

TAXONOMY: Merrett (1980).

HAWAIIAN RECORDS: Pioneer Bank, NWHI (25°48.352'N, 173°26.344'W) at 1208–1209 m (C. Kelley & Emily Yam, pers. comm., 5 Aug. 2004). A larva was collected off O'ahu (B. Mundy, unpub. data). Adults were found at the Mid-Pacific Seamounts (Hughes & Iwai, 1978).

GENERAL RANGE: Probably circumglobal in the tropical Atlantic, Indian, and Pacific oceans, but known from few collections. Benthic at 692–1420 m (Merrett, 1980).

*[Ipnops agassizii* Garman]

*Ipnops agassizii* Garman, 1899, p. 259, Pl. H (figs. 2–2a), Pacific Ocean off western Mexico at 2°34'N, 92°06'W.  
*Ipnops agassizi* Garman, 1899: Nielsen (1966b), Wilson *et al.* (1985).

TAXONOMY: Nielsen (1966b).

HAWAIIAN RECORDS: None, but *I. agassizii* was collected from Hamilton Guyot (19°55'N, 177°13'E) at 1600 m (Wilson *et al.*, 1985) indicating that it could also occur in deep water around the Hawaiian Islands.

GENERAL RANGE: Tropical Indo-Pacific from east Africa to Mid-Pacific Seamounts and the Galapagos Islands. Benthic at 1392–2820 m (Nielsen, 1966b; Wilson *et al.*, 1985).

*[Ipnops meadi* Nielsen]

*Ipnops meadi* Nielsen, 1966b, p. 57, Fig. 5, Indian Ocean off Kenya at 3°23'S, 44°04'E.  
*Ipnops meadi* Nielsen, 1966b: Nielsen (1966b), Kaufman *et al.* (1989).

TAXONOMY: Nielsen (1966b).

HAWAIIAN RECORDS: None, but Kaufman *et al.* (1989) recorded *I. meadi* from the Magellan Rise (07°00'N, 176°00'W) at 3100–3200 m, indicating that this species could occur in deep water near the Hawaiian Islands.

GENERAL RANGE: Tropical Indo-Pacific from east Africa to the Mid-Pacific Seamounts and waters off Peru. Benthic at 3100–4940 m (Nielsen, 1966b; Kaufman *et al.*, 1989).

### Scopelarchidae — Pearleyes<sup>26</sup>

*Benthalbella infans* Zugmayer

*Benthalbella infans* Zugmayer, 1911, p. 14, North Atlantic north of Madeira at 6°07'N, 10°18'W.  
*Benthalbella infans* Zugmayer, 1911: Johnson (1974b), Loeb (1979), Johnson (1982), Boehlert & Mundy (1992).

TAXONOMY: Johnson (1974b).

HAWAIIAN RECORDS: O'ahu to the Hancock Seamounts (Johnson, 1974b, 1982; Boehlert & Mundy, 1992).

GENERAL RANGE: Circumglobal between 60°N–37°S in the tropical through temperate Atlantic, Indian, and Pacific oceans except the eastern Pacific. Meso- and bathypelagic at 200–1800 m (Johnson, 1974b).

*Rosenblattichthys hubbsi* Johnson

*Rosenblattichthys hubbsi* Johnson, 1974a, p. 452, South Atlantic at 2°27'S, 19°00'W.  
*Rosenblattichthys hubbsi* Johnson, 1974a: Johnson (1974a), Loeb (1979), Johnson (1982), Johnson *in* Quéro *et al.* (1990).

TAXONOMY: Johnson (1974a).

HAWAIIAN RECORDS: O'ahu (Johnson, 1982).

GENERAL RANGE: Tropical and subtropical north Atlantic, south Atlantic, southern Indian Ocean, western North Pacific, and central North Pacific. Mesopelagic at 0–657 m fishing depths (Johnson, 1982; Johnson *in* Quéro *et al.*, 1990).

*Scopelarchus analis* (Brauer)

*Dissomma anale* Brauer, 1902, p. 278, equatorial Atlantic at 0°28'N, 6°32'W.  
*Scopelarchus analis* (Brauer, 1902): Johnson (1974b), Loeb (1979), Novikov *et al.* (1981), Johnson (1982), Boehlert & Mundy (1992).

TAXONOMY: Johnson (1974b).

HAWAIIAN RECORDS: Maui to the Hancock Seamounts (Johnson, 1982; Boehlert & Mundy, 1992).

GENERAL RANGE: Circumglobal between 45°N–40°S in the tropical through temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans except the eastern tropical Pacific. Mesopelagic at 0 to <800 m fishing depths (Johnson, 1974b, 1982).

COMMENTS: *Scopelarchus oxyderces* and *S. alcoccki* [sic] listed by Borets & Sokolovsky (1978) are *nomen nudum* (Johnson, 1974a by inference; see Rofen, 1966a; these names were not mentioned by Eschmeyer, 1998). The identity of these specimens cannot be determined.

***Scopelarchus guentheri*** Alcock

*Scopelarchus guentheri* Alcock, 1896, p. 307, Arabian Sea off Indus Delta at 22°14'25"N, 67°08'55"E.  
*Scopelarchus guentheri* Alcock, 1896: Johnson (1974b), Loeb (1979), Johnson *in* Quéro *et al.* (1990).

TAXONOMY: Johnson (1974b).

HAWAIIAN RECORDS: Hawai'i Island to the Hancock Seamounts (Johnson, 1974b).

GENERAL RANGE: Circumglobal in the Atlantic, Indian, and Pacific oceans. Tropical and subtropical to 30°N in northern hemisphere, tropical through temperate to 50°S in southern Pacific. Mesopelagic at 0–>500 m fishing depths (Johnson, 1974b; Johnson *in* Quéro *et al.*, 1990).

***Scopelarchus michaelsarsi*** Koefoed

*Scopelarchus michaelsarsi* Koefoed, 1955, p. 6, Fig., North Atlantic at 40°17'N, 50°39'W.  
*Scopelarchus michaelsarsi* Koefoed, 1955: Johnson (1974b), Loeb (1979).

TAXONOMY: Johnson (1974b).

HAWAIIAN RECORDS: O'ahu (Johnson, 1974b).

GENERAL RANGE: Circumglobal between 40°N–35°S in the tropical through warm-temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans except the eastern Pacific. Mesopelagic at 256–>500 m (Johnson, 1974b).

***Scopelarchus stephensi*** Johnson

*Scopelarchus stephensi* Johnson, 1974a, p. 455, 27°56.9'–28°07.9'N, 177°53.4–39.2'W.  
*Scopelarchus stephensi* Johnson, 1974a: Johnson (1974a, 1974b), Loeb (1979), Boehlert & Mundy (1992).

TAXONOMY: Johnson (1974b).

HAWAIIAN RECORDS: The Hancock Seamounts, where larvae occur only in winter (Johnson, 1974a; Boehlert & Mundy, 1992).

GENERAL RANGE: North Pacific transition zone endemic known from 25°–35°N, 125°W–160°E. Meso- and bathypelagic from 0–>1000 m (Johnson, 1974b).

**Notosudidae — Waryfishes, Wearyfishes*****Ahliesaurus brevis*** Bertelsen, Krefft, & Marshall

*Ahliesaurus brevis* Bertelsen, Krefft & Marshall, 1976, p. 27, Figs. 17–19, central North Pacific south of the Hancock Seamounts at 25°27.9'N, 178°07.3'E to 25°50'N, 178°31.9'E.  
*Ahliesaurus brevis* Bertelsen, Krefft & Marshall, 1976: Bertelsen *et al.* (1976), Loeb (1979), Parin *et al.* (1995).

TAXONOMY: Bertelsen *et al.* (1976).

HAWAIIAN RECORDS: O'ahu, probably to Midway and perhaps the Hancock Seamounts (Bertelsen *et al.*, 1976).

GENERAL RANGE: Indo-transpacific from east Africa to the Philippines, Cook Islands, Kuril Islands, the Hawaiian Islands, and off Baja California. Meso- and bathypelagic; larvae at 0–600 m, adults at ca. 200–2000 m (Bertelsen *et al.*, 1976; Parin *et al.*, 1995).

**[*Scopelosaurus adleri* (Fedorov)]**

*Notosudis adleri* Fedorov, 1967, p. 68, Fig. 2, Bering Sea at 58°16'N, 175°13'E.  
*Scopelosaurus harryi* non (Mead, 1953): Bertelsen *et al.* (1976, in part).  
*Scopelosaurus adleri* (Fedorov, 1967): Balanov & Savinykh (1999), Savinykh & Balanov (2000).

TAXONOMY: Balanov & Savinykh (1999).

HAWAIIAN RECORDS: None but the general range, with a record at 38°00'N, 179°43.8'W and records southward to 20°N in the Kuroshio and California Currents, suggests that this species could occur at the Hancock Seamounts (Balanov & Savinykh, 1999; Savinykh & Balanov, 2000).

GENERAL RANGE: Subarctic Pacific and Bering Sea endemic found primarily between 40–60°N from Japan to California. Migrates southward seasonally to spawn primarily in the California Current with lesser spawning activity in the Kuroshio Current. Meso- and bathypelagic at 0–950 m fishing depths but adults are most often found at 400–950 m near the bottom (Savinykh & Balanov, 2000).

[*Scopelosaurus harryi* (Mead)]

*Luciosudis harryi* Mead in Mead & Taylor, 1953, p. 578, Fig. 8, 38 mi east 1/2 north of Ohakozaki, Japan.

*Scopelosaurus* sp. II: Bertelsen *et al.* (1976).

*Scopelosaurus harryi* (Mead, 1953): Bertelsen *et al.* (1976, in part), Balanov & Savinykh (1999), Savinykh & Balanov (2000).

TAXONOMY: Bertelsen *et al.* (1976), Balanov & Savinykh (1999).

HAWAIIAN RECORDS: None, but the general range, with a juvenile collected at ca. 30°N, 170°E, suggests that this species could occur at the Hancock Seamounts (Balanov & Savinykh, 1999).

GENERAL RANGE: Subarctic Pacific and Bering Sea endemic found primarily from 40–60°N from Japan to Canada. Migrates southward seasonally to spawn in the Kuroshio Current. Mesopelagic, not bottom-associated, at 0–1000 m fishing depths but adults are most often found at 200–500 m (Savinykh & Balanov, 2000).

*Scopelosaurus hoedti* Bleeker

*Scopelosaurus hoedti* Bleeker, 1860, p. 13, Ambon Island, Moluccas Islands, Indonesia.

*Scopelosaurus hoedti* Bleeker, 1860: Bertelsen *et al.* (1976).

TAXONOMY: Bertelsen *et al.* (1976).

HAWAIIAN RECORDS: O'ahu to Kaua'i (Bertelsen *et al.*, 1976).

GENERAL RANGE: Indo-Pacific from east Africa to the Ryukyus, southeastern Australia, the Hawaiian Islands, and the eastern central Pacific (15°S, 105°W). Epi- and mesopelagic, associated with island slopes, at 0–600 m (Bertelsen *et al.*, 1976).

COMMENTS: The *Scopelosaurus* sp. of Borets & Sokolovsky (1978) and larval *Scopelosaurus* collected at Johnston Atoll (Boehlert *et al.*, 1992) were not identified to species.

*Scopelosaurus smithii* Bean

*Scopelosaurus smithii* Bean, 1925, p. 13, southwestern Atlantic off the coast of Brazil.

*Scopelosaurus smithii* Bean, 1925: Bertelsen *et al.* (1976), Loeb (1979).

TAXONOMY: Bertelsen *et al.* (1976).

HAWAIIAN RECORDS: Hawai'i Island to O'ahu (Bertelsen *et al.*, 1976).

GENERAL RANGE: Circumglobal between 40°N–30°S in the tropical through temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans except the eastern Pacific. Mesopelagic, benthopelagic as adults, at 0–>200 m (Bertelsen *et al.*, 1976).

**Alepisauroidae****Synodontidae — Lizardfishes<sup>27</sup>***Bathysaurus mollis* Günther

*Bathysaurus mollis* Günther, 1878, p. 182, central South Pacific Ocean and off Tokyo, Japan.

*Bathysaurus mollis* Günther, 1878: Sulak *et al.* (1985), Kaufman *et al.* (1989).

TAXONOMY: Sulak *et al.* (1985). Johnson *et al.* (1996) concluded that *Bathysaurus* should be excluded from the Synodontidae and other synodontoid families. Baldwin & Johnson (1996) proposed that the genus be assigned to its own family, the Bathysauridae, within the Giganturoidei.

HAWAIIAN RECORDS: *Bathysaurus mollis* has been photographed off Hawai'i Island (19°38'N, 156°07.5'W) at 2533 m (E. Chave, unpubl. data). Also recorded from the Magellan Rise (07°00'N, 176°00'W; Kaufman *et al.*, 1989) with collections and photographs from elsewhere in the mid-Pacific (Sulak *et al.*, 1985).

GENERAL RANGE: Circumglobal between 60°N–40°S in the tropical through temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans except the eastern tropical and eastern South Pacific. Benthic at 1683–4903 m (Sulak *et al.*, 1985).

*Saurida flamma* Waples

*Saurida flamma* Waples, 1982, p. 225, Fig. 2, Kewalo Basin, Honolulu, Hawaiian Islands.



*Saurida flamma* Waples, 1982: Waples (1982), Randall (1985a, 1996a), Randall *et al.* (1985a), Hoover (1993, 2003), Russell *in* Carpenter & Niem (1999a).

TAXONOMY: Waples (1982).

COMMON NAMES: ‘Ulae (Hoover, 1993, 2003; Randall, 1996a), Orangemouth saury (FAO), Orangemouth lizardfish (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and O‘ahu to French Frigate at 5–30 m (Waples, 1982; Randall *et al.*, 1985b).

GENERAL RANGE: Central Pacific endemic. Recorded specifically from the Hawaiian Islands, Johnston Atoll, the Austral Islands, Rapa, and Pitcairn Island. Benthic and reef-associated at 5–30 m (Waples, 1982; Randall *et al.*, 1985b; Russell *in* Carpenter & Niem, 1999a).

### *Saurida gracilis* (Quoy & Gaimard)

*Saurus gracilis* Quoy & Gaimard, 1824, p. 224, Hawaiian Islands and Mauritius.

*Saurus gracilis* Quoy & Gaimard, 1824: Quoy & Gaimard (1824).

*Saurida tumbil* non (Bloch, 1795) [a valid species not found in the Hawaiian Islands]: Fowler (1900).

*Saurida gracilis* (Quoy & Gaimard, 1824): Jenkins (1903), Gilbert (1905), Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Hobson (1974), Waples (1982), Tinker (1982), Randall (1985a, 1996a), Randall *et al.* (1985a), Uchida & Uchiyama (1986), Cressey *in* Smith & Heemstra (1986), Myers (1989), Randall *et al.* (1990a, 1993b, 1997a).

TAXONOMY: Waples (1982).

COMMON NAMES: ‘Ulae (Randall, 1996a), Gracile lizardfish (FAO), Slender lizardfish (Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to Midway at 1–10 m; recorded to 338 m from trawl samples (Quoy & Gaimard, 1824; Gilbert, 1905; Jordan & Evermann, 1905; Waples, 1982; Randall *et al.*, 1985b; Uchida & Uchiyama, 1986; Randall *et al.*, 1993b).

GENERAL RANGE: Indo-Pacific from the Red Sea and South Africa to the Ryukyu and Ogasawara Islands, eastern Australia, the Hawaiian Islands, and Ducie Island. Benthic on sand, reef-associated at 1–135 m and perhaps to 338 m (Cressey *in* Smith & Heemstra, 1986; Myers, 1989; Randall *et al.*, 1990a, 1997b).

### *Saurida nebulosa* Valenciennes

*Saurida nebulosa* Valenciennes *in* Cuvier & Valenciennes, 1850, p. 504, Pl. 648, Mauritius.

*Synodus sharpi* Fowler, 1900: Fowler (1900).

*Saurida gracilis* non (Quoy & Gaimard, 1824) [a valid species also found in the Hawaiian Islands]: Fowler (1928, 1931, 1934, in part), Gosline & Brock (1960, in part).

*Saurida nebulosa* Valenciennes *in* Cuvier & Valenciennes, 1850: Günther (1864), Streets (1877), Waples (1982), Myers (1989), Kuiter (1993), Randall (1996a), Randall *et al.* (1997a).

TAXONOMY: Waples (1982).

COMMON NAMES: ‘Ulae (Randall, 1996a), Clouded lizardfish (FAO), Nebulous lizardfish (Randall, 1996a).

HAWAIIAN RECORDS: O‘ahu at 0–2 m (Fowler, 1900; Waples, 1982).

GENERAL RANGE: Indo-Pacific from Mauritius to Micronesia, the Ogasawara Islands, the Hawaiian Islands, southeastern Australia, and the Society Islands. Benthic in sand, mud, rock, and eel-grass habitats at 0–6 m (Waples, 1982; Myers, 1989; Kuiter, 1993; Randall *et al.*, 1997b).

### *Synodus amaranthus* Waples & Randall

*Synodus amaranthus* Waples & Randall, 1989, p. 185, Figs. 1, 3, Honolulu Market, O‘ahu, Hawaiian Islands.

*Synodus varius* non (Lacépède, 1803) [a junior synonym of *Synodus variegatus* (Lacépède, 1803), a valid species that also occurs in the Hawaiian Islands]: Jordan & Evermann (1905, in part).

*Synodus dermatogenys* non Fowler, 1912 [a valid species that also occurs in the Hawaiian Islands]: Fowler (1912, in part).

*Synodus variegatus* non (Lacépède, 1803) [a valid species that also occurs in the Hawaiian Islands]: Cressey (1981, in part).

*Synodus amaranthus* Waples & Randall, 1989: Waples & Randall (1989).

TAXONOMY: Waples & Randall (1989). J.E. Randall (pers. comm., Mar. 2005) will show that *S. amaranthus* is a junior synonym of *S. dermatogenys* Fowler.

HAWAIIAN RECORDS: Hawai'i Island to O'ahu (Jordan & Evermann, 1905; Waples & Randall, 1989).

GENERAL RANGE: The Hawaiian Islands and perhaps Australia. Benthic at unknown depths (Waples & Randall, 1989).

### *Synodus binotatus* Schultz

*Synodus binotatus* Schultz in Schultz *et al.*, 1953, p. 35, Fig. 8, Ennylabegan Island, Kwajalein Atoll, Marshall Islands.

*Synodus binotatus* Schultz in Schultz *et al.*, 1953: Gosline & Brock (1960), Cressey (1981), Tinker (1982), Randall (1985a, 1996a), Randall *et al.* (1985a), Uchida & Uchiyama (1986), Waples & Randall (1989), Myers (1989), Hoover (1993, 2003), Randall *et al.* (1990a, 1997a).

TAXONOMY: Waples & Randall (1989).

COMMON NAMES: 'Ulae (Hoover, 1993, 2003; Randall, 1996a), Twospot lizardfish (FAO; Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Laysan 29–88 m (Gosline & Brock, 1960; Randall *et al.*, 1985b; Uchida & Uchiyama, 1986; Waples & Randall, 1989).

GENERAL RANGE: Indo-Pacific from the Red Sea and South Africa to Okinawa and the Ogasawara Islands, the Great Barrier Reef, Micronesia, the Hawaiian Islands and Gambier Islands. Benthic near reefs at 1–88 m, usually at <10 m (Cressey, 1981; Uchida & Uchiyama, 1986; Myers, 1989; Randall *et al.*, 1990a, 1997b). Waples & Randall (1989) stated that the species is unknown from below 20 m.

### *Synodus capricornis* Cressey & Randall

*Synodus capricornis* Cressey & Randall, 1978, p. 767, Figs. 1–3, off Ahu Akapu, Easter Island.

*Synodus capricornis* Cressey & Randall, 1978: Cressey (1981), Waples & Randall (1989), Randall (1996a).

TAXONOMY: Waples & Randall (1989).

COMMON NAMES: 'Ulae (Randall, 1996a), Capricorn lizardfish (FAO; Randall, 1996a).

HAWAIIAN RECORDS: Hawai'i Island to O'ahu at 25–88 m (Waples & Randall, 1989).

GENERAL RANGE: Antitropical Pacific Plate endemic known only from the Hawaiian, Pitcairn, and Easter islands. Benthic at 21–88 m (Cressey, 1981; Waples & Randall, 1989).

### *Synodus dermatogenys* Fowler

*Synodus dermatogenys* Fowler, 1912a, p. 566, Fig. 3, "Hawaiian Islands".

*Synodus japonicus* non (Houttuyn, 1782) [a *nomen dubium* that cannot be assigned to a currently recognized species (Waples & Randall 1989)]: Fowler (1928, 1931, 1934, 1949, in part).

*Synodus variegatus* non (Lacépède, 1803) [a valid species that also occurs in the Hawaiian Islands]: Fowler (1912), Gosline & Brock (1960), Struhsaker (1973a), Hobson (1974), Cressey (1981), Tinker (1982), Randall (1985a), Randall *et al.* (1985a), Uchida & Uchiyama (1986), Myers (1989).

*Synodus dermatogenys* Fowler, 1912a: Gosline & Brock (1960), Struhsaker (1973a), Iwai (1976)?, Tinker (1982), Uchida & Uchiyama (1986), Waples & Randall (1989), Randall *et al.* (1990a, 1993b), Randall (1996a), Randall *et al.* (1997a), Hoover (2003).

TAXONOMY: Prior to Waples & Randall (1989), the name *Synodus variegatus* was applied to the species originally described as *S. dermatogenys*.

COMMON NAMES: 'Ulae (Randall, 1996a; Hoover, 2003), Banded lizardfish (FAO), Clearfin lizardfish (Randall, 1996a; Hoover, 2003).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure at <10–97 m (Fowler, 1912b; Hobson, 1974; Randall *et al.*, 1985b; Uchida & Uchiyama, 1986; Randall *et al.*, 1993b). The specimen from 280 m identified as *S. dermatogenys* by Iwai (1976) may not be this species.

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to the Ryukyu and Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, and the Tuamotus. Benthic near reefs at 1–97 m (Cressey, 1981; Uchida & Uchiyama, 1986; Waples & Randall, 1989; Myers, 1989; Randall *et al.*, 1997b).

### *Synodus doaki* Russell & Cressey

*Synodus doaki* Russell & Cressey, 1979, p. 166, Fig. 1, Nursery Bay, Port Knights Island, New Zealand.

*Synodus doaki* Russell & Cressey, 1979: Cressey (1981), Waples & Randall (1989), Randall *et al.* (1990a), Chave & Mundy (1994).

TAXONOMY: Waples & Randall (1989).

COMMON NAMES: Doak's lizardfish (FAO), Arrowtooth lizardfish (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Moloka'i to Maro Reef at 52–260 m (Cressey, 1981; Waples & Randall, 1989; Chave & Mundy, 1994).

GENERAL RANGE: Indo-Pacific, known from disjunct localities, from east Africa to southern Japan, the Great Barrier Reef, New Zealand, and the Hawaiian Islands. Benthic at 9–260 m (Cressey, 1981; Waples & Randall, 1989; Randall *et al.*, 1990a).

### *Synodus falcatus* Waples & Randall

*Synodus falcatus* Waples & Randall, 1989, p. 191, Pls. 1f, 3c; Figs. 1, 4, Maro Reef, Northwestern Hawaiian Islands.

*Synodus varius* non (Lacépède, 1803) [a junior synonym of *Synodus variegatus* (Lacépède, 1803), a valid species that also occurs in the Hawaiian Islands]: Jordan & Evermann (1905, in part).

*Synodus ulae* non Schultz in Schultz *et al.*, 1953 [a valid species also found in the Hawaiian Islands]: Schultz in Schultz *et al.* (1953, in part), Cressey (1981, in part).

*Synodus falcatus* Waples & Randall, 1989: Waples & Randall (1989).

TAXONOMY: Waples & Randall (1989).

HAWAIIAN RECORDS: Moloka'i to Laysan at 30–115 m (Jordan & Evermann, 1905; Waples & Randall, 1989).

GENERAL RANGE: Hawaiian endemic. Benthic at 30–115 m (Waples & Randall, 1989).

### *Synodus janus* Waples & Randall

*Synodus janus* Waples & Randall, 1989, p. 195, Figs. 1, 5, Hilo Bay, Hawai'i Island.

*Synodus janus* Waples & Randall, 1989: Waples & Randall (1989).

TAXONOMY: Waples & Randall (1989). J.E. Randall (pers. comm., Mar. 2005) will show that *S. janus* is a junior synonym of *S. falcatus* Waples & Randall.

HAWAIIAN RECORDS: Hawai'i Island at unknown depths (Waples & Randall, 1989).

GENERAL RANGE: Hawaiian endemic known only from the holotype collected at an unknown depth (Waples & Randall, 1989).

### *Synodus kaianus* (Günther)

*Saurus kaianus* Günther, 1880, p. 50, Pl. 23 (fig. C), Kai Island, Indonesia, Arafura Sea.

*Synodus kaianus* (Günther, 1880): Gilbert (1905), Jordan & Evermann (1905), Fowler (1928), Gosline & Brock (1960), Struhsaker (1973a), Cressey (1981), Tinker (1982), Uchida & Uchiyama (1986), Waples & Randall (1989).

TAXONOMY: Waples & Randall (1989).

COMMON NAMES: Kaianus lizardfish (FAO).

HAWAIIAN RECORDS: Hawai'i Island to Laysan at 48–326 m (Gilbert, 1905; Struhsaker, 1973a; Uchida & Uchiyama, 1986).

GENERAL RANGE: Pacific endemic from southern Japan to northern Australia, Fiji, and the Hawaiian Islands. Benthic at 48–326 m (Struhsaker, 1973a; Cressey, 1981; Waples & Randall, 1989).

### *Synodus lobeli* Waples & Randall

*Synodus lobeli* Waples & Randall, 1989, p. 198, Pl. 2 (fig. a), Pl. 3 (fig. d); Fig. 1, off Kailua, Kona Coast of Hawai'i Island.

*Synodus varius* non (Lacépède, 1803) [a junior synonym of *Synodus variegatus* (Lacépède, 1803), a valid species that also occurs in the Hawaiian Islands]: Jordan & Evermann (1905, in part).

*Synodus lobeli* Waples & Randall, 1989: Waples & Randall (1989), Senou *et al.* (1995), Randall (1996a).

TAXONOMY: Waples & Randall (1989).

COMMON NAMES: 'Ulae (Randall, 1996a), Lobel's lizardfish (Randall, 1996a).

HAWAIIAN RECORDS: Hawai'i Island at 31–32 m (Jordan & Evermann, 1905; Waples & Randall, 1989). Also known from unspecified banks in the Northwestern Hawaiian Islands (F. Parrish, pers. comm., May 2003).

GENERAL RANGE: Western and central North Pacific endemic from the Ogasawara Islands and the Hawaiian Islands. Benthic at 31–140 m (Waples & Randall, 1989; Senou *et al.*, 1995).

***Synodus rubromarmoratus*** Russell & Cressey

*Synodus rubromarmoratus* Russell & Cressey, 1979, p. 172, Fig. 3, Mrs. Watson's Bay, Lizard Island, Great Barrier Reef, Australia.

*Synodus rubromarmoratus* Russell & Cressey, 1979; Randall *et al.* (1990a), Randall (1998d).

TAXONOMY: Randall (1998d).

COMMON NAMES: Redmarbled lizardfish (FAO; Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Hawai'i Island at 5 m (Randall, 1998d).

GENERAL RANGE: Western and central Pacific endemic known from northeastern Australia, Indonesia, the Philippines, Taiwan, and the Ogasawara Islands to the Hawaiian Islands. Benthic at 1–26 m (Randall *et al.*, 1990a; Randall, 1998d).

***Synodus ulae*** Schultz

*Synodus ulae* Schultz in Schultz *et al.*, 1953, p. 38, Honolulu market, O'ahu, Hawaiian Islands.

*Synodus varius* non (Lacépède, 1803) [a junior synonym of *Synodus variegatus* (Lacépède, 1803), a valid species that also occurs in the Hawaiian Islands]: Jordan & Evermann (1905, in part).

*Synodus ulae* Schultz in Schultz *et al.*, 1953: Schultz in Schultz *et al.* (1953, in part), Cressey (1981), Tinker (1982), Randall (1985a), Waples & Randall (1989), Randall *et al.* (1993b), Randall (1996a), Randall *et al.* (1997a), Hoover (2003).

TAXONOMY: Waples & Randall (1989).

COMMON NAMES: 'Ulae (Randall, 1996a; Hoover, 2003), Ulae (Randall, 1996a), Hawaiian lizardfish (Hoover, 2003).

HAWAIIAN RECORDS: Hawai'i Island to Midway at 6–99 m (Jordan & Evermann, 1905; Schultz in Schultz *et al.*, 1953; Waples & Randall, 1989; Randall *et al.*, 1993b).

GENERAL RANGE: Western and central North Pacific endemic from Southern Japan, the Ryukyus and the Ogasawara Islands to the Hawaiian Islands. Benthic near reefs at 1–121 m (Cressey, 1981; Waples & Randall, 1989; Randall *et al.*, 1997b).

***Synodus usitatus*** Cressey

*Synodus usitatus* Cressey, 1981, p. 42, Fig. 35, off Haleiwa, O'ahu, Hawaiian Islands.

*Synodus usitatus* Cressey, 1981; Cressey (1981), Waples & Randall (1989).

TAXONOMY: Waples & Randall (1989).

HAWAIIAN RECORDS: Moloka'i to Maro Reef at ca. 100 m (Cressey, 1981; Waples & Randall, 1989).

GENERAL RANGE: Known only from Indonesia, southern Japan, and the Hawaiian Islands. Benthic at ca. 100 m (Cressey, 1981; Waples & Randall, 1989).

***Synodus variegatus*** (Lacépède)

*Salmo variegatus* Lacépède, 1803, p. 157, 224, Pl. 3 (fig. 3), Mauritius, Indian Ocean.

*Saurus variegatus* Lacépède, 1803: Quoy & Gaimard (1824).

*Synodus varius* (Lacépède, 1803): Steindachner (1900), Jenkins (1903), Snyder (1904), Jordan & Snyder (1904b), Gilbert (1905, in part), Jordan & Evermann (1905, in part).

*Synodus englemani* Schultz in Schultz *et al.*, 1953: Schultz in Schultz *et al.* (1953), Cressey (1981), Randall *et al.* (1985a), Myers (1989).

*Synodus ulae* non Schultz in Schultz *et al.*, 1953 [a valid species that also occurs in the Hawaiian Islands]: Schultz in Schultz *et al.* (1953, in part).

*Synodus variegatus* (Lacépède, 1803): Waples & Randall (1989), Randall *et al.* (1990a, 1993b, 1997a), Randall (1996a), Hoover (1993, 2003).

TAXONOMY: Prior to Waples & Randall (1989), the name *Synodus variegatus* was applied to the species originally described as *S. dermatogenys*, while the name *S. engelmani* was applied to the true *S. variegatus*.

COMMON NAMES: 'Ulae (Hoover, 1993, 2003; Randall, 1996a), Variegated lizardfish (FAO; Randall, 1985), Reef lizardfish (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at 3–121 m (Quoy & Gaimard, 1824; Jordan & Evermann, 1905; Gilbert, 1905; Randall *et al.*, 1985b, 1993b).

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to Okinawa and the Ogasawara Islands, the Great Barrier Reef, Micronesia, the Hawaiian Islands, and Pitcairn Island. Benthic near reefs at 3–121 m (Cressey, 1981; Waples & Randall, 1989; Randall *et al.*, 1990a, 1997b).

***Trachinocephalus myops* (Forster)**

*Salmo myops* Forster in Bloch & Schneider, 1801, p. 421, St. Helena, South Atlantic Ocean.

*Saurus limbatus* Eydoux & Souleyet, 1850: Eydoux & Souleyet (1850) [cited in Jordan & Evermann (1905), but no locality was actually given].

*Trachinocephalus myops* (Forster in Bloch & Schneider, 1801): Jenkins (1903), Snyder (1904), Gilbert (1905), Jordan & Evermann (1905), Fowler (1928, 1934, 1949), Gosline & Brock (1960), Anderson *et al.* (1966), Struhsaker (1973a), Tinker (1982), Uchida & Uchiyama (1986), Waples & Randall (1989), Randall *et al.* (1990a), Kuitert (1993), Randall (1996a).

TAXONOMY: Waples & Randall (1989).

COMMON NAMES: Kawelea, Wele'ā (Randall, 1996a), Snakefish (AFS; Randall, 1996a), Bluntnose lizardfish (FAO).

HAWAIIAN RECORDS: Hawai'i Island to Kure at 18–250 m (Jordan & Evermann, 1905; Gilbert, 1905; Struhsaker, 1973a; Uchida & Uchiyama, 1986).

GENERAL RANGE: Circumtropical and subtropical in the Gulf of Mexico, Atlantic, Indian, and Pacific oceans except the eastern Pacific. Benthic at 3–388 m (Anderson *et al.*, 1966; Struhsaker, 1973a; Uchida & Uchiyama, 1986; Randall *et al.*, 1990a; Kuitert, 1993).

**Paralepididae — Barracudinas<sup>28</sup>**

***Arctozenus risso* (Bonaparte)**

*Paralepis risso* Bonaparte, 1840, fasc. 29, punt. 152, pl. 124, off Italy, Mediterranean Sea.

*Paralepis rissoi* Bonaparte, 1840: Ege (1953).

*Notolepis rissoi* (Bonaparte, 1840): Rofen (1966), Novikov *et al.* (1981).

[*Notolepis*] *rissoi* (Bonaparte, 1840): Post in Whitehead *et al.* (1984).

*Arctozenus rissoi* (Bonaparte, 1840): Post (1987), Parin *et al.* (1990).

TAXONOMY: Post (1987), Eschmeyer (1998) for spelling of species name.

COMMON NAMES: White barracudina (AFS).

HAWAIIAN RECORDS: Main Hawaiian Islands from unspecified locations and depths (Post, 1987).

GENERAL RANGE: Circumglobal in the Atlantic (80°N–60°S), Indian (20°–20°S), and Pacific (40°N–50°S) oceans. Mesopelagic, primarily at 200–1000 m (Post in Whitehead *et al.*, 1984; Post, 1987; Parin *et al.*, 1990).

***Lestidiops indopacifica* (Ege)**

*Lestidium indopacificum* Ege, 1953, p. 120, Fig. 26, off India at 1°45'N, 73°03'E.

*Lestidium indopacificum* Ege, 1953: Ege (1953).

Type B (like *L. interpacificum*) [sic; probably a *lapsus* for *L. indopacifica*]: Loeb (1979)?

*Lestidiops indopacifica* (Ege, 1953): Rofen (1966), Post (1972), Ozawa (1986), Paxton *et al.* (1989), Parin *et al.* (1990), Boehlert & Mundy (1996).

TAXONOMY: Post (1972).

HAWAIIAN RECORDS: Larvae have been collected at O'ahu and the Hancock Seamounts (Boehlert & Mundy, 1996). Larval *Lestidiops* from Johnston Atoll were not identified to species (Boehlert *et al.*, 1992).

GENERAL RANGE: Indo-Pacific from east Africa to southern Japan, southeastern Australia, the Hawaiian Islands, the Marquesas, and off Chile. Mesopelagic at ca. 15–330 m, adults unknown (Ege, 1953; Rofen, 1966a; Ozawa, 1986; Paxton *et al.*, 1989; Parin *et al.*, 1990; NMFS, unpubl. data).

**[*Lestidiops jayakari jayakari* (Boulenger)]**

*Sudis jayakari* Boulenger, 1889, p. 241, Fig., Muscat, Oman.

*Lestidium pseudosphyraenoides danae* (Ege, 1930): Ege (1953).

*Lestidiops jayakari jayakari* (Boulenger, 1889): Rofen (1966), Post (1972), Post *in* Smith & Heemstra (1986), Ozawa (1986).

TAXONOMY: Post (1972).

HAWAIIAN RECORDS: Larvae tentatively identified from O'ahu and the Hancock Seamounts (B. Mundy, unpubl. data).

GENERAL RANGE: Circumglobal in the tropical and subtropical Atlantic, Indian, and Pacific oceans except the eastern Pacific. Epi- to bathypelagic at ca. 15–>2000 m (Ege, 1953; Rofen, 1966a; Post *in* Smith & Heemstra, 1986).

[*Lestidiops jayakari pacifica* (Parr)]

*Paralepis pacificus* Parr, 1931, p. 19, Figs. 6–7, off Puerto Vallarta, Pacific coast of Mexico at 20°48'15"N, 106°11'50"W.

*Lestidium pseudosphraenoides progressum* Ege, 1953; Ege (1953), Parin *et al.* (1990).

*Lestidiops jayakari pacifica* (Parr, 1931): Rofen (1966), Post (1972).

TAXONOMY: Post (1972), but several other authors (i. e., Ambrose, 1996) recognize this form as a distinct species, *L. pacifica*.

HAWAIIAN RECORDS: None but collections at 30°–34°N, 165°–175°W indicate that this subspecies probably occurs at the Hancock Seamounts (Ege, 1953).

GENERAL RANGE: Known from disjunct Pacific areas; around northern New Zealand, off Panama westward to 0°, 100°W, off Chile, and between 30–34°N, 130–175°W in the central North Pacific. Mesopelagic at ca. 15–330 m (Ege, 1953; Parin *et al.*, 1990; Rofen, 1966a).

*Lestidiops mirabilis* (Ege)

*Paralepis mirabilis* Ege, 1933, p. 228, Celebes [Sulawesi] Sea at 4°03'N, 123°26'E.

*Lestidium mirabile* (Ege, 1933): Ege (1953).

*Uncisudis? mirabilis* (Ege, 1933): Post (1972).

*Macroparalepis mirabilis* (Ege, 1933): Post *in* Smith & Heemstra (1986).

*Lestidiops mirabilis* (Ege, 1933): Harry (1953), Gosline & Brock (1960), Rofen (1966), Post (1972), Borets & Sokolovsky (1978), Tinker (1982), Ozawa (1986), Boehlert & Mundy (1996).

TAXONOMY: The generic allocation of *L. mirabilis* is uncertain. Post (1972) stated that *L. mirabilis* might belong in *Uncisudis*. He later listed it as *Macroparalepis mirabilis* (i.e., Post *in* Smith & Heemstra, 1986) although he did not include *L. mirabilis* in his earlier revision of *Macroparalepis* (i.e., Post, 1973).

HAWAIIAN RECORDS: Hawai'i Island to O'ahu at ca. 61–91 m (Harry, 1953; Boehlert & Mundy, 1996).

GENERAL RANGE: Probably circumglobal in the tropical Atlantic, Indian, and Pacific oceans except the eastern Atlantic and eastern Pacific. Epi - and probably mesopelagic at ca. 15–200 m (Rofen, 1966a).

[*Lestidiops ringens* (Jordan & Gilbert)]

*Sudis ringens* Jordan & Gilbert, 1880b, p. 273, Santa Barbara Channel, California.

*Lestidium elongatum* Ege, 1953; Ege (1953).

*Lestidiops ringens* (Jordan & Gilbert, 1880b): Rofen (1966), Post (1972), Parin *et al.* (1990, 1995).

TAXONOMY: Post (1972).

HAWAIIAN RECORDS: None but records from 40°N, 167°W (Ege, 1953) indicate that *L. ringens* might occur at the Hancock Seamounts.

GENERAL RANGE: North Pacific subarctic and transition zone endemic (perhaps in South Pacific). Pelagic at ca. 60–500 m (Ege, 1953; Rofen, 1966a; Parin *et al.*, 1990, 1995).

[*Lestidiops sphyraenopsis* Hubbs]

*Lestidiops sphyraenopsis* Hubbs, 1916, p. 155, Pl. 18, Avalon Bay, Santa Catalina Island, California.

*Lestidium sphyraenopsis* (Hubbs, 1916): Ege (1953).

Paralepididae type C: Loeb (1979)?

*Lestidiops sphyraenopsis* Hubbs, 1916: Post *in* Smith & Heemstra (1986), Parin *et al.* (1996).

TAXONOMY: Post (*in* Smith & Heemstra, 1986) stated that this species may be a junior synonym of *L. jayakari*.

HAWAIIAN RECORDS: None but records from Japan, California (Ege, 1953), and northeast of the Hawaiian Islands (Loeb, 1979) suggest that this species might occur at the Hancock Seamounts.

GENERAL RANGE: Perhaps a Pacific transition zone endemic, known only from southern California, southern Japan, the Kuril Islands, and perhaps northeast of the Hawaiian Islands. Pelagic at ca. 60–500 m (Ege, 1953; Loeb, 1979; Parin *et al.*, 1996).

[*Lestidium atlanticum* Borodin]

*Lestidium atlanticum* Borodin, 1928, p. 10, Pl. 1 (fig. 2), Port Antonia, Jamaica.

*Lestidium atlanticum* Borodin, 1928: Ege (1953), Rofen (1966), Post (1972), Post *in* Smith & Heemstra (1986), Ozawa (1986).

TAXONOMY: Post (1972).

HAWAIIAN RECORDS: Larvae tentatively identified from O‘ahu (B. Mundy, unpubl. data).

GENERAL RANGE: Circumglobal from 35°N–30°S in the tropical and subtropical Gulf of Mexico, Atlantic, Indian, and Pacific oceans except the eastern Pacific. Mesopelagic at ca. 50–1000 m (Rofen, 1966a; Ozawa, 1986; Post *in* Smith & Heemstra, 1986).

*Lestidium nudum* Gilbert

*Lestidium nudum* Gilbert, 1905, p. 607, Fig. 236, Pailolo Channel between Moloka‘i and Maui, Hawaiian Islands.

*Lestidium nudum* Gilbert, 1905: Gilbert (1905), Fowler (1928), Ege (1953, in part), Gosline & Brock (1960), Rofen (1966), Post (1972), Struhsaker (1973a), Novikov *et al.* (1981), Tinker (1982), Paxton *et al.* (1989), Parin *et al.* (1990), Reid *et al.* (1991).

TAXONOMY: Post (1972). Rofen (1966a) noted that the specimens discussed by Ege (1953), except for the holotype of *Lestidium nudum*, are *Lestrolepis luetkeni* (Ege, 1933). The identifications of most specimens recorded as *Lestidium nudum* need confirmation.

HAWAIIAN RECORDS: Hawai‘i Island to Moloka‘i at 183–700 m, perhaps northward through the Emperor Seamounts (Gilbert, 1905; Struhsaker, 1973a; Novikov *et al.*, 1981; Reid *et al.*, 1991). The larval *Lestidium* from Johnston Atoll were not identified to species (Boehlert *et al.*, 1992).

GENERAL RANGE: Probably a Pacific endemic, known with certainty only from the Hawaiian Islands, the Timor Sea, and southeastern Australia, but perhaps also in the eastern South Pacific. Meso- or perhaps benthopelagic at 183–700 m (Gilbert, 1905; Struhsaker, 1973a; Paxton *et al.*, 1989; Parin *et al.*, 1990; Reid *et al.*, 1991).

[*Lestidium prolixum* Harry]

*Lestidium (Lestidium) prolixum* Harry, 1953, p. 204, Figs. 25, 28, Kumano-Nada, off Shikoku, Japan.

*Lestidium proximum* non (Ege, 1953) [probably a *lapsus* for *L. prolixum* Harry, 1953 but *L. proximum* is a junior synonym of *L. jayakari*]: Borets & Sokolovsky (1978).

*Lestidium prolixum* Harry, 1953: Rofen (1966), Post (1972), Fujii *in* Masuda *et al.* (1984), Ozawa (1986).

TAXONOMY: Post (1972). Rofen (1966a) stated that this species might be a junior synonym of *L. nudum*.

HAWAIIAN RECORDS: Borets & Sokolovsky (1978) listed “*Lestidium proximum* Harry” from Hawaiian waters or the Emperor Seamounts. *Paralepis proximus* was described by Ege (1933), not Harry, and it is therefore assumed here that Borets & Sokolovsky’s (1978) record was a misprint for *Lestidium prolixum* Harry.

GENERAL RANGE: Western North and perhaps central North Pacific endemic, known with certainty only from Japan. Meso- and benthopelagic at ca. 367 m (Rofen, 1966a; Fujii *in* Masuda *et al.*, 1984; Ozawa, 1986).

*Lestrolepis intermedia* (Poey)

*Paralepis intermedius* Poey, 1868, p. 416, off Matanzas, eastern Cuba.

?*Lestidium intermedium* (Poey, 1868): Ege (1953).

*Lestrolepis intermedia* (Poey, 1868): Rofen (1966), Post (1972), Fujii *in* Masuda *et al.* (1984), Ozawa (1986).

TAXONOMY: Post (1972).

HAWAIIAN RECORDS: Larvae tentatively identified as this species have been collected off O‘ahu (B. Mundy, unpubl. data).

GENERAL RANGE: Circumglobal in the tropical and subtropical Gulf of Mexico, Atlantic, Indian, and Pacific oceans. Epi- to bathypelagic at 35–1320 m fishing depths, perhaps benthopelagic (Rofen, 1966a; Fujii *in* Masuda *et al.*, 1984).

[*Lestrolepis japonica* (Tanaka)]

*Lestidium japonicum* Tanaka, 1908a, p. 27, Sagami Sea, Japan.

*Lestidium philippinum* (Fowler, 1934): Ege (1953).

*Lestrolepis japonica* (Tanaka, 1908a): Rofen (1966), Post (1972), Fujii *in* Masuda *et al.* (1984), Ozawa (1986), Paxton *et al.* (1989).

TAXONOMY: Post (1972) suggested that this species may be a junior synonym of *L. intermedia*.

HAWAIIAN RECORDS: Larvae tentatively identified from O'ahu (B. Mundy, unpubl. data).

GENERAL RANGE: Eastern Indian and western Pacific oceans, from both sides of Indonesia to southern Japan and western Australia. Meso- and benthopelagic at ca. 18–200 m (Ege, 1953; Fujii *in* Masuda *et al.*, 1984; Paxton *et al.*, 1989).

[*Lestrolepis luetkeni* (Ege)]

*Paralepis luetkeni* Ege, 1933, p. 226, Mozambique Channel, Indian Ocean, at 18°30'S, 42°18'E.

*Sudis pofi* (Harry, 1953): Tinker (1982).

*Lestidium nudum* non Gilbert, 1905: Ege (1953, all specimens except holotype).

*Lestrolepis luetkeni* (Ege, 1933): Rofen (1966), Post (1972), Ozawa (1986), Boehlert & Mundy (1996).

TAXONOMY: Post (1972).

HAWAIIAN RECORDS: The larvae recorded from off O'ahu by Boehlert & Mundy (1996) are not this species. Even so, the general range of this species indicates that it can be expected in the region. Tinker's record (1982) probably referred to the description of *Lestidium pofi* (= *Lestrolepis luetkeni*) from Christmas Island, Line Islands.

GENERAL RANGE: Indo-Pacific from east Africa to Indonesia, Japan, Samoa, and the Line Islands. Epi- and mesopelagic at ca. 0–231 m (Ege, 1953; Rofen, 1966a; Ozawa, 1986).

*Magnisudis atlantica* (Krøyer)

*Paralepis atlanticus* Krøyer, 1868, p. 70, Skaw, Jutland, eastern North Atlantic.

*Paralepis brevis* Zugmayer, 1911: Ege (1953).

*Paralepis atlantica* Krøyer, 1868: Loeb (1979), Novikov *et al.* (1981), Ozawa (1986).

*Magnisudis atlantica* (Krøyer, 1868): Rofen (1966), Post (1987), Boehlert & Mundy (1996).

TAXONOMY: Post (1987).

COMMON NAMES: Duckbill barracudina (AFS).

HAWAIIAN RECORDS: Larvae collected from O'ahu to the Hancock Seamounts (Post, 1987; Boehlert & Mundy, 1996).

GENERAL RANGE: Circumglobal from 70°N–40°S in the tropical through cold-temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans except the eastern tropical Pacific. Meso- and bathypelagic at 66–2166 m (Rofen, 1966a; Post, 1987).

*Stemonosudis elegans* (Ege)

*Macroparalepis elegans* Ege, 1933, p. 232, south of Lord Howe Island, southwestern Pacific, at 33°39.5'N, 159°00'E.

*Macroparalepis elegans* Ege, 1933: Ege (1957).

*Stemonosudis elegans* (Ege, 1933): Rofen (1966), Post (1972), Ozawa (1986), Boehlert & Mundy (1996).

TAXONOMY: Post (1972).

HAWAIIAN RECORDS: Larvae collected off O'ahu (Boehlert & Mundy, 1996).

GENERAL RANGE: Indo-Pacific from South and east Africa to Japan, southeastern Australia, the Hawaiian Islands, and the Society Islands. Epi- to mesopelagic at 18–>330 m (Ege, 1957; Rofen, 1966a; Ozawa, 1986).

COMMENTS: The record of a *Macroparalepis* sp. by Novikov *et al.* (1981) probably refers to one of the species which has been transferred from *Macroparalepis* to *Stemonosudis*.



***Stemonosudis elongata*** (Ege)

*Macroparalepis elongatus* Ege, 1933, p. 233, southwest of Sri Lanka, Indian Ocean, at 4°28'N, 82°13'E.

*Macroparalepis elongatus* Ege, 1933: Ege (1957).

*Stemonosudis elongata* (Ege, 1933): Rofen (1966), Post (1972), Boehlert & Mundy (1996).

TAXONOMY: Post (1972).

HAWAIIAN RECORDS: Larvae collected off O'ahu (Boehlert & Mundy, 1996).

GENERAL RANGE: Indo-Pacific from east Africa to the Philippines, Fiji, the Hawaiian Islands, and the Marquesas. Epi- to mesopelagic at 18–330 m (Ege, 1957; Rofen, 1966a).

***Stemonosudis macrura*** (Ege)

*Macroparalepis macrurus* Ege, 1933, p. 232, Indonesia at 5°17'S, 97°06'E.

*Macroparalepis macrurus* Ege, 1933: Ege (1957).

*Stemonosudis macrura* (Ege, 1933): Rofen (1966), Post (1972), Loeb (1979), Ozawa (1986), Parin *et al.* (1990), Boehlert & Mundy (1992, 1996).

TAXONOMY: Post (1972).

HAWAIIAN RECORDS: Larvae collected from O'ahu to the Hancock Seamounts (Boehlert & Mundy 1992, 1996).

GENERAL RANGE: Indo-Pacific from South and east Africa to Japan, southeastern Australia, the Hawaiian Islands, the Marquesas, the Galapagos Islands, and off Chile. Adults unknown. Epi- to mesopelagic at 18–330 m (Ege, 1957; Rofen, 1966a; Ozawa, 1986; Parin *et al.*, 1990).

***Stemonosudis rothschildi*** Richards

*Stemonosudis rothschildi* Richards, 1967, p. 35, Fig. 1, central North Pacific east of the Hawaiian Islands at 22°47'N, 150°09'W.

*Stemonosudis rothschildi* Richards, 1967: Richards (1967), Post (1972), Loeb (1979), Fujii *in* Masuda *et al.* (1984), Ozawa (1986), Paxton *et al.* (1989), Boehlert & Mundy (1996).

TAXONOMY: Post (1972).

HAWAIIAN RECORDS: Larvae collected from O'ahu (Boehlert & Mundy, 1996). Originally described from a collection taken ca. 180 nmi east of the 200-nmi EEZ (Richards, 1967).

GENERAL RANGE: Probably circumtropical except perhaps in the eastern Pacific, known from the western tropical Atlantic, Indian Ocean, western Australia, Kyushu-Palau Ridge, Japan, the Timor Sea, and the Hawaiian Islands. Adults unknown. Mesopelagic (Richards, 1967; Loeb, 1979; Fujii *in* Masuda *et al.*, 1984; Ozawa, 1986; Paxton *et al.*, 1989).

***Sudis atrox*** Rofen

*Sudis atrox* Rofen, 1963, p. 5, Fig. 1, eastern North Pacific at 29°26'N, 134°59'W.

*Sudis* sp.?: Novikov *et al.* (1981).

*Sudis atrox* Rofen, 1963: Rofen (1966), Post (1972), Loeb (1979), Tinker (1982), Ozawa (1986), Post *in* Quéro *et al.* (1990), Parin *et al.* (1990), Boehlert & Mundy (1992, 1996).

TAXONOMY: Post (1972).

HAWAIIAN RECORDS: Larvae collected from O'ahu to the Hancock Seamounts (Tinker, 1982; Boehlert & Mundy, 1992, 1996).

GENERAL RANGE: Probably circumtropical and subtropical, known from the western tropical Atlantic, the North Pacific from Japan to the Hawaiian Islands, the eastern tropical Pacific, and South Pacific off Chile. Mesopelagic (Rofen, 1966a; Loeb, 1979; Ozawa, 1986; Post *in* Quéro *et al.*, 1990; Parin *et al.*, 1990).

***Uncisudis advena*** (Rofen)

*Pontosudis advena* Rofen, 1963, p. 4, Gulf of Mexico at 28°58'N, 88°18'W.

*Pontosudis advena* Rofen, 1963: Rofen (1966).

*Uncisudis advena* (Rofen, 1963): Post (1972), Loeb (1979), Ozawa (1986), Boehlert & Mundy (1996).

TAXONOMY: Post (1972).

HAWAIIAN RECORDS: Larvae collected from O'ahu to the Hancock Seamounts (Boehlert & Mundy, 1996).

GENERAL RANGE: Probably circumtropical and subtropical except in the eastern Pacific, known from the Gulf of Mexico, western North Atlantic, Japan, and central North Pacific. Mesopelagic at 25–997 m (Rofen, 1966a; Loeb, 1979; Ozawa, 1986).

***Uncisudis quadrimaculata* (Post)**

*Pontosudis quadrimaculata* Post, 1969, p. 10, Figs. 1–4, Atlantic Ocean at 8°21'N, 24°10'W.

*Uncisudis quadrimaculata* (Post, 1969): Post (1969, 1972), Ozawa (1986), Post *in* Quéro *et al.* (1990), Boehlert & Mundy (1996).

TAXONOMY: Post (1972).

HAWAIIAN RECORDS: Larvae collected off O'ahu (Boehlert & Mundy, 1996).

GENERAL RANGE: Probably circumtropical and subtropical, known from the eastern North Atlantic, the Hawaiian Islands, and Japan. Mesopelagic at 25–600 m (Post, 1969; Ozawa, 1986; Post *in* Quéro *et al.*, 1990; B. Mundy, unpubl. data).

**Anotopteridae — Daggertoos<sup>29</sup>**

[*Anotopterus pharao* Zugmayer]

*Anotopterus pharao* Zugmayer, 1911, p. 13, eastern North Atlantic at 36°64'30"N, 11°49'W.

*Anotopterus pharao* Zugmayer, 1911: Hubbs *et al.* (1953), Rofen (1966), Post *in* Whitehead *et al.* (1984).

*Anotopterus nikparini* Kukuev, 1998: Kukuev (1998).

TAXONOMY: Rofen (1966a). Kukuev (1998) recognized three species in the genus and described the North Pacific population as a new taxon, *A. nikparini*. The distinction between *A. nikparini* and *A. pharao* was based primarily on morphometric characters and is need of more investigation using a much larger number of specimens from a broad range of sizes.

COMMON NAMES: Daggertooth (AFS; FAO).

HAWAIIAN RECORDS: None but a specimen collected at 31°36.5–54.3'N, 152°03.6–21.6'W (Hubbs *et al.*, 1953; Kukuev, 1998) indicates that *Anotopterus* could be expected at the Hancock Seamounts.

GENERAL RANGE: Antitropical, circumglobal from 25°–60°N and 20°–72°S in the temperate to subpolar Atlantic and Pacific oceans. *Anotopterus nikparini*, if valid, is a primarily a subarctic North Pacific endemic species ranging from the Aleutian Islands to ca. 31°N, although specimens have been collected as far south as 21°–25°N in the boundary currents on the eastern and western edges of the North Pacific basin. Epi- to bathypelagic at 0–>2000 m, usually below 500 m (Hubbs *et al.*, 1953; Rofen, 1966a; Post *in* Whitehead *et al.*, 1984; Kukuev, 1998).

**Evermannellidae — Sabertooth fishes<sup>30</sup>**

***Coccorella atlantica* (Parr)**

*Evermannella atrata atlantica* Parr, 1928, p. 166, Figs. 39B, 40B, Tongue of the Ocean, Bahamas, at 23°58'N, 77°26'W.

*Coccorella atlantica* (Parr, 1928): Loeb (1979), Johnson (1982), Johnson *in* Quéro *et al.* (1990).

TAXONOMY: Johnson (1982).

HAWAIIAN RECORDS: O'ahu to the Hancock Seamounts (Johnson, 1982).

GENERAL RANGE: Anti-equatorial in the subtropical through temperate central water masses of the Gulf of Mexico, Atlantic, Indian, and Pacific oceans. Mesopelagic at ca. 50–1000 m (Johnson, 1982; Johnson *in* Quéro *et al.*, 1990).

[*Coccorella atrata* (Alcock)]

*Odontostomus atratus* Alcock, 1894, p. 182, Pl. 9 (fig. 4), Bay of Bengal, Indian Ocean, at 14°13'08"N, 80°24'02"W.

*Coccorella atrata* (Alcock, 1894): Borets & Sokolovsky (1978), Novikov *et al.* (1981), Johnson (1982), Kimura & Suzuki (1990).

TAXONOMY: Johnson (1982).

HAWAIIAN RECORDS: Milwaukee Seamount (Borets & Sokolovsky, 1978; Novikov *et al.*, 1981). A record

from 20°N, 145°W (Johnson, 1982), in conjunction with records from the Milwaukee Seamount and Japan (Novikov *et al.*, 1981; Kimura & Suzuki, 1990), suggests that this species could occur throughout the archipelago. Despite this, Johnson (1982) did not give records of *C. atrata* from within the 200-nmi EEZ and there is a possibility that the records from Milwaukee Seamount actually refer to *C. atlantica*. The occurrence of *C. atrata* in the Hawaiian Islands needs verification before it can be unconditionally accepted.

GENERAL RANGE: Indo-Pacific from east Africa to Japan, Indonesia, and perhaps the Hawaiian Ridge, eastward to 97°W. Mesopelagic at 50–700 m (Johnson, 1982; Kimura & Suzuki, 1990).

### *Evermannella indica* Brauer

*Evermannella indica* Brauer, 1906, p. 135, “Three localities, Indian Ocean”.

*Evermannella indica* Brauer, 1906: Borets & Sokolovsky (1978), Loeb (1979), Novikov *et al.* (1981), Johnson (1982), Johnson *in* Quéro *et al.* (1990), Swinney (1994).

TAXONOMY: Johnson (1982), Swinney (1994).

HAWAIIAN RECORDS: South of Hawai‘i Island to Koko Seamount (Novikov *et al.*, 1981; Johnson, 1982).

Larval *Evermannella* collected at Johnston Atoll were not identified to species (Boehlert *et al.*, 1992). The *Evermannella* species of Miller *et al.* (1979) is probably this species.

GENERAL RANGE: Usually thought to be circumglobal in the tropical through subtropical Atlantic, Indian, and Pacific oceans except the eastern tropical Pacific. Recent evidence suggests that the Atlantic populations are a distinct species, *E. melanoderma* Parr, 1928, and that *E. indica* is Indo-Pacific. Mesopelagic at ca. 0–800 m (Johnson, 1982; Johnson *in* Quéro *et al.*, 1990; Swinney, 1994).

### *Odontostomops normalops* (Parr)

*Evermannella normalops* Parr, 1928, p. 164, Figs. 39A, 40A, Tongue of the Ocean, Bahamas, at 24°29'N, 77°29'W.

*Odontostomops normalops* (Parr, 1928): Loeb (1979), Johnson (1982), Johnson *in* Quéro *et al.* (1990), Boehlert *et al.* (1992).

TAXONOMY: Johnson (1982).

HAWAIIAN RECORDS: Johnston Atoll and O‘ahu (Johnson, 1982; Boehlert *et al.*, 1992) but the general range indicates that *O. normalops* occurs throughout the archipelago.

GENERAL RANGE: Nearly circumglobal in the tropical through warm-temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans except the eastern Pacific. Mesopelagic at ca. 100–1000 m (Johnson, 1982; Johnson *in* Quéro *et al.*, 1990).

## Omosudidae — Hammerjaws<sup>31</sup>

### *Omosudis lowii* Günther

*Omosudis lowii* Günther, 1887, p. 201, Pl. 52 (figs. C–C’), “Philippine Seas” and Magdalena, Madeira.

*Omosudis lowei* Günther, 1887 [a *lapsus* for *O. lowii*]: Rofen (1966), Amesbury (1975), Borets & Sokolovsky (1978), Loeb (1979), Novikov *et al.* (1981), Nielsen & Jespersen (1986).

*Omosudis lowii* Günther, 1887: Eschmeyer (1998).

TAXONOMY: Nielsen & Jespersen (1986). Eschmeyer (1998) clarified the original spelling of the species name.

COMMON NAMES: Omosudid (FAO), Hammerjaw.

HAWAIIAN RECORDS: O‘ahu to Jingu Seamount north of Koko Seamount at 700–850 m (Amesbury, 1975; Novikov *et al.*, 1981).

GENERAL RANGE: Nearly circumglobal between 40°N–30°S in the tropical through temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans except the eastern tropical and eastern South Pacific. Meso- and bathypelagic at 700–1830 m (Rofen, 1966a; Amesbury, 1975).

## Alepisauridae — Lancetfishes

### *Alepisaurus ferox* Lowe

*Alepisaurus ferox* Lowe, 1833a, p. 104, off Madeira, eastern North Atlantic Ocean.

*Alepisaurus borealis* (Gill, 1862): Gosline & Brock (1960), Tinker (1982).

*Alepisaurus ferox* Lowe, 1833a: Fowler (1928), Gibbs & Wilimovsky (1966), Loeb (1979), Francis (1981), Post *in* Whitehead *et al.* (1984), Boehlert & Mundy (1992), Boggs (1992), Fujita (1996).

TAXONOMY: Gibbs & Wilimovsky (1966), Fujita (1996).

COMMON NAMES: Longnose lancetfish (AFS).

HAWAIIAN RECORDS: Johnston Atoll, Cross Seamount, and Hawai'i Island to the Hancock Seamounts from 50–420 m (Gosline & Brock, 1960; Gibbs & Wilimovsky, 1966; Boehlert & Mundy, 1992; Boggs, 1992).

GENERAL RANGE: Circumglobal between 60°N–40°S in all tropical through cold temperate seas. Epi- to bathypelagic at 1–1000 m (Gibbs & Wilimovsky, 1966; Francis, 1981; Post *in* Whitehead *et al.*, 1984).

## Myctophiformes<sup>32</sup>

### Neoscopelidae

#### *Neoscopelus macrolepidotus* Johnson

*Neoscopelus macrolepidotus* Johnson, 1863, p. 44, Pl. 7, off Madeira, eastern North Atlantic Ocean.

*Neoscopelus alcocki* Jordan & Starks, 1904: Jordan & Evermann (1905).

*Neoscopelus macrolepidotus* Johnson, 1863: Gilbert & Cramer (1897), Gilbert (1905), Fowler (1928), Gosline & Brock (1960), Struhsaker (1973a), Nafpaktitis (1977), Tinker (1982), Hulley *in* Smith & Heemstra (1986), Becker & Shcherbachev (1990), Boehlert & Mundy (1992).

TAXONOMY: Nafpaktitis (1977).

HAWAIIAN RECORDS: Hawai'i Island to the Hancock Seamounts at 576–704 m, 40–1463 m fishing depths (Gilbert & Cramer, 1897; Gilbert, 1905; Struhsaker, 1973a; Boehlert & Mundy, 1992).

GENERAL RANGE: Circumglobal in the tropical and subtropical Atlantic, Indian, and Pacific oceans. In the Pacific, known from southern Japan, Australia, the Emperor Seamounts, the Hawaiian Islands, and the eastern South Pacific. Benthopelagic at 300–1120 m (Struhsaker, 1973a; Nafpaktitis, 1977; Becker & Shcherbachev, 1990).

#### [*Neoscopelus microchir* Matsubara]

*Neoscopelus microchir* Matsubara, 1943, p. 59, Fig. 13, Heta, Suruga, Japan.

*Neoscopelus microchir* Matsubara, 1943: Nafpaktitis (1977), Humphreys *et al.* (1984).

TAXONOMY: Nafpaktitis (1977).

HAWAIIAN RECORDS: None but *N. microchir* has been recorded from the Koko Seamount (Humphreys *et al.*, 1984).

GENERAL RANGE: Probably circumglobal in the tropical through temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans except the eastern and perhaps the central Pacific. Benthopelagic at 250–700 m (Nafpaktitis, 1977).

#### *Scopelengys clarkei* Butler & Ahlstrom

*Scopelengys clarkei* Butler & Ahlstrom, 1976, p. 148, 1B, 2B, 3B, central North Pacific at 29°56.6'N, 144°56.6'W.

*Scopelengys tristis* non Alcock, 1890 [a valid species not found in the Hawaiian Islands]: Miller *et al.* (1979).

*Scopelengys clarkei* Butler & Ahlstrom, 1976: Butler & Ahlstrom (1976), Nafpaktitis (1977), Loeb (1979), Becker & Shcherbachev (1990).

TAXONOMY: Nafpaktitis (1977) but Becker & Shcherbachev (1990) questioned the distinction of this species from *S. tristis* Alcock, 1890.

HAWAIIAN RECORDS: O'ahu to Kaua'i at 0–1000 m fishing depths (Butler & Ahlstrom, 1976). The record of *S. tristis* from the Hawaiian Islands by Miller *et al.* (1979) is probably of this species.

GENERAL RANGE: Central and eastern Pacific endemic from the Hawaiian Islands to Guadalupe Island near Mexico. Mesopelagic at 0–1000 m fishing depths (Butler & Ahlstrom, 1976).

**Myctophidae — Lanternfishes*****Benthoosema fibulatum*** (Gilbert & Cramer)

*Myctophum fibulatum* Gilbert & Cramer, 1897, p. 411, Pl. 38 (?fig. 2 not 3), Kaiwi Channel between O'ahu and Moloka'i, Hawaiian Islands.

*Myctophum fibulatum* Gilbert & Cramer, 1897: Gilbert & Cramer (1897), Gilbert (1905), Fowler (1934).

*Myctophum hollandi* Jordan & Jordan, 1922: Jordan & Jordan (1922), Gosline & Brock (1960), Tinker (1982).

*Benthoosema fibulata* (Gilbert & Cramer, 1897): Jordan (1921a), Gosline & Brock (1960), Tinker (1982), Borets & Sokolovsky (1978).

*Myctophum pterotum* non (Alcock, 1890) [a valid species not found in the Hawaiian Islands]: Fowler (1928).

*Benthoosema fibulatum* (Gilbert & Cramer, 1897): Struhsaker (1973a), Clarke (1973), Wisner (1976), Paxton (1979), Novikov *et al.* (1981), Becker (1983), Uchida & Uchiyama (1986), Paxton *et al.* (1989), Becker & Shcherbachev (1990), Reid *et al.* (1991), Boehlert & Mundy (1992), Chave & Mundy (1994).

TAXONOMY: Paxton (1979), Becker (1983).

COMMON NAMES: Spinycheek lanternfish (FAO).

HAWAIIAN RECORDS: Hawai'i Island to Koko Seamount at 0–165 m at night, 500–550 m during day (Gilbert & Cramer, 1897; Gilbert, 1905; Struhsaker, 1973a; Clarke, 1973; Novikov *et al.*, 1981; Uchida & Uchiyama, 1986; Boehlert & Mundy, 1992). *Benthoosema* larvae collected at Johnston were not identified to species (Boehlert *et al.*, 1992).

GENERAL RANGE: Indo-Pacific from east Africa and the Red Sea through the northern Indian Ocean; in the Pacific known only from Australia, New Guinea, the Hawaiian Islands, and the Marquesas. Benthic, epi-, and mesopelagic in nearshore areas at 0–856 m (Gilbert, 1905; Struhsaker, 1973a; Becker, 1983; Becker & Shcherbachev, 1990; Reid *et al.*, 1991; Paxton *et al.*, 1989; Chave & Mundy, 1994).

***Benthoosema suborbitale*** (Gilbert)

*Myctophum suborbitale* Gilbert, 1913, p. 82, Suruga Bay, Japan at 35°02' 10"N, 138°38'E.

*Benthoosema suborbitale* (Gilbert, 1913): Clarke (1973), Amesbury (1975), Wisner (1976), Nafpaktitis *et al.* (1977), Borets & Sokolovsky (1978), Loeb (1979), Paxton (1979), Novikov *et al.* (1981), Tinker (1982), Becker (1983), Hulley *in* Smith & Heemstra (1986), Boehlert & Mundy (1992).

TAXONOMY: Paxton (1979), Becker (1983).

COMMON NAMES: Smallfin lanternfish (FAO).

HAWAIIAN RECORDS: Hawai'i Island to Koko Seamount at 15–75 m at night, 490–625 m during day (Clarke, 1973; Amesbury, 1975; Novikov *et al.*, 1981; Boehlert & Mundy, 1992).

GENERAL RANGE: Circumglobal in the tropical and subtropical Gulf of Mexico, Atlantic, Indian, and Pacific oceans except the western South Atlantic, northern Indian Ocean, equatorial Pacific, and eastern tropical Pacific. Epi- and mesopelagic at 1–125 m at night, 375–800 m during day (Clarke, 1973; Wisner, 1976; Nafpaktitis *et al.*, 1977; Becker, 1983; Hulley *in* Smith & Heemstra, 1986).

***Bolinichthys distofax*** Johnson

*Bolinichthys distofax* Johnson, 1975, p. 54, Fig. 1A, D, off Mauna Loa lava flow, Kona, Hawai'i Island.

*Bolinichthys supralateralis* non (Parr, 1928) [a valid Atlantic species]: Clarke (1973), Tinker (1982).

*Bolinichthys* sp.: Boehlert & Mundy (1992).

*Bolinichthys distofax* Johnson, 1975: Johnson (1975), Nafpaktitis *et al.* (1977), Loeb (1979), Paxton (1979), Tinker (1982), Becker (1983), Hulley *in* Quéro *et al.* (1990).

TAXONOMY: Paxton (1979), Becker (1983).

HAWAIIAN RECORDS: O'ahu to the Hancock Seamounts at 95–225 m at night, 490–690 m during day (Clarke, 1973; Johnson, 1975; Boehlert & Mundy, 1992). Larval *Bolinichthys* collected at Johnston Atoll were not identified to species (Boehlert *et al.*, 1992).

GENERAL RANGE: Tropical and subtropical Atlantic and Pacific oceans. In the Pacific, known from southern Japan to the northern Philippines, the Santa Cruz Islands, and near the Hawaiian Islands. Mesopelagic at 95–225 m at night, 490–690 m during day (Nafpaktitis *et al.*, 1977; Becker, 1983; Hulley *in* Quéro *et al.*, 1990).

***Bolinichthys longipes*** (Brauer)

*Myctophum* (*Lampanyctus*) *longipes* Brauer, 1906, p. 236, Fig. 155, several localities including off Madeira, the Gulf of Guinea, south and north of Cocos Island, Bay of Bengal, Chagos Archipelago, and the Seychelles.

*Bolinichthys longipes* (Brauer, 1906): Clarke (1973), Amesbury (1975), Wisner (1976), Loeb (1979), Paxton (1979), Tinker (1982), Becker (1983), Paxton *et al.* (1989), Reid *et al.* (1991), Boehlert & Mundy (1992).

TAXONOMY: Paxton (1979), Becker (1983).

HAWAIIAN RECORDS: Hawai'i Island to the Hancock Seamounts at 50–150 m at night, 500–725 m during day (Clarke, 1973; Amesbury, 1975; Wisner, 1976; Reid *et al.*, 1991; Boehlert & Mundy, 1992).

GENERAL RANGE: Indo-transpacific from South Africa to southern Japan, Australia, the Hawaiian Islands, California, and northern Chile. Mesopelagic at 50–150 m at night, 500–725 m during day (Clarke, 1973; Becker, 1983; Paxton *et al.*, 1989).

***Bolinichthys photothorax*** (Parr)

*Lampanyctus photothorax* Parr, 1928, p. 95, Fig. 13, Tongue of the Ocean, Bahamas, at 23°55'N, 77°09'W.

*Bolinichthys photothorax* (Parr, 1928): Wisner (1976), Nafpaktitis *et al.* (1977), Paxton (1979), Becker (1983), Paxton *et al.* (1989).

TAXONOMY: Paxton (1979), Becker (1983).

HAWAIIAN RECORDS: None but Becker (1983) showed the main Hawaiian Islands within the range of *B. photothorax*. Wisner (1976) stated that this species has the same range in the Pacific as *B. longipes*, but his record nearest to Hawai'i was from ca. 13°N, 166°W.

GENERAL RANGE: Circumglobal throughout the tropical and subtropical Gulf of Mexico, Atlantic, Indian, and Pacific oceans except near South America. Mesopelagic at 40–500 m at night, 425–800 m during day (Nafpaktitis *et al.*, 1977; Becker, 1983; Paxton *et al.*, 1989).

**[*Bolinichthys pyrsobolus* (Alcock)]**

*Scopelus pyrsobolus* Alcock, 1890, p. 218, Pl. 8 (fig. 3), off Madras Coast, India, at 15°38'N, 82°30'E.

*Bolinichthys blacki* (Fowler, 1934): Wisner (1976).

*Lampanyctus pyrsobolus* (Alcock, 1890): Borets & Sokolovsky (1978).

*Lepidophanes pyrsobolus* (Alcock, 1890): Borets & Sokolovsky (1978).

*Bolinichthys pyrsobolus* (Alcock, 1890): Wisner (1976), Borets & Sokolovsky (1978), Paxton (1979), Becker (1983), Paxton *et al.* (1989).

TAXONOMY: Wisner (1976) stated that this species is not recognizable and recognized *B. blacki* (Fowler, 1928) as a valid species but Paxton (1979) and Becker (1983) considered *B. blacki* to be a junior synonym of *B. pyrsobolus* (Alcock, 1890).

HAWAIIAN RECORDS: Borets & Sokolovsky (1978) recorded *Lampanyctus pyrsobolus* and *Lepidophanes pyrsobolus* from the Emperor Seamounts and Hawaiian Ridge. These records probably refer to *B. distofax*, *longipes*, or *supralateralis*. *Bolinichthys pyrsobolus* apparently does not occur in Hawaiian waters (Becker, 1983).

GENERAL RANGE: Indo-Pacific from western India to southern Japan, the Philippines, Sulawesi, northern Australia, and equatorial waters to ca. 140°W. Mesopelagic at >200 m (Becker, 1983; Paxton *et al.*, 1989).

***Centrobranchus andreae*** (Lütken)

*Scopelus* (*Rhinoscopelus*) *andreae* Lütken, 1892a, p. 209, off Jacobshavn, Greenland.

*Centrobranchus gracilicaudus* Gilbert, 1905: Gilbert (1905).

*Myctophum andreae* (Lütken, 1892a): Fowler (1934).

*Gonichthys* sp.: Boehlert *et al.* (1992)?

*Centrobranchus andreae* (Lütken, 1892a): Fowler (1928), Clarke (1973), Wisner (1976), Borets & Sokolovsky (1978), Loeb (1979), Paxton (1979), Novikov *et al.* (1981), Tinker (1982), Becker (1983), Gago & Lavenberg (1992).

TAXONOMY: Paxton (1979), Gago & Lavenberg (1992).

HAWAIIAN RECORDS: Johnston Atoll and Southwest of Hawai'i Island to Koko Seamount at 0–165 m at night, 640–650 m during day (Gilbert, 1905; Clarke, 1973; Wisner, 1976; Novikov *et al.*, 1981; Boeh-

lert *et al.*, 1992). Unpublished notes by W. Watson have the identification of *Gonichthys* sp. larvae from Johnston corrected to *C. andreae*.

GENERAL RANGE: Indo-Pacific from east Africa to 27°N, 138°W and 28°S, 98°W but absent from the eastern Pacific near the American continents and from equatorial Pacific. Neustonic and mesopelagic at 0–165 m at night, 640–650 m during day (Gilbert, 1905; Clarke, 1973; Wisner, 1976; Becker, 1983).

### *Centrobranchus nigroocellatus* (Günther)

*Scopelus nigroocellatus* Günther, 1873c, p. 91, “South Atlantic”.

*Centrobranchus choerocephalus* Fowler, 1904: Gilbert (1905), Jordan & Evermann (1905), Fowler (1928), Gosline & Brock (1960), Moser & Ahlstrom (1970), Clark (1973), Wisner (1976), Nafpaktitis *et al.* (1977), Loeb (1979), Paxton (1979), Tinker (1982), Becker (1983).

*Myctophum nigro-ocellatum* (Günther, 1873c): Fowler (1934, 1949).

*Centrobranchus brevisrostris* Becker, 1964: Wisner (1976), Nafpaktitis *et al.* (1977), Loeb (1979), Paxton (1979), Becker (1983).

*Centrobranchus* sp.: Boehlert & Mundy (1992).

*Centrobranchus nigroocellatus* (Günther, 1873c): Nafpaktitis *et al.* (1977), Borets & Sokolovsky (1978), Paxton (1979), Novikov *et al.* (1981), Becker (1983), Gago & Lavenberg (1992).

TAXONOMY: Gago & Lavenberg (1992).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to Milwaukee Seamount at 0–150 m at night, 490–650 m during day (Gilbert, 1905; Clarke, 1973; Wisner, 1976; Novikov *et al.*, 1981; Boehlert *et al.*, 1992; Boehlert & Mundy, 1992). *Centrobranchus* larvae collected at Johnston Atoll were not identified to species but unpublished notes by W. Watson indicate that these were *C. nigroocellatus* (see Boehlert *et al.*, 1992).

GENERAL RANGE: Circumglobal in the tropical through temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans except the equatorial and eastern tropical Pacific. Neustonic and mesopelagic at 0–200 m at night, 375–800 m during day (Gilbert, 1905; Wisner, 1976; Nafpaktitis *et al.*, 1977; Becker, 1983; Gago & Lavenberg, 1992).

### *Ceratoscopelus townsendi* (Eigenmann & Eigenmann)

*Myctophum townsendi* Eigenmann & Eigenmann, 1889, p. 125, Cortez Bank off San Diego, California.

*Ceratoscopelus warmingii* (Lütken, 1892): Struhsaker (1973a), Clarke (1973), Amesbury (1975), Wisner (1976), Nafpaktitis *et al.* (1977), Loeb (1979), Novikov *et al.* (1981), Tinker (1982), Becker (1983), Reid *et al.* (1991), Boehlert *et al.* (1992).

*Ceratoscopelus townsendi* (Eigenmann & Eigenmann, 1889): Wisner (1976), Borets & Sokolovsky (1978), Becker (1983), Badcock & Araújo (1988), Boehlert & Mundy (1992).

TAXONOMY: Badcock & Araújo (1988).

COMMON NAMES: Dogtooth lampfish (AFS).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to Koko Seamount at 15–140 m at night, 620–1325 m during day (Struhsaker, 1973a; Clarke, 1973; Amesbury, 1975; Wisner, 1976; Novikov *et al.*, 1981; Reid *et al.*, 1991; Boehlert *et al.*, 1992; Boehlert & Mundy, 1992).

GENERAL RANGE: Circumglobal throughout the tropical through cold-temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans. Meso- and bathypelagic at 0–200 m at night, 425–1500 m during day (Clarke, 1973; Wisner, 1976; Becker, 1983; Nafpaktitis *et al.*, 1977; Badcock & Araújo, 1988).

### *Diaphus adenomus* Gilbert

*Diaphus adenomus* Gilbert, 1905, p. 592, Pl. 68 (fig. 1), Kaiwi Channel between O‘ahu and Moloka‘i, Hawaiian Islands.

*Diaphus adenomus* Gilbert, 1905: Gilbert (1905), Fowler (1928), Gosline & Brock (1960), Struhsaker (1973a), Clarke (1973), Wisner (1976), Nafpaktitis *et al.* (1977), Borets & Sokolovsky (1978), Kawaguchi & Shimizu (1978), Paxton (1979), Novikov *et al.* (1981), Tinker (1982), Becker (1983, 1992), Uchida & Uchiyama (1986).

TAXONOMY: Paxton (1979), Becker (1983).

HAWAIIAN RECORDS: Hawai‘i Island to Koko Seamount at 124–686 m, 495–550 m at night (Gilbert, 1905; Struhsaker, 1973a; Clarke, 1973; Novikov *et al.*, 1981; Uchida & Uchiyama, 1986).

GENERAL RANGE: Circumglobal at disjunct localities in the Gulf of Mexico, Caribbean Sea, eastern North

Atlantic, southern Japan, the Hawaiian Islands, and the eastern South Pacific. Benthic- and mesopelagic in nearshore areas at 0–550 m at night, 500–686 m during day (Struhsaker, 1973a; Wisner, 1976; Nafpaktitis *et al.*, 1977; Kawaguchi & Shimizu, 1978; Becker, 1983, 1993).

[?*Diaphus agassizii* Gilbert]

*Diaphus agassizii* Gilbert, 1908, p. 226, Pl. 2, off Nuku Hiva, Marquesas Islands.

?*Diaphus agassizii* Gilbert, 1908: Novikov *et al.* (1981).

*Diaphus agassizii* Gilbert, 1908: Fowler (1934, 1949), Borets & Sokolovsky (1978), Paxton (1979), Becker (1983).

TAXONOMY: Paxton (1979) and Becker (1983) questioned the validity of this species.

HAWAIIAN RECORDS: None but the species has been recorded from Milwaukee and Koko seamounts (Novikov *et al.*, 1981, with reservations about the identification).

GENERAL RANGE: Pacific endemic? Recorded from the Marquesas. Mesopelagic (Paxton, 1979).

***Diaphus anderseni* Tåning**

*Diaphus anderseni* Tåning, 1932, p. 134, Fig. 6, southwest of Fiji at 20°00'S, 174°29'E.

*Diaphus* “slender A (*anderseni*)”: Loeb (1979)?

*Diaphus anderseni* Tåning, 1932: Fowler (1934), Clarke (1973), Wisner (1976), Nafpaktitis *et al.* (1977), Borets & Sokolovsky (1978), Kawaguchi & Shimizu (1978), Paxton (1979), Novikov *et al.* (1981), Tinker (1982), Becker (1983), Paxton *et al.* (1989).

TAXONOMY: Paxton (1979), Becker (1983).

HAWAIIAN RECORDS: O‘ahu to Koko Seamount at 95–260 m at night, 300–560? m during day (Clarke, 1973; Novikov *et al.*, 1981).

GENERAL RANGE: Known only from the tropical and subtropical South Atlantic and the Pacific Ocean from Japan, Australia, Fiji the southern Emperor Seamounts, the Hawaiian Islands, California, and the equator at 100°W. Mesopelagic at 24–260 m at night, 225–560? m during day (Clarke, 1973; Wisner, 1976; Nafpaktitis *et al.*, 1977; Becker, 1983; Paxton *et al.*, 1989).

***Diaphus bertelseni* Nafpaktitis**

*Diaphus bertelseni* Nafpaktitis, 1966, p. 405, Figs. 2–5, equatorial Atlantic at 0°15'S, 18°35–45'W.

*Diaphus bertelseni* Nafpaktitis, 1966: Clarke (1973), Nafpaktitis *et al.* (1977), Paxton (1979), Becker (1983), Hulley *in* Whitehead *et al.* (1984), Paxton *et al.* (1989), Hulley *in* Quéro *et al.* (1990).

TAXONOMY: Paxton (1979).

HAWAIIAN RECORDS: O‘ahu at 100–150 m at night, 300? m during day (Clarke, 1973). Hulley (*in* Whitehead *et al.*, 1984, and *in* Quéro *et al.*, 1990) expressed reservations about the validity of the Hawaiian Islands record but it was accepted by Becker (1983).

GENERAL RANGE: Known only from the tropical and subtropical Gulf of Mexico, North and western South Atlantic, the Ryukyus, Australia, and the Hawaiian Islands. Mesopelagic at 60–175 m at night, 200–300 m during day (Nafpaktitis *et al.*, 1977; Becker, 1983; Paxton, *et al.*, 1989).

***Diaphus brachycephalus* Tåning**

*Diaphus brachycephalus* Tåning, 1928, p. 59, North Atlantic at 19°22'N, 24°06'W.

*Diaphus richardsoni* non Tåning, 1932: Borets & Sokolovsky (1978)?

*Diaphus* “slender D (prob. *brachycephalus*)”: Loeb (1979)?

*Diaphus brachycephalus* Tåning, 1928: Clarke (1973), Wisner (1976), Nafpaktitis *et al.* (1977), Nafpaktitis (1978), Borets & Sokolovsky (1978), Kawaguchi & Shimizu (1978), Paxton (1979), Tinker (1982), Becker (1983), Hulley *in* Whitehead *et al.* (1984), Paxton *et al.* (1989).

TAXONOMY: Paxton (1979). Nafpaktitis *et al.* (1977) suggested that Wisner’s (1976) *D. brachycephalus* included *D. richardsoni* but Kawaguchi & Shimizu (1978) and Becker (1983) stated that *D. richardsoni* does not occur in the central Pacific. Hulley (*in* Whitehead *et al.*, 1984) accepted the Hawaiian records of *D. brachycephalus*.

HAWAIIAN RECORDS: Hawai‘i Island to east of the Hancock Seamounts at 30–200 m at night, 300–600? during day (Clarke, 1973; Wisner, 1976; Kawaguchi & Shimizu, 1978).



GENERAL RANGE: Circumglobal in the tropical through temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans except the eastern Pacific. Mesopelagic at 0–255 m at night, 175–>600 m during day (Clarke, 1973; Wisner, 1976; Nafpaktitis *et al.*, 1977; Nafpaktitis, 1978; Becker, 1983; Hulley *in* Whitehead *et al.*, 1984; Paxton *et al.*, 1989).

***Diaphus chryсорhynchus* Gilbert & Cramer**

*Diaphus chryсорhynchus* Gilbert & Cramer, 1897, p. 409, Pl. 38 (fig. 2 [?3]), Kaiwi Channel between O‘ahu and Moloka‘i, Hawaiian Islands, at 21°15'49"N, 157°44'27"W.

*Diaphus astridae* Giltay, 1929: Fowler (1934)?

*Diaphus chryсорhynchus* Gilbert & Cramer, 1897: Gilbert & Cramer (1897), Gilbert (1905), Fowler (1928), Gosline & Brock (1960), Struhsaker (1973a), Clarke (1973), Wisner (1976), Borets & Sokolovsky (1978), Paxton (1979), Novikov *et al.* (1981), Tinker (1982), Becker (1983), Paxton *et al.* (1989), Chave & Mundy (1994).

TAXONOMY: Paxton (1979), Becker (1983).

HAWAIIAN RECORDS: Hawai‘i Island to Koko Seamount at 0–190 m at night, 418–600 m during day (Gilbert & Cramer, 1897; Gilbert, 1905; Struhsaker, 1973a; Clarke, 1973; Wisner, 1976; Novikov *et al.*, 1981; Chave & Mundy, 1994).

GENERAL RANGE: Pacific Ocean endemic known only from Borneo, southern Japan, the Philippines, Australia, and the Hawaiian Islands. Meso- and benthopelagic in nearshore areas at 0–190 m at night, 418–960 m during day (Struhsaker, 1973a; Wisner, 1976; Becker, 1983; Paxton *et al.*, 1989; Chave & Mundy, 1994).

[*Diaphus dumerilii* (Bleeker)]

*Scopelus dumerilii* Bleeker, 1856b, p. 66, off Manado, Sulawesi, Indonesia.

*Diaphus dumerilii* non (Bleeker, 1856b): Fowler (1928)?, Tinker (1982).

*Diaphus dumerilii* (Bleeker, 1856b): Wisner (1976), Nafpaktitis *et al.* (1977), Paxton (1979), Becker (1983), Hulley *in* Whitehead *et al.* (1984), Hulley *in* Smith & Heemstra (1986), Hulley *in* Quéro *et al.* (1990).

TAXONOMY: Paxton (1979), Becker (1983).

HAWAIIAN RECORDS: Fowler (1928) recorded *D. dumerilii* from an unspecified location in the Hawaiian Islands. Wisner (1976) questioned the validity of this record. There are no other reports of *D. dumerilii* from Hawaiian waters.

GENERAL RANGE: Known with certainty only from the tropical through temperate Atlantic and the Celebes Sea (the type locality) but also recorded from the Hawaiian Islands. Meso- and benthopelagic at 0–125 m at night, 225–750 m during day (Nafpaktitis *et al.*, 1977; Hulley *in* Smith & Heemstra, 1986). Becker (1983) and Hulley (*in* Whitehead *et al.*, 1984, and *in* Quéro *et al.*, 1990) stated that this species is absent or rare in the Indo-Pacific.

***Diaphus fragilis* Tåning**

*Diaphus fragilis* Tåning, 1928, p. 61, North Atlantic at 12°11'N, 35°49'W.

*Diaphus fragilis* Tåning, 1928: Clarke (1973), Wisner (1976), Nafpaktitis *et al.* (1977), Kawaguchi & Shimizu (1978), Paxton (1979), Tinker (1982), Becker (1983).

TAXONOMY: Paxton (1979). Nafpaktitis *et al.* (1977) stated that this species is confused with *D. thiollierei* Fowler, 1934a, outside of the Atlantic. Kawaguchi & Shimizu (1978) reported *D. fragilis* from off Japan and did not collect *D. thiollierei* in the central Pacific. Becker (1983) listed *D. thiollierei* as an Indian Ocean endemic and *D. fragilis* as the species present in the Atlantic and Pacific oceans.

HAWAIIAN RECORDS: Hawai‘i Island to O‘ahu at 15–120 m at night, 520–600 m during day (Clarke, 1973; Wisner, 1976).

GENERAL RANGE: Circumglobal in the tropical and subtropical Gulf of Mexico, western North and central Atlantic, Indian, and Pacific oceans except the eastern Pacific. Apparently absent near continents in most parts of its range. Mesopelagic at 15–150 m at night, 375–750 m during day (Clarke, 1973; Nafpaktitis *et al.*, 1977; Becker, 1983).

***Diaphus fulgens* (Brauer)**

*Myctophum* (*Nyctophus*) *fulgens* Brauer, 1904, p. 402, Fig. 4, four *Valdivia* stations in the Indian Ocean.

*Diaphus nanus* Gilbert, 1908: Fowler (1928).

*Diaphus fulgens* non (Brauer, 1904) [form A]: Wisner (1976) in part?

*Diaphus fulgens* non (Brauer, 1904) [form B]: Wisner (1976)?

*Diaphus fulgens* (Brauer, 1904) [form C]: Wisner (1976).

*Diaphus fulgens* non (Brauer, 1904): Borets & Sokolovsky (1978), Novikov *et al.* (1981).

*Diaphus fulgens* (Brauer, 1904): Nafpaktitis (1978), Kawaguchi & Shimizu (1978), Becker (1983).

TAXONOMY: Nafpaktitis (1978) stated that the species complex that includes *D. fulgens* (Brauer, 1904) and *D. theta* Eigenmann & Eigenmann, 1890, "... is taxonomically perhaps the most exasperating assemblage of *Diaphus*." The taxonomy of specimens reported as *D. fulgens* (Brauer, 1904), *D. mollis* Tåning, 1928, and *D. rafinesquii* (Cocco, 1838) in Hawaiian waters is incredibly confused. Wisner (1976) reported eight distinct types (species?) from the North Pacific under these names. Their identities remain a puzzle. For example, *D. rafinesquii* does not occur outside of the Atlantic (Becker, 1983). Specimens reported from near Hawai'i as forms of *D. mollis*, *fulgens*, and *rafinesquii* may include undescribed species. See Wisner's (1976) discussion of "The *Diaphus fulgens-rafinesquii* species complex in the Pacific Ocean" and his discussions of the three species. Wisner (1976) recorded his *D. fulgens* "forms A and B" from near Hawai'i, and indicated that the forms currently referred to this species need revision. However, "form C" of Wisner (1976), which was not taken near Hawai'i, has been identified as the true *D. fulgens* (see Nafpaktitis, 1978; Kawaguchi & Shimizu, 1978). Some of the specimens of Wisner's *Diaphus fulgens* "form A" were described as *D. wisneri* Nafpaktitis, Robertson, & Paxton, 1995. The identity of Wisner's (1976) *D. fulgens* "form B" remains unknown. Kawaguchi & Nafpaktitis (1978) noted that their new species, *Diaphus kuroshio* Kawaguchi & Nafpaktitis, 1978, was similar to the forms that Wisner (1976) described as *D. rafinesquii*. Despite this, Kawaguchi & Nafpaktitis (1978) did not identify any of Wisner's types as synonymous with *D. kuroshio*.

HAWAIIAN RECORDS: Northeast of Kaua'i to the Milwaukee and Koko seamounts (Wisner, 1976; Novikov *et al.*, 1981). See also *D. mollis*.

GENERAL RANGE: The range of the entire *D. fulgens* group is the tropical and subtropical Indo-Pacific from east Africa to Japan, New Guinea, the Hawaiian Islands, and Peru, although it is otherwise absent from the eastern Pacific. Wisner's (1976) *D. fulgens* "Form B" is known only from the Hawaiian Islands and Emperor Seamounts. "Form C" (*D. fulgens sensu stricto*) is known from the central equatorial Pacific, Borneo, the Philippines, and Japan. *Diaphus wisneri* [i.e., Wisner's (1976) *D. fulgens* "Form A"] is known from northeast of Kaua'i, off O'ahu, the eastern tropical Pacific (15°N & 13–18°S, 110°–143°W), and near the Kermadec Islands (Nafpaktitis *et al.*, 1995). Mesopelagic at ~85–380 m (Wisner, 1976; Kawaguchi & Shimizu, 1978; Becker, 1983).

***Diaphus garmani* Gilbert**

*Diaphus garmani* Gilbert, 1906, p. 258, Pl. 2, off Cuba.

*Diaphus signatus* non Gilbert, 1908 [a valid equatorial and Kuroshio species]: Borets & Sokolovsky (1978)?, Novikov *et al.* (1981)?

*Diaphus garmani* Gilbert, 1906: Fowler (1949), Wisner (1976), Nafpaktitis *et al.* (1977), Kawaguchi & Shimizu (1978), Paxton (1979), Becker (1983), Hulley *in* Smith & Heemstra (1986), Paxton *et al.* (1989).

TAXONOMY: Paxton (1979), Becker (1983). Nafpaktitis *et al.* (1977) stated that in the Pacific, *D. garmani* Gilbert, 1906, can be confused with *D. signatus* Gilbert, 1908, and an undescribed species. Kawaguchi & Shimizu (1978) recognized Wisner's (1976) Hawaiian records of *D. garmani* as valid and concluded that *D. signatus* is a Kuroshio and equatorial species. Becker (1983) gave the range of *D. signatus* as the equatorial Indo-Pacific with a restricted population in the southern Kuroshio and no records from the central North Pacific. Hulley (*in* Smith & Heemstra, 1986) also recognized the validity of Pacific records of *D. garmani*.

HAWAIIAN RECORDS: Southeast of Hawai'i Island to Koko Seamount (Wisner, 1976; Kawaguchi & Shimizu, 1978; Novikov *et al.*, 1981).

GENERAL RANGE: Circumglobal in the tropical and subtropical Gulf of Mexico, western North Atlantic, Indian, and Pacific oceans, sometimes abundant near islands. In the Pacific from Japan to the

Philippines, Australia, Samoa, the Hawaiian Islands, Mexico, and off Chile. Meso- and benthopelagic at 0–125 m at night, 325–750 m during day (Wisner, 1976; Nafpaktitis *et al.*, 1977; Kawaguchi & Shimizu, 1978; Becker, 1983; Hulley *in* Smith & Heemstra, 1986; Paxton *et al.*, 1989).

***Diaphus kuroshio*** Kawaguchi & Nafpaktitis

*Diaphus kuroshio* Kawaguchi & Nafpaktitis, 1978, p. 89, Figs. 1–2, off Japan at 31°24.1'N, 136°52.4'W.

*Diaphus kuroshio* Kawaguchi & Nafpaktitis, 1978; Kawaguchi & Shimizu (1978), Paxton (1979), Becker (1983).

TAXONOMY: Paxton (1979), Becker (1983).

HAWAIIAN RECORDS: The Hancock Seamounts (C. Wilson, unpubl. data).

GENERAL RANGE: North Pacific transition zone endemic, from Japan to 36°N, 165°W and the Hancock Seamounts. Mesopelagic at >1–100 m at night, 200–300 m during day (Kawaguchi & Shimizu, 1978; Becker, 1983).

[*Diaphus malayanus* Weber]

*Diaphus malayanus* Weber, 1913, p. 89, Fig. 30, Halmahera Sea at 0°17.6'S, 129°14.5'E and Banda Sea at 3°58'S, 128°20'E.

*Diaphus tanakae* Gilbert, 1913; Borets & Sokolovsky (1978), Novikov *et al.* (1981)?

*Diaphus malayanus* Weber, 1913; Becker (1983), Hulley *in* Smith & Heemstra (1986), Paxton *et al.* (1989).

TAXONOMY: Becker (1983) tentatively included *D. tanakae* in synonymy with *D. malayanus*.

HAWAIIAN RECORDS: None but Novikov *et al.* (1981) recorded specimens tentatively identified as ?*D. tanakae* from the Milwaukee and Koko seamounts.

GENERAL RANGE: Tropical and subtropical Indo-Pacific from east Africa and the Arabian Peninsula to southern Japan, Australia, and the equatorial central Pacific to ca. 105°W. Epi- and mesopelagic at 20–85 m at night, >100 m during day (Becker, 1983; Hulley *in* Smith & Heemstra, 1986; Paxton *et al.*, 1989).

***Diaphus metopoclampus*** (Cocco)

*Myctophum metopoclampus* Cocco, 1829, p. 144, off Messina, Italy.

*Diaphus metopoclampus* (Cocco, 1829): Clarke (1973), Wisner (1976), Nafpaktitis *et al.* (1977), Nafpaktitis (1978), Paxton (1979), Tinker (1982), Becker (1983), Paxton *et al.* (1989), Parin *et al.* (1995).

TAXONOMY: Paxton (1979), Becker (1983).

HAWAIIAN RECORDS: O'ahu from one specimen taken at 185 m at night (Clarke, 1973).

GENERAL RANGE: Circumglobal from disjunct areas in all seas except the Red Sea, but apparently associated with land masses and absent from open ocean areas. In the Pacific, known from southern Japan, the Kuril Islands, Micronesia, Australia, New Guinea, and the Lord Howe, Norfolk, Hawaiian, Cook, and Society Islands. Meso- and benthopelagic at 90–850 m at night, 375–1000 m during day (Clarke, 1973; Wisner, 1976; Nafpaktitis *et al.*, 1977; Nafpaktitis, 1978; Becker, 1983; Paxton *et al.*, 1989; Parin *et al.*, 1995).

***Diaphus mollis*** Tåning

*Diaphus mollis* Tåning, 1928, p. 60, North Atlantic at 19°22'N, 24°06'W.

*Diaphus* sp. A [related to but distinct from *D. mollis*]: Clarke (1973), Amesbury (1975).

*Diaphus* sp. B [related to but distinct from *D. mollis*]: Clarke (1973), Amesbury (1975).

*Diaphus* “slender B (*mollis* poss. no. 2)”: Loeb (1979)?

*Diaphus* “slender C (*mollis* poss. no. 1)”: Loeb (1979)?

*Diaphus mollis* Tåning, 1928; Wisner (1976), Nafpaktitis *et al.* (1977), Nafpaktitis (1978), Kawaguchi & Shimizu (1978), Paxton (1979), Becker (1983), Hulley *in* Smith & Heemstra (1986), Paxton *et al.* (1989), Hulley *in* Quéro *et al.* (1990), Reid *et al.* (1991).

TAXONOMY: Wisner (1976), Paxton (1979). *Diaphus mollis* Tåning, 1928, *D. fulgens* (Brauer, 1904), and *D. rafinesquii* (Cocco, 1838) have convoluted taxonomies in Hawaiian waters. Allocation of *Diaphus* specimens identified as *D. mollis* types in Clarke (1973) and Amesbury (1975) to *D. mollis*, *D. fulgens*, and *D. rafinesquii* is not possible at this time. Nafpaktitis *et al.* (1977) and Hulley (*in* Smith & Heemstra, 1986) did not include the central North Pacific in the range of their *D. mollis* but Becker (1983) did. See *D. fulgens*.

HAWAIIAN RECORDS: Hawai'i Island to O'ahu and east of the Hancock Seamounts. *Diaphus* “*mollis*” sp.

A at 25–85 m at night, 425–525 m during day. *Diaphus* “*mollis*” sp. B at 30–190 m at night, 490–560 m during day (Clarke, 1973; Amesbury, 1975; Kawaguchi & Shimizu, 1978; Reid *et al.*, 1991).

GENERAL RANGE: Circumglobal in the tropical through temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans except the eastern Pacific near the American continents. Mesopelagic at 0–350 m at night, 300–800 m during day (Clarke, 1973; Wisner, 1976; Nafpaktitis *et al.*, 1977; Nafpaktitis, 1978; Becker, 1983; Paxton *et al.*, 1989; Hulley in Quéro *et al.*, 1990).

### *Diaphus pacificus* Parr

*Diaphus pacificus* Parr, 1931, p. 34, Fig. 14, Pacific coast off Mexico at 16°14'00"N, 99°36'30"W.

*Diaphus pacificus* Parr, 1931: Wisner (1976), Becker (1983), Boehlert *et al.* (1992).

TAXONOMY: Becker (1983).

HAWAIIAN RECORDS: Larvae were identified at Johnston Atoll (Boehlert *et al.*, 1992). Otherwise unrecorded from the region.

GENERAL RANGE: Eastern Pacific endemic from Baja California and the Gulf of California to Peru west to at least 5°N, 140°W, perhaps Johnston. Mesopelagic at ≥90 m (Wisner, 1976; Becker, 1983; Boehlert *et al.*, 1992).

### [*Diaphus parri* Tåning]

*Diaphus parri* Tåning, 1932, p. 135, Fig. 7, southeast of New Caledonia at 27°21'S, 175°11'E.

*Diaphus longleyi* Fowler, 1934: Wisner (1976)?

*Diaphus parri* Tåning, 1932: Fowler (1934), Nafpaktitis (1978), Kawaguchi & Shimizu (1978), Paxton (1979), Becker (1983), Hulley in Smith & Heemstra (1986), Paxton *et al.* (1989).

TAXONOMY: Paxton (1979), Becker (1983).

HAWAIIAN RECORDS: None but the Hawaiian Islands are within the range given for this species by Becker (1983).

GENERAL RANGE: Indo-Pacific from east Africa to Japan, Australia, and 25°N, 145°W and 15°S, 93°W. Mesopelagic at ≤150 m at night, >100 m during day (Wisner, 1976; Nafpaktitis, 1978; Kawaguchi & Shimizu, 1978; Becker, 1983; Hulley in Smith & Heemstra, 1986; Paxton *et al.*, 1989).

### *Diaphus perspicillatus* (Ogilby)

*Aethoprora perspicillata* Ogilby, 1898b, p. 36, Lord Howe Island.

*Diaphus elucens* (Brauer, 1904): Clarke (1973), Amesbury (1975), Wisner (1976), Borets & Sokolovsky (1978), Tinker (1982).

*Diaphus gigas* Gilbert, 1913: Wisner (1976), Kawaguchi & Shimizu (1978), Parin *et al.* (1995).

*Diaphus* “stubby A (*elucens*)”: Loeb (1979)?

*Diaphus perspicillatus* (Ogilby, 1898b) [*lapsus* for *perspicillatus*]: Novikov *et al.* (1981).

*Diaphus perspiculatus* (Ogilby, 1898b) [*lapsus* for *perspicillatus*]: Reid *et al.* (1991).

*Diaphus perspicillatus* (Ogilby, 1898b): Nafpaktitis *et al.* (1977), Kawaguchi & Shimizu (1978), Paxton (1979), Becker (1983), Hulley in Smith & Heemstra (1986).

TAXONOMY: Kawaguchi & Shimizu (1978) recognized *D. perspicillatus* (Ogilby, 1898) and *D. gigas* Gilbert, 1913, as valid but stated that specimens of appropriate size and maturity were not available to test whether the species are synonymous. Paxton (1979) included *D. gigas* in synonymy with *D. perspicillatus* with reservations. Becker (1983) included *D. elucens* (Brauer, 1904) and *D. gigas* as junior synonyms of *D. perspicillatus* but more recently Parin *et al.* (1995) stated that these species are distinct. This problem clearly needs more investigation.

HAWAIIAN RECORDS: Hawai'i Island to the Hancock Seamounts at 15–100 m at night, 450–600 m during day (Clarke, 1973; Amesbury, 1975; Wisner, 1976; Kawaguchi & Shimizu, 1978; Reid *et al.*, 1991).

GENERAL RANGE: Circumglobal in the tropical through temperate Gulf of Mexico, western and central Atlantic, Indian, and Pacific oceans except the eastern Pacific. Mesopelagic at 0–240 m at night, 315–1500 m during day (Clarke, 1973; Wisner, 1976; Nafpaktitis *et al.*, 1977; Becker, 1983; Hulley in Smith & Heemstra, 1986; Parin *et al.*, 1995). If *D. gigas* is a valid species, it is probably a transition zone endemic found from Japan and the Kuril Islands to the Hawaiian Islands (Parin *et al.*, 1995).

***Diaphus phillipsi*** Fowler

*Diaphus phillipsi* Fowler, 1934b, p. 287, Fig. 47, between Panay and Negros, Philippines.

*Diaphus rolfbolini* Wisner, 1971: Clarke (1973), Amesbury (1975), Wisner (1976), Tinker (1982).

*Diaphus* “stubby B (prob. *rolfbolini*)”: Loeb (1979)?

*Diaphus phillipsi* Fowler, 1934b: Kawaguchi & Shimizu (1978), Nafpaktitis (1978), Paxton (1979), Becker (1983), Paxton *et al.* (1989).

TAXONOMY: Paxton (1979), Becker (1983).

HAWAIIAN RECORDS: Southeast of Hawai‘i Island to O‘ahu at 50–200 m at night, 490–690 m during day (Clarke, 1973; Amesbury, 1975; Kawaguchi & Shimizu, 1978).

GENERAL RANGE: Tropical and subtropical Indo-Pacific from east Africa to southern Japan, Australia, the Hawaiian Islands, and the eastern South Pacific to 15°S, 93°W but absent from the eastern Pacific near the American continents. Mesopelagic at 50–200 m at night, 490–690 m during day (Clarke, 1973; Wisner, 1976; Nafpaktitis, 1978; Becker, 1983; Paxton *et al.*, 1989).

**[*Diaphus rafinesquii* (Cocco)]**

*Nyctophus rafinesquii* Cocco, 1838, p. 180, Pl. 7 (fig. 7), off San Raineri, Messina, Italy.

*Diaphus rafinesquei* (Cocco, 1838) [*lapsus* for *rafinesquii*]: Fowler (1934).

*Diaphus rafinesquei* non (Cocco, 1838): Borets & Sokolovsky (1978).

*Diaphus rafinesquii* non (Cocco, 1838) [forms R-1, R-2, and R-3?]: Wisner (1976).

*Diaphus rafinesquii* (Cocco, 1838): Nafpaktitis *et al.* (1977), Paxton (1979), Becker (1983), Hulley *in* Whitehead *et al.* (1984), Hulley *in* Quéro *et al.* (1990).

*Diaphus rafinesquii* non (Cocco, 1838): Novikov *et al.* (1981).

TAXONOMY: Paxton (1979). *Diaphus rafinesquii* is not found in the Pacific Ocean (Nafpaktitis *et al.*, 1977; Becker, 1983; Hulley *in* Whitehead *et al.*, 1984) and the identities of Wisner’s (1976) and Novikov *et al.*’s (1980) “*D. rafinesquii*” remain unknown. See *D. fulgens* and *D. mollis*.

HAWAIIAN RECORDS: None but *D. rafinesquii* has been recorded from the Milwaukee and Koko seamounts (Novikov *et al.*, 1981). Wisner (1976) showed the ranges for his “forms R-1, R-2 and R-3” to be near the Hancock Seamounts but not the main Hawaiian Islands.

GENERAL RANGE: Wisner’s “forms R-1, R-2, and R-3” are known only from the North Pacific transition zone, 30°N–40°N, 135°W–160°E. Mesopelagic at 0–880 m (Wisner, 1976). Otherwise, *D. rafinesquii* is a Gulf of Mexico, Mediterranean, and north Atlantic endemic. Mesopelagic at 0–600 m at night, 325–750 m during day (Nafpaktitis *et al.*, 1977; Becker, 1983; Hulley *in* Whitehead *et al.*, 1984; Hulley *in* Quéro *et al.*, 1990).

***Diaphus schmidti*** Tåning

*Diaphus schmidti* Tåning, 1932, p. 139, Fig. 11, north of Samoa at 7°46’S, 167°10’E.

*Diaphus* “stubby C (poss. *schmidti*)”: Loeb (1979)?

*Diaphus schmidti* Tåning, 1932: Fowler (1934), Clarke (1973), Amesbury (1975), Wisner (1973), Borets & Sokolovsky (1978), Kawaguchi & Shimizu (1978), Paxton (1979), Tinker (1982), Becker (1983), Reid *et al.* (1991).

TAXONOMY: Paxton (1979), Becker (1983).

HAWAIIAN RECORDS: Hawai‘i Island to Kaua‘i at 15–80 m at night, 490–625 m during day (Clarke, 1973; Amesbury, 1975; Kawaguchi & Shimizu, 1978; Reid *et al.*, 1991).

GENERAL RANGE: Pacific endemic, from southern Japan and Sulawesi to Micronesia, Samoa, the Hawaiian Islands and the central Pacific to 15°S, 104°W. Absent from the eastern Pacific. Meso- and bentho-pelagic at 15–100 m at night, 490–625 m during day (Clarke, 1973; Wisner, 1976; Becker, 1983; Reid *et al.*, 1991).

***Diaphus theta*** Eigenmann & Eigenmann

*Diaphus theta* Eigenmann & Eigenmann, 1890, p. 4, off Point Loma, California.

*Diaphus theta* Eigenmann & Eigenmann, 1890: Clarke (1973), Wisner (1976), Kawaguchi & Shimizu (1978), Paxton (1979), Novikov *et al.* (1981), Tinker (1982), Becker (1983).

TAXONOMY: Paxton (1979), Becker (1983).

COMMON NAMES: California headlightfish (AFS).

HAWAIIAN RECORDS: Recorded in the Hawaiian Islands by a single waif specimen taken near O'ahu at 145 m (Clarke, 1973; Becker, 1983).

GENERAL RANGE: North Pacific subarctic, transition zone, and California Current endemic. Similar forms have been collected at the Hawaiian Islands, off Peru, and in the eastern South Pacific. Mesopelagic at ?10–145 m at night, ?400 m during day (Clarke, 1973; Wisner, 1976; Kawaguchi & Shimizu, 1978; Becker, 1983).

#### *Diaphus trachops* Wisner

*Diaphus trachops* Wisner, 1974, p. 5, Figs. 2, 3A., off O'ahu, Hawaiian Islands.

*Diaphus "glandulifer"* non Gilbert, 1913 [a junior synonym of *D. suborbitalis* Weber, 1913, a valid species not found in the Hawaiian Islands]; Clarke (1973).

*Diaphus termophilus* non Tåning, 1928 [a valid species not found in the Hawaiian Islands]; Struhsaker (1973a), Borets & Sokolovsky (1978), Tinker (1982).

*Diaphus trachops* Wisner, 1974: Wisner (1976), Nafpaktitis (1978), Kawaguchi & Shimizu (1978), Paxton (1979), Becker (1983), Humphreys *et al.* (1984), Uchida & Uchiyama (1986), Reid *et al.* (1991).

TAXONOMY: Nafpaktitis (1978), Paxton (1979), Becker (1983). Clarke's (1973) specimens of *D. "glandulifer"* non Gilbert, 1913, are *D. trachops* Wisner, 1974 (*vide* T. Clarke, pers. comm.). *Diaphus glandulifer* is a junior synonym of *D. suborbitalis* Weber, 1913, a valid species that does not occur in Hawaiian waters (Kawaguchi & Shimizu, 1978). Kawaguchi & Shimizu (1978) list *D. trachops* as the Hawaiian sibling species of *D. suborbitalis*. Reports of *D. termophilus* Tåning, 1928, from Hawaiian waters also refer to *D. trachops* (see Wisner, 1976).

HAWAIIAN RECORDS: Hawai'i Island to the Hancock Seamounts at 95–225 m at night, 425–600 m during day (Struhsaker, 1973a; Clarke, 1973; Wisner, 1976; Humphreys *et al.*, 1984; Uchida & Uchiyama, 1986; Reid *et al.*, 1991).

GENERAL RANGE: Central and eastern Pacific endemic known from the Hawaiian Islands to central California; most specimens have been collected in Hawaiian waters. Meso- and benthopelagic at 95–225 m at night, 425–600 m during day (Clarke, 1973; Wisner, 1976; Becker, 1983; Reid *et al.*, 1991).

#### *Diaphus wisneri* Nafpaktitis, Robertson, & Paxton

*Diaphus wisneri* Nafpaktitis, Robertson & Paxton, 1995, p. 339, Fig. 3, off O'ahu, Hawaiian Islands, at 21°00'N, 158°20'W.

Form A of *Diaphus fulgens* species complex: Wisner (1976, in part).

*Diaphus wisneri* Nafpaktitis, Robertson & Paxton, 1995: Nafpaktitis *et al.* (1995).

TAXONOMY: Nafpaktitis *et al.* (1995).

HAWAIIAN RECORDS: O'ahu at 50–60 m (Nafpaktitis *et al.*, 1995).

GENERAL RANGE: Central Pacific endemic, perhaps antiequatorial, from isolated collections north of Hawai'i, off O'ahu, west of Mexico, west of Peru and Chile, and east of the Kermadec Islands. Epi- and mesopelagic at 50–375 m (Wisner, 1976; Nafpaktitis *et al.*, 1995).

#### [*Diaphus* spp.]

COMMENTS: Borets & Sokolovsky (1978) recorded *Diaphus coeruleus* [a *lapsus* for *D. coeruleus* (Klunzinger, 1871)], *problematicus* Parr, 1928 [as *D. weberi* Tåning, 1932], and *regani* Tåning, 1932, from unspecified locations in the Hawaiian Ridge and the Emperor Seamounts. They did not state which species were collected in Hawaiian waters. The identification of these species in the region needs confirmation. Larval *Diaphus* collected at Johnston Atoll and the Hancock Seamounts were not identified to species (Boehlert *et al.*, 1992; Boehlert & Mundy, 1992).

#### *Diogenichthys atlanticus* (Tåning)

*Myctophum laternatum atlanticum* Tåning, 1928, p. 56, North Atlantic at 20°00'N, 21°55'W.

*Diogenichthys atlanticus* (Tåning, 1928): Moser & Ahlstrom (1970), Clarke (1973), Wisner (1976), Nafpaktitis *et al.* (1977), Borets & Sokolovsky (1978), Novikov *et al.* (1981), Loeb (1979), Paxton (1979), Tinker (1982), Becker (1983), Boehlert & Mundy (1992).

TAXONOMY: Paxton (1979), Becker (1983).

HAWAIIAN RECORDS: South of Hawai'i Island to Koko Seamount, rare near the main Hawaiian Islands but larvae are abundant at the Hancock Seamounts; at 15–100 m at night, 400–600 m during day (Clarke, 1973; Wisner, 1976; Novikov *et al.*, 1981; Boehlert & Mundy, 1992).

GENERAL RANGE: Circumglobal in the tropical through temperate Gulf of Mexico, Atlantic, southern Indian, and Pacific oceans except the eastern tropical Pacific. Rare or absent from central water masses far from land. Epi- and mesopelagic at 10–1050 m at night, 400–1250 m during day (Clarke, 1973; Wisner, 1976; Nafpaktitis *et al.*, 1977; Becker, 1983).

***Diogenichthys laternatus*** (Garman)

*Myctophum laternatum* Garman, 1899, p. 267, Pl. 56 (fig. 1), off Mexico and Central America at 7°06'–27°39'40"N, 79°48'–111°00'30"W.

*Diogenichthys laternatus* (Garman, 1899): Moser & Ahlstrom (1970), Wisner (1976), Paxton (1979), Becker (1983).

TAXONOMY: Paxton (1979), Becker (1983).

COMMON NAMES: Diogenes lanternfish (AFS).

HAWAIIAN RECORDS: Only a single record from Hawai'i Island (Wisner, 1976), probably of a waif.

GENERAL RANGE: Eastern tropical and subtropical Pacific endemic, from southern California to central Chile west to Hawai'i Island and 170°W at the equator. Epi- and mesopelagic at 0–100 m at night, 600–650 m during day (Moser & Ahlstrom 1970; Wisner, 1976; Becker, 1983).

***Electrona risso*** (Cocco)

*Scopelus risso* Cocco, 1829, p. 144, off Messina, Italy.

*Electrona rissoi* (Cocco, 1829) [*lapsus* for *risso*]: Moser & Ahlstrom (1970), Wisner (1976), Novikov *et al.* (1981).

*Electrona risso* (Cocco, 1829): Nafpaktitis *et al.* (1977), Borets & Sokolovsky (1978), Paxton (1979), Becker (1983), Hulley *in* Smith & Heemstra (1986), Boehlert & Mundy (1992).

TAXONOMY: Paxton (1979), Becker (1983).

HAWAIIAN RECORDS: East of Hawai'i Island (20°N, 147°W) to Koko Seamount but apparently absent from the main Hawaiian Islands (Moser & Ahlstrom, 1970; Wisner, 1976; Novikov *et al.*, 1981; Becker, 1983; Boehlert & Mundy, 1992). Larval *Electrona* from Johnston Atoll were not identified to species (Boehlert *et al.*, 1992) but were probably *E. risso*.

GENERAL RANGE: Disjunct circumglobal distribution with populations in the Mediterranean Sea; eastern, equatorial, and southwestern Atlantic Ocean; western Indian Ocean; and western, equatorial, north-eastern, and southeastern Pacific Ocean. Mesopelagic at 90–700 m at night, 200–750 m during day (Wisner, 1976; Nafpaktitis *et al.*, 1977; Becker, 1983; Hulley *in* Smith & Heemstra, 1986).

[*Gonichthys* sp.]

*Rhinoscopelus coruscans* (Richardson, 1845) [a junior synonym of *Gonichthys barnesi* Whitley, 1943, a Southern Hemisphere species]: Fowler (1900).

*Rhinoscopelus cocco* non (Cocco, 1829) [a valid Atlantic endemic *Gonichthys* species]: Fowler (1928)?

*Rhinoscopelus tenuiculus* (Garman, 1899) [a valid eastern tropical Pacific endemic *Gonichthys* species]: Fowler (1928)?

*Myctophum cocco* non (Cocco, 1829): Fowler (1934, 1949)?

*Myctophum hians* non Richardson, 1845 [a junior synonym of *G. cocco* (Cocco, 1829)]: Fowler (1934, 1949)?

*Myctophum coccoi* non (Cocco, 1829): Tinker (1982)?

*Gonichthys* sp.: Loeb (1979)?

*Gonichthys cocco* (Cocco, 1829): Nafpaktitis *et al.* (1977), Paxton (1979), Becker (1983), Hulley *in* Quéro *et al.* (1990).

*Gonichthys tenuiculus* (Garman, 1899): Moser & Ahlstrom (1970), Wisner (1976), Becker (1983).

*Gonichthys venetus* Becker, 1964 [a valid equatorial and South Pacific endemic]: Wisner (1976), Becker (1983).

TAXONOMY: Paxton (1979), Becker (1983).

HAWAIIAN RECORDS: Fowler (1900) recorded *Rhinoscopelus coruscans* (Richardson, 1845) from “near the Sandwich Islands.” In 1928, Fowler listed *Rhinoscopelus cocco* (Cocco, 1829) and *R. tenuiculus* (Garman, 1899) as occurring in the central Pacific Ocean. He later (1934a, 1949) listed *Myctophum*

*cocco* and *M. hians* Richardson, 1845, (= *G. cocco*), including *M. tenuiculus* in synonymy with *M. cocco*, and stated that a specimen of *M. cocco* had been collected near the Hawaiian Islands. These identifications are highly suspect, as *Gonichthys cocco* is not known with certainty to occur outside of the Atlantic Ocean (Nafpaktitis *et al.*, 1977; Hulley in Quéro *et al.*, 1990) and *G. tenuiculus* is an eastern tropical Pacific Ocean endemic which has never been positively reported from Hawaiian waters (Wisner, 1976; Becker, 1983). Tinker (1982) repeated Fowler's (1934) record as *M. coccoi*. It is probable that Fowler's records of *Gonichthys* species are referable to the *Centrobranchus* or *Loweina* species known from the region. Examination of Fowler's specimens might solve these problems, if those specimens still exist.

Loeb (1979) recorded larvae of *Gonichthys* sp. from 28°N, 155°W. Unpublished notes by W. Watson about Johnston Atoll samples have the identification of *Gonichthys* sp. in Boehlert *et al.* (1992) corrected to *Centrobranchus andreae* (Lütken, 1892). Loeb's (1979) larvae may also have been *C. andreae*. *Gonichthys tenuiculus* and *G. venetus* Becker, 1964, are the *Gonichthys* species known to occur most closely to these sites (Wisner, 1976; Becker, 1983). See Moser & Ahlstrom (1970) for the distribution of *G. tenuiculus* larvae.

GENERAL RANGE: *Gonichthys tenuiculus* is an eastern tropical Pacific endemic, occurring from southern California to Chile westward to 10°N, 148°W. *Gonichthys venetus* is a central and South Pacific endemic, occurring between ca. 5°N–35°S, 60°W–160°E. Both are neustonic and mesopelagic at 0–? m at night and unrecorded depths during the day (Wisner, 1976; Becker, 1983).

[*Hygophum macrochir* (Günther)]

*Scopelus macrochir* Günther, 1864d, p. 408, no type locality given.

*Hygophum macrochir* non (Günther, 1864): Borets & Sokolovsky (1978)?

*Hygophum macrochir* (Günther, 1864) [a valid Atlantic Ocean and southwestern Pacific species]: Nafpaktitis *et al.* (1977), Paxton (1979), Becker (1983), Paxton *et al.* (1989), Hulley in Quéro *et al.* (1990).

TAXONOMY: Paxton (1979), Becker (1983).

HAWAIIAN RECORDS: The record of larvae of this species from the Hawaiian Ridge or the Emperor Seamounts (Borets & Sokolovsky, 1978) is erroneous, given the range of this species. It is not possible to determine what species was represented by Borets & Sokolovsky's specimens.

GENERAL RANGE: Usually described as a tropical and subtropical Atlantic Ocean endemic but similar specimens have been collected off Australia. Mesopelagic at 0–200 m at night, 275–750 m during day (Nafpaktitis *et al.*, 1977; Paxton *et al.*, 1989; Hulley in Quéro *et al.*, 1990).

*Hygophum proximum* Becker

*Hygophum proximum* Becker, 1965, p. 81, Fig. 7, Indian Ocean at 0°58'N, 82°58'E.

*Hygophum proximum* Becker, 1965: Clarke (1973), Amesbury (1975), Wisner (1976), Borets & Sokolovsky (1978), Loeb (1979), Paxton (1979), Novikov *et al.* (1981), Tinker (1982), Becker (1983), Paxton *et al.* (1989), Reid *et al.* (1991), Boehlert *et al.* (1992).

TAXONOMY: Paxton (1979), Becker (1983).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Milwaukee Seamount at 0–150 m at night, 500–700 m during day (Clarke, 1973; Amesbury, 1975; Wisner, 1976; Novikov *et al.*, 1981; Reid *et al.*, 1991; Boehlert *et al.*, 1992).

GENERAL RANGE: Indo-Pacific in tropical and subtropical regions from South Africa to southern Japan, Australia, the Hawaiian Islands, and the eastern Pacific, but absent near the American continents. Neustonic and mesopelagic at 0–150 m at night, 500–700 m during day (Clarke, 1973; Wisner, 1976; Becker, 1983; Paxton *et al.*, 1989).

*Hygophum reinhardtii* (Lütken)

*Scopelus reinhardtii* Lütken, 1892b, p. 257, Fig. 18 (or 16?), near Madeira at 34°22'N, 18°10'W.

*Myctophum braueri* Gilbert, 1905: Gilbert (1905 text).

*Myctophum lütkeni* Gilbert, 1905: Gilbert (1905, plate 70).

*Myctophum reinharti* (Lütken, 1892b) [a *lapsus* in spelling]: Fowler (1928).

*Hygophum reinhardtii* (Lütken, 1892b): Gosline & Brock (1960), Moser & Ahlstrom (1970), Clarke (1973), Amesbury (1975), Wisner (1976), Nafpaktitis *et al.* (1977), Borets & Sokolovsky (1978), Loeb (1979),



Paxton (1979), Novikov *et al.* (1981), Tinker (1982), Becker (1983), Boehlert *et al.* (1992), Boehlert & Mundy (1992).

**TAXONOMY:** Paxton (1979), Becker (1983). Larvae from the Hancock Seamounts had a few characters diagnostic of *H. atratum* Garman larvae (Moser & Ahlstrom, 1970) but were identified as *H. reinhardtii* because most characters were diagnostic for the latter species (Boehlert & Mundy, 1992).

**HAWAIIAN RECORDS:** Johnston Atoll and west of Hawai'i Island to Koko Seamount at 0–175 m at night, 550–900 m during day (Gilbert, 1905; Clarke, 1973; Amesbury, 1975; Novikov *et al.*, 1981; Boehlert *et al.*, 1992; Boehlert & Mundy, 1992).

**GENERAL RANGE:** Antiequatorial in the subtropical through temperate Gulf of Mexico, Atlantic, and Pacific oceans, but unknown from the Indian Ocean. Neustonic to mesopelagic at 0–250 m at night, 475–1100 m during day (Gilbert, 1905; Clarke, 1973; Wisner, 1976; Nafpaktitis *et al.*, 1977; Becker, 1983).

### *Idiolychnus urolampus* (Gilbert & Cramer)

*Diaphus urolampus* Gilbert & Cramer, 1897, p. 408, Pl. 38 (fig. 1), “Hawaiian Islands”.

*Diaphus urolampus* Gilbert & Cramer, 1897: Gilbert & Cramer (1897), Gilbert (1905), Fowler (1934), Gosline & Brock (1960), Struhsaker (1973a).

*Lobianchia urolampa* (Gilbert & Cramer, 1897): Clarke (1973), Wisner (1976), Tinker (1982).

*Idiolychnus urolampus* (Gilbert & Cramer, 1897): Nafpaktitis & Paxton (1978), Paxton (1979), Novikov *et al.* (1981), Becker (1983), Becker & Shcherbachev (1990), Becker (1993).

**TAXONOMY:** Nafpaktitis & Paxton (1978), Paxton (1979), Becker (1983).

**HAWAIIAN RECORDS:** Hawai'i Island to Koko Seamount at 100?–190 m at night, 539–582 m during day (Gilbert & Cramer, 1897; Gilbert, 1905; Struhsaker, 1973a; Clarke, 1973; Novikov *et al.*, 1981).

**GENERAL RANGE:** Indo-Pacific from Madagascar to the central Pacific seamounts, the Hawaiian Islands, and the Sala y Gomez Ridge in the southeastern Pacific. Benthopelagic in nearshore areas or at seamounts at 124–582 m (Gilbert, 1905; Struhsaker, 1973a; Becker & Shcherbachev, 1990; Becker, 1992).

### *Lampadena anomala* Parr

*Lampadena anomala* Parr, 1928, p. 150, Fig. 35, near Bermuda at 32°24'N, 64°29'W.

*Lampadena anomala* Parr, 1928: Clarke (1973), Wisner (1976), Nafpaktitis *et al.* (1977), Loeb (1979), Paxton (1979), Tinker (1982), Becker (1983), Hulley *in* Smith & Heemstra (1986), Hulley *in* Quéro *et al.* (1990), Niass & Ozawa (2000).

**TAXONOMY:** Paxton (1979), Becker (1983), Niass & Ozawa (2000).

**HAWAIIAN RECORDS:** In Hawaiian waters, known from only three specimens taken near O'ahu at 300–400 m at night, 800 m during day (Clarke, 1973). Another specimen was collected just outside of the 200-nmi EEZ east of Hawai'i Island (Niass & Ozawa 2000). *Lampadena* larvae from Johnston Atoll were not identified to species, except those of *L. urophaos* (see Boehlert *et al.*, 1992).

**GENERAL RANGE:** Rare in the tropical and subtropical Gulf of Mexico, Atlantic, Indian, and Pacific oceans. Meso- and bathypelagic at 170–>1000 m at night, 500–2000 m during day (Clarke, 1973; Wisner, 1976; Nafpaktitis *et al.*, 1977; Becker, 1983; Hulley *in* Smith & Heemstra, 1986; Hulley *in* Quéro *et al.*, 1990; Niass & Ozawa, 2000).

### *Lampadena luminosa* (Garman)

*Myctophum luminosum* Garman, 1899, p. 263, Pl. 55 (fig. 2), Galapagos Islands at 0°57'30"N, 89°03'30"W.

*Lampadena nitida* Täning, 1928: Borets & Sokolovsky (1978).

*Lampadena luminosa* (Garman, 1899): Clarke (1973), Wisner (1976), Nafpaktitis *et al.* (1977), Loeb (1979), Paxton (1979), Tinker (1982), Becker (1983), Paxton *et al.* (1989), Boehlert & Mundy (1992), Parin *et al.* (1995).

**TAXONOMY:** Paxton (1979), Becker (1983).

**HAWAIIAN RECORDS:** O'ahu to the Hancock Seamounts at 95–140 m at night, 525–725 m during day (Clarke, 1973; Boehlert & Mundy, 1992).

**GENERAL RANGE:** Circumglobal in the tropical through temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans. In the Pacific from the Kuril Islands, southern Japan, the Philippines, and Australia

to the Hawaiian Islands, Fiji, and the equator to ca. 90°W. Absent near the American continents. Mesopelagic at 20–300 m at night, 425–850 m during day (Clarke, 1973; Wisner, 1976; Nafpaktitis *et al.*, 1977; Becker, 1983; Paxton *et al.*, 1989; Parin *et al.*, 1995).

***Lampadena urophaos urophaos* Paxton**

*Lampadena urophaos* Paxton, 1963, p. 29, Figs. 1–2, 5.7 mi. north of Ship Rock, Santa Catalina Island, southern California at 33°32'N, 118°25'W.

*Lampadena urophaos* Paxton, 1963: Clarke (1973), Struhsaker (1973a), Wisner (1976), Nafpaktitis *et al.* (1977), Loeb (1979), Paxton (1979), Tinker (1982), Becker (1983), Paxton *et al.* (1989), Reid *et al.* (1991), Boehlert *et al.* (1992), Boehlert & Mundy (1992), Parin *et al.* (1995).

TAXONOMY: Nafpaktitis *et al.* (1977), Paxton (1979).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to the Hancock Seamounts at 95–183 m at night, 620–775 m during day (Clarke, 1973; Struhsaker, 1973a; Reid *et al.*, 1991; Boehlert *et al.*, 1992; Boehlert & Mundy, 1992).

GENERAL RANGE: North Atlantic (*L. urophaos atlantica* Maul, 1969) and North Pacific (*L. u. urophaos* Paxton, 1963) oceans. In the Pacific from Taiwan to the Kuril Islands, Australia, the Hawaiian Islands, along the equator, North America from Washington to Baja California, and off Colombia. Mesopelagic at 50–600 m at night, 500–1000 m during day (Clarke, 1973; Wisner, 1976; Nafpaktitis *et al.*, 1977; Becker, 1983; Paxton *et al.*, 1989; Parin *et al.*, 1995).

[*Lampanyctus acanthurus* Wisner]

*Lampanyctus acanthurus* Wisner, 1974, p. 17, Fig. 8, North Pacific north of Hawai'i Island at 27°25'N, 155°32'W.

*Lampanyctus acanthurus* Wisner, 1974: Wisner (1976), Loeb (1979), Becker (1983), Paxton (1979), Parin *et al.* (1995).

TAXONOMY: Paxton (1979), Becker (1983).

HAWAIIAN RECORDS: Wisner (1976) reported records of this species north of the Hawaiian Islands at 27–31°N, 155°W. Loeb (1979) reported larvae of this species collected at 28°N, 155°W. It is likely that the species occurs at the Hancock Seamounts.

GENERAL RANGE: North Pacific Transition Zone endemic from the Kuril Islands to the Hawaiian Islands to California. Mesopelagic at ≤800 m at night (Wisner, 1976; Parin *et al.*, 1995).

[*Lampanyctus alatus* Goode & Bean]

*Lampanyctus alatus* Goode & Bean, 1896, p. 79, Pl. 24 (fig. 92), Gulf of Mexico off Florida at 28°43'N, 87°14'30"W.

*Lampanyctus punctatissimus* Gilbert, 1913: Borets & Sokolovsky (1978).

*Lampanyctus alatus* Goode & Bean, 1896: Nafpaktitis *et al.* (1977), Borets & Sokolovsky (1978), Loeb (1979), Paxton (1979), Novikov *et al.* (1981), Becker (1983).

TAXONOMY: Paxton (1979).

HAWAIIAN RECORDS: Milwaukee Seamount to Koko Seamount (Novikov *et al.*, 1981). Loeb (1979) reported larvae from 28°N, 155°W; these records suggest that *L. alatus* occurs at the Hancock Seamounts.

GENERAL RANGE: Tropical through cold-temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans except the Pacific east of 175°E (perhaps to 155°W in the central North Pacific). Mesopelagic at 40–300 m at night, 275–1000 m during day (Nafpaktitis *et al.*, 1977; Loeb, 1979; Becker, 1983).

[*Lampanyctus festivus* Tåning]

*Lampanyctus festivus* Tåning, 1928, p. 67, North Atlantic at 35°44'N, 29°33'W.

*Lampanyctus bensoni* (Fowler, 1934): Borets & Sokolovsky (1978)?

?*Lampanyctus festivus* Tåning, 1928: Novikov *et al.* (1981)?

*Lampanyctus festivus* Tåning, 1928: Borets & Sokolovsky (1978), Becker (1983), Hulley in Smith & Heemstra (1986), Hulley in Quéro *et al.* (1990).

TAXONOMY: Becker (1983). See *L. steinbecki*.

HAWAIIAN RECORDS: None but recorded from Koko Seamount (Novikov *et al.*, 1981).

GENERAL RANGE: Probably circumglobal, perhaps antiequatorial, through the tropical through temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans except the eastern tropical Pacific. Distribution

uncertain because of confusion with *L. steinbecki* and *L. tenuiformis*. Mesopelagic at 40–350 m at night, 475–1000 m during day (Becker, 1983; Hulley in Smith & Heemstra, 1986; Hulley in Quéro *et al.*, 1990).

***Lampanyctus jordani* Gilbert**

*Lampanyctus jordani* Gilbert, 1913, p. 104, Pl. 14, off Nemuro, Hokkaido, Japan.

*Lampanyctus jordani* Gilbert, 1913: Wisner (1976), Borets & Sokolovsky (1978), Paxton (1979), Novikov *et al.* (1981), Becker (1983).

TAXONOMY: Paxton (1979), Becker (1983).

HAWAIIAN RECORDS: The Hancock Seamounts at unrecorded depths (C. Wilson, unpubl. data).

GENERAL RANGE: North Pacific subarctic, transition zone, and California Current endemic. Mesopelagic at 0–200 m at night, 200–1000 m during day (Wisner, 1976; Becker, 1983).

***Lampanyctus macropterus* (Brauer)**

*Myctophum (Lampanyctus) macropteron* Brauer, 1904, p. 397, Fig. 5, ten localities in the Indian Ocean.

*Lampanyctus macropterus* (Brauer, 1904): Wisner (1976), Borets & Sokolovsky (1978), Paxton (1979), Becker (1983).

TAXONOMY: Paxton (1979). The Hawaiian specimens may represent a species complex, rather than a single form (Wisner, 1976). Becker (1983) listed this species as an Indian Ocean endemic, absent from the Pacific Ocean. *Lampanyctus nobilis* is similar (Wisner, 1976) and Pacific records of *L. macropterus* may refer to that species.

HAWAIIAN RECORDS: Unspecified localities near the Hawaiian Islands at 40 m at night (Wisner, 1976).

GENERAL RANGE: Indian Ocean from east Africa to western Australia and Java. Questionably from the central North Pacific. Mesopelagic at  $\leq 40$  m (Wisner, 1976; Becker, 1983).

***Lampanyctus nobilis* Tåning**

*Lampanyctus nobilis* Tåning, 1928, p. 66, North Atlantic at 17°41'N, 60°58'W.

*Lampanyctus nobilis*: Clarke (1973), Amesbury (1975), Wisner (1976), Nafpaktitis *et al.* (1977), Loeb (1979), Paxton (1979), Tinker (1982), Becker (1983), Hulley in Smith & Heemstra (1986).

TAXONOMY: Paxton (1979), Becker (1983).

HAWAIIAN RECORDS: O'ahu at 40–140 m at night, 590–1250 m during day (Clarke, 1973; Amesbury, 1975).

GENERAL RANGE: Tropical and subtropical Gulf of Mexico, central and western North Atlantic, Indian, and Pacific oceans except the eastern Pacific. Mesopelagic at 40–500 m at night, 475–1250 m during day (Wisner, 1976; Nafpaktitis *et al.*, 1977; Becker, 1983; Hulley in Smith & Heemstra, 1986).

[*Lampanyctus parvicauda* Parr]

*Lampanyctus omostigma parvicauda* Parr, 1931, p. 26, Fig. 9, Pacific Coast of Mexico at 16°14'00"N, 99°36'30"W.

*Lampanyctus parvicauda* Parr, 1931: Wisner (1976), Becker (1983).

TAXONOMY: Becker (1983).

HAWAIIAN RECORDS: None but Becker (1983) indicated the main Hawaiian Islands as within the range of *L. parvicauda*. Wisner (1976) gave 15°N, 152°W as the most northwestern record. The Hawaiian records need verification.

GENERAL RANGE: Eastern tropical Pacific endemic from Baja California to Chile, the Hawaiian Islands, and west to ca. 10°N, 170°W. Epi- and mesopelagic from the surface to unknown depths (Wisner, 1976; Becker, 1983).

[*Lampanyctus reinhardti* (Jordan)]

*Nyctimaster reinhardti* Jordan, 1921a, p. 645, Fig. 2, off lava flow from Mauna Loa volcano near Alikea, Hawai'i Island.

*Nyctimaster reinhardti* Jordan, 1921a: Jordan (1921a).

*Lampanyctus omostigma* non Gilbert, 1908 [in part?]: Fowler (1928)?

*Lampanyctus reinhardti* (Jordan, 1921a) [an unidentifiable species]: Gosline & Brock (1960), Paxton (1979), Becker (1983).

TAXONOMY: Gosline & Brock (1960), Paxton (1979), and Becker (1983) listed this species but questioned its validity. The identity of this form is unknown.

HAWAIIAN RECORDS: Hawai'i Island, floating on the surface near a lava flow (Jordan, 1921a).

GENERAL RANGE: Known only from the type series. General range cannot be determined unless the identity of this species is resolved (Paxton, 1979; Becker, 1983).

[*Lampanyctus simulator* Wisner]

*Lampanyctus simulator* Wisner, 1971, p. 51, Fig. 7, eastern Pacific at 41°01'N, 155°00'W.

*Lampanyctus simulator* Wisner, 1971: Wisner (1976), Paxton (1979), Becker (1983).

TAXONOMY: Paxton (1979), Becker (1983).

HAWAIIAN RECORDS: Records of this species from areas to the northeast of the Hancock Seamounts ("... between 30°–35°N, 140°–180°W"; Wisner, 1976) indicate that it could occur at Hancock.

GENERAL RANGE: North Pacific transition zone endemic. Mesopelagic at ≤200 m at night (Wisner, 1976; Becker, 1983).

*Lampanyctus steinbecki* Bolin

*Lampanyctus steinbecki* Bolin, 1939, p. 140, Fig. 23, off Lone Point, Santa Catalina Island, California.

*Lampanyctus festivus* non Tåning, 1928: Borets & Sokolovsky (1978) in part?

*Lampanyctus bensoni* non (Fowler, 1934): Borets & Sokolovsky (1978) in part?

?*Lampanyctus festivus* non Tåning, 1928: Novikov *et al.* (1981) in part?

*Lampanyctus steinbecki* Bolin, 1939: Clarke (1973), Wisner (1976), Nafpaktitis *et al.* (1977), Borets & Sokolovsky (1978), Loeb (1979), Paxton (1979), Tinker (1982), Becker (1983), Boehlert & Mundy (1992).

TAXONOMY: Paxton (1979). Wisner (1976) commented that three to four species were probably present in the northeastern Pacific material that he identified as *L. steinbecki* Bolin, 1939, and *L. tenuiformis* (Brauer, 1906). Specimens identified as ?*L. festivus* Tåning, 1928, by Novikov *et al.* (1981) and *L. festivus* and *L. bensoni* (Fowler, 1934a) by Borets & Sokolovsky (1978) may have been either *L. steinbecki*, *L. festivus*, or *L. tenuiformis*, as all three are similar (Wisner, 1976; Nafpaktitis *et al.*, 1977). Eschmeyer (1998) noted that the status of *L. bensoni* also remains unresolved. Becker (1983) indicated that *L. steinbecki* and *L. festivus* occur in the central North Pacific but showed the range of *L. tenuiformis* in the Pacific as restricted to equatorial waters and the Southern Hemisphere. The identification and biogeography of *L. steinbecki*, *L. festivus*, and *L. tenuiformis* in the Pacific need clarification.

HAWAIIAN RECORDS: O'ahu to Koko Seamount at 80–275 m at night, 675–1000 m during day (Clarke, 1973; Novikov *et al.*, 1981; Boehlert & Mundy, 1992).

GENERAL RANGE: Tropical through temperate Indo-Pacific from east Africa to the Philippines, the Hawaiian Islands, southern California, and 15°S, 93°W but absent from the eastern tropical and eastern South Pacific. Mesopelagic at 80–300 m at night, 675–1000 m during day (Clarke, 1973; Wisner, 1976).

*Lampanyctus tenuiformis* (Brauer)

*Myctophum* (*Lampanyctus*) *tenuiforme* Brauer, 1906, p. 243, Fig. 160, between the Seychelles and Zanzibar, Indian Ocean, at 4°34'08"S, 53°42'08"E.

*Lampanyctus tenuiformis* (Brauer, 1906): Clarke (1973)?, Amesbury (1975)?, Wisner (1976), Nafpaktitis *et al.* (1977), Paxton (1979), Tinker (1982)?, Becker (1983).

TAXONOMY: Paxton (1979). Wisner (1976) stated that Hawaiian specimens did not strictly conform to the description of *L. tenuiformis* (Brauer, 1906) and could have been comprised of two species, one of which might have been *L. festivus* Tåning, 1928. Nafpaktitis *et al.* (1977) also only tentatively agreed that Hawaiian specimens (from Clarke, 1973) were *L. tenuiformis*. Wisner (1976) elected to use the name *L. tenuiformis* for these specimens because it was the oldest available name. Becker (1983) did not include the central North Pacific within the range of *L. tenuiformis*. See *L. steinbecki*.

HAWAIIAN RECORDS: O'ahu at 250–300 m at night, 640–800 m during day (Clarke, 1973; Amesbury, 1975).

GENERAL RANGE: Circumglobal and primarily equatorial in the tropical and subtropical Gulf of Mexico, North Atlantic, Indian, and Pacific oceans except for the eastern Pacific. Mesopelagic at 40–325 m at night, 300–800 m during day (Clarke, 1973; Wisner, 1976; Nafpaktitis *et al.*, 1977; Becker, 1983).

*[Lampanyctus sp.]*

HAWAIIAN RECORDS: The *Lampanyctus* species were not identified from Hawai'i Island at 823–869 m (Struhsaker, 1973a), from larval collections at Johnston Atoll (Boehlert *et al.*, 1992), and from larval collections at the Hancock Seamounts (Boehlert & Mundy, 1992).

*Lobianchia gemellarii* (Cocco)

*Nyctophus gemellarii* Cocco, 1838, p. 186, pl. 7 (fig. 9), off Messina, Italy.

*Lobianchia gemellarii* (Cocco, 1838): Clarke (1973), Amesbury (1975), Wisner (1976), Nafpaktitis *et al.* (1977), Loeb (1979), Paxton (1979), Novikov *et al.* (1981), Tinker (1982), Becker (1983), Hulley in Smith & Heemstra (1986), Reid *et al.* (1991), Boehlert & Mundy (1992).

TAXONOMY: Paxton (1979), Becker (1983).

HAWAIIAN RECORDS: Hawai'i Island to Koko Seamount at 25–360 m at night, 400–560 m during day (Clarke, 1973; Amesbury, 1975; Wisner, 1976; Novikov *et al.*, 1981; Reid *et al.*, 1991; Boehlert & Mundy, 1992). *Lobianchia* larvae from Johnston Atoll were not identified to species (Boehlert *et al.*, 1992) but were probably *L. gemellarii*.

GENERAL RANGE: Circumglobal in the tropical through temperate Gulf of Mexico, Mediterranean, Atlantic, Indian and Pacific oceans except absent in most of the equatorial Pacific and near South America. Mesopelagic at 25–350 m at night, 300–800 m during day (Nafpaktitis *et al.*, 1977; Becker, 1983; Hulley in Smith & Heemstra, 1986).

*Loweina rara* (Lütken)

*Scopelus (Rhinoscopelus) rarus* Lütken, 1892b, p. 246, Fig. 4, North Atlantic at 20°00'N, 49°00'W.

*Loweina laurae* Wisner, 1971: Clarke (1973), Wisner (1976), Tinker (1982), Becker (1983).

*Loweina* sp.: Loeb (1979).

*Loweina rara* (Lütken, 1892b): Moser & Ahlstrom (1970), Wisner (1976), Nafpaktitis *et al.* (1977), Paxton (1979), Becker (1983), Boehlert & Mundy (1992).

TAXONOMY: According to Wisner (1976) *L. rara* (Lütken, 1892) is replaced in the Pacific by *L. laurae* Wisner, 1971, but Paxton (1979) synonymized the two species. Becker (1983) listed both species but questioned the validity of *L. laurae*.

HAWAIIAN RECORDS: O'ahu to the Hancock Seamounts at 250? m at night, 690? m during day (Clarke, 1973; Boehlert & Mundy, 1992).

GENERAL RANGE: Circumglobal in the tropical through temperate Atlantic, Indian, and Pacific oceans. Neustonic to mesopelagic at >1–350 m at night, 550–1050 m during day (Clarke, 1973; Wisner, 1976; Nafpaktitis *et al.*, 1977; Becker, 1983).

*Loweina terminata* Becker

*Loweina terminata* Becker, 1964, p. 18, Fig. 2, North Pacific at 37°59'N, 172°56'E.

*Loweina terminata* Becker, 1964: Clarke (1973), Wisner (1976), Paxton (1979), Becker (1983).

TAXONOMY: Paxton (1979), Becker (1983).

HAWAIIAN RECORDS: O'ahu to the Hancock Seamounts (?) at 825 m during day (Clarke, 1973; Becker, 1983).

GENERAL RANGE: North Pacific transition zone (and central gyre?) endemic. Neustonic to mesopelagic; at the surface at night and to 825 m during day (Clarke, 1973; Wisner, 1976; Becker, 1983).

*Myctophum asperum* Richardson

*Myctophum asperum* Richardson, 1845a, p. 41, Pl. 27 (figs. 13–15), no type locality given.

*Dasyscopelus asper* (Richardson, 1845a) [*lapsus* for *asperum*]: Fowler (1928, in part).

*Myctophum asper* Richardson, 1845a [*lapsus* for *asperum*]: Fowler (1934).

*Myctophum asperum* Richardson, 1845a: Kawaguchi & Aioi (1972), Kawaguchi *et al.* (1972), Wisner (1976), Nafpaktitis *et al.* (1977), Borets & Sokolovsky (1978)?, Novikov *et al.* (1981)?, Becker (1983), Boehlert *et al.* (1992).

TAXONOMY: Becker (1983). Wisner (1976) distinguished two forms in his Pacific specimens of *M. asperum* but no other mention of this has been found in the literature.

HAWAIIAN RECORDS: Johnston Atoll (Boehlert *et al.*, 1992); no verified reports from the Hawaiian Islands. A record from Koko Seamount (Novikov *et al.*, 1981) needs confirmation (see range given in Kawaguchi *et al.*, 1972; Becker, 1983).

GENERAL RANGE: Circumtropical and warm-temperate in the Gulf of Mexico, Atlantic, Indian and Pacific oceans except the eastern Pacific near the American continents. Neustonic to mesopelagic at 1–125 m at night, 425–750 m during day (Kawaguchi *et al.*, 1972; Wisner, 1976; Nafpaktitis *et al.*, 1977; Becker, 1983).

***Myctophum aurolaternatum* Garman**

*Myctophum aurolaternatum* Garman, 1899, p. 264, Pl. 55 (fig. 3), off Malpelo-Culpepper Island, eastern Pacific, at 6°21'N, 80°41'W.

*Myctophum aurolaternatum* Garman, 1899: Fowler (1934), Kawaguchi & Aioi (1972), Wisner (1976), Borets & Sokolovsky (1978), Paxton (1979), Becker (1983), Hulley *in* Smith & Heemstra (1986), Boehlert *et al.* (1992).

TAXONOMY: Paxton (1979), Becker (1983).

HAWAIIAN RECORDS: Johnston Atoll and north of Kaua'i (Kawaguchi *et al.*, 1972; Boehlert *et al.*, 1992).

GENERAL RANGE: Tropical and subtropical Indo-Pacific from east Africa to Indonesia, southern Japan, northern Australia, and east to the Gulf of California and Peru. Neustonic to mesopelagic at 1–300 m at night (Kawaguchi *et al.*, 1972; Wisner, 1976; Becker, 1983; Hulley *in* Smith & Heemstra, 1986).

***Myctophum brachygnathum* (Bleeker)**

*Scopelus brachygnathos* Bleeker, 1856b, p. 65, off Manado, Sulawesi, Indonesia.

*Dasy Scopelus pristilepis* Gilbert & Cramer, 1897: Gilbert & Cramer (1897), Gilbert (1905).

*Dasy Scopelus asper* non (Richardson, 1845): Fowler (1924, in part).

*Myctophum pristilepis* (Gilbert & Cramer, 1897): Fowler (1934, 1949).

*Myctophum brachygnathos* (Bleeker, 1856b): Gosline & Brock (1960), Reid *et al.* (1991).

*Myctophum brachygnathum* (Bleeker, 1856b): Wisner (1976), Loeb (1979), Paxton (1979), Tinker (1982), Becker (1983), Paxton *et al.* (1989).

TAXONOMY: Wisner (1976), Paxton (1979), Becker (1983).

HAWAIIAN RECORDS: Maui to Laysan at 1–856 m (Gilbert & Cramer, 1897; Gilbert, 1905; Reid *et al.*, 1991).

GENERAL RANGE: Tropical and subtropical Indo-Pacific from east Africa to the Ryukyus, Australia, and east of the Hawaiian Islands but absent from the eastern Pacific. Neustonic, benthic, and mesopelagic between 1 m at night and 856 m during day (Gilbert, 1905; Becker, 1983; Paxton *et al.*, 1989; Reid *et al.*, 1991).

***Myctophum lychnobium* Bolin**

*Myctophum lychnobium* Bolin, 1946, p. 137, Fig. 1, about 200 mi. off Cape Comorin, India, at 5°56'N, 76°22'E.

*Myctophum spinosum* non (Steindachner, 1867) [a valid species also found in the Hawaiian Islands]: Kawaguchi & Aioi (1972, in part), Kawaguchi *et al.* (1972, in part), Nafpaktitis *et al.* (1977, in part).

?*Myctophum lychnobium* Bolin, 1946: Paxton (1979).

*Myctophum lychnobium* Bolin, 1946: Wisner (1976), Loeb (1979), Becker (1983).

TAXONOMY: *Myctophum lychnobium* Bolin, 1946, has frequently been confused with *M. spinosum* (Steindachner, 1867) (see Kawaguchi & Aioi, 1972; Kawaguchi *et al.*, 1972; Nafpaktitis *et al.*, 1977; Paxton, 1979) but both are valid and occur in the central Pacific, as evidenced by distinct types of larvae. *Myctophum lychnobium* appears to occur more frequently in subtropical regions and *M. spinosum* is more equatorial in distribution (Becker, 1983).

HAWAIIAN RECORDS: Southwest of Hawai'i Island to the Hancock Seamounts (Wisner, 1976; Becker, 1983).

GENERAL RANGE: Indo-Pacific from east Africa to southern Japan, Australia, the Hawaiian Islands, the Marquesas, and the eastern equatorial Pacific, but absent near the American continents. Neustonic to mesopelagic at 1 m and greater depths (Wisner, 1976; Becker, 1983).

***Myctophum nitidulum*** Garman

*Myctophum nitidulum* Garman, 1899, p. 266, Pl. 56 (fig. 3), northeast of the Hawaiian Islands at 27°50'N, 145°45'30"W.

*Myctophum margaritatum* Gilbert, 1905: Gilbert (1905).

*Rhinoscopelus oceanicus* Jordan & Evermann, 1903: Jordan & Evermann (1903a, described from outside of the Hawaiian region at 10°57'N, 137°35'W, 1905).

*Myctophum affine* non (Lütken, 1892) [a valid Atlantic species]: Fowler (1928, 1949), Gosline & Brock (1960), Borets & Sokolovsky (1978), Tinker (1982).

*Myctophum nitidulum* Garman, 1899: Moser & Ahlstrom (1970), Kawaguchi & Aioi (1972), Kawaguchi *et al.* (1972), Clarke (1973), Wisner (1976), Nafpaktitis *et al.* (1977), Loeb (1979), Paxton (1979), Novikov *et al.* (1981), Tinker (1982), Becker (1983), Humphreys *et al.* (1984), Uchida & Uchiyama (1986), Reid *et al.* (1991), Boehlert & Mundy (1992).

TAXONOMY: Wisner (1976), Paxton (1979), Becker (1983).

HAWAIIAN RECORDS: Hawai'i Island to Koko Seamount at 1–15 m at night, 258–800 m (usually 600–800 m) during day (Gilbert, 1905; Kawaguchi *et al.*, 1972; Clarke, 1973; Novikov *et al.*, 1981; Humphreys *et al.*, 1984; Uchida & Uchiyama, 1986; Reid *et al.*, 1991; Boehlert & Mundy, 1992).

GENERAL RANGE: Circumglobal in the tropical through temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans. Neustonic to mesopelagic at 1–950 m at night, 258–850 m during day (Gilbert, 1905; Clarke, 1973; Wisner, 1976; Nafpaktitis *et al.*, 1977; Becker, 1983).

***Myctophum obtusirostre*** Tåning

*Myctophum pristilepis obtusirostre* Tåning, 1928, p. 53, North Atlantic at 17°54'N, 64°54'W.

*Myctophum obtusirostrum* Tåning, 1928: Kawaguchi & Aioi (1972), Kawaguchi *et al.* (1972), Clarke (1973), Wisner (1976), Paxton (1979), Tinker (1982).

*Myctophum obtusirostre* Tåning, 1928: Nafpaktitis *et al.* (1977), Becker (1983), Paxton *et al.* (1989), Hulley in Quéro *et al.* (1990).

TAXONOMY: Nafpaktitis *et al.* (1977), Paxton (1979), Becker (1983).

HAWAIIAN RECORDS: Hawai'i Island to ca. Laysan at 1–15? m at night, 500–700 m during day (Kawaguchi *et al.*, 1972; Clarke, 1973).

GENERAL RANGE: Circumsubtropical in the Atlantic, Indian and Pacific oceans but absent in the Pacific east of ca. 85°W. Neustonic and mesopelagic at 1–125 m at night, 325–750 m during day (Nafpaktitis *et al.*, 1977; Kawaguchi *et al.*, 1972; Paxton *et al.*, 1989; Hulley in Quéro *et al.*, 1990). However, Becker (1983) shows the range of this species as restricted to the Atlantic Ocean.

***Myctophum selenops*** Tåning

*Myctophum selenops* Tåning, 1928, p. 54, North Atlantic at 23°13'N, 82°21'W.

*Myctophum selenoides* Wisner, 1971: Wisner (1971), Clarke (1973), Wisner (1976), Tinker (1982).

?*Myctophum selenoides* Wisner, 1971: Paxton (1979).

*Myctophum selenops* Tåning, 1928: Nafpaktitis *et al.* (1977), Loeb (1979), Paxton (1979), Becker (1983), Boehlert & Mundy (1992).

TAXONOMY: Nafpaktitis *et al.* (1977), Paxton (1979), Becker (1983).

HAWAIIAN RECORDS: Hawai'i Island to the Hancock Seamounts at 25–150 m at night, 300–500 m during day (Wisner, 1971; Clarke, 1973; Boehlert & Mundy, 1992).

GENERAL RANGE: Circumglobal in the tropical through temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans except the eastern Pacific. Epi- and mesopelagic at 20–225 m at night, 225–500 m during day (Clarke, 1973; Wisner, 1976; Nafpaktitis *et al.*, 1977; Becker, 1983).

***Myctophum spinosum*** (Steindachner)

*Scopelus spinosus* Steindachner, 1867, p. 119, "China".

*Dasy Scopelus spinosus* (Steindachner, 1867): Gilbert (1905), Fowler (1928).

*Myctophum spinosus* (Steindachner, 1867): Fowler (1934).

*Myctophum spinosum* (Steindachner, 1867): Fowler (1949, in part), Gosline & Brock (1960, in part), Kawaguchi & Aioi (1972, in part), Kawaguchi *et al.* (1972, in part), Clarke (1973), Wisner (1976), Tinker (1982, in part), Becker (1983), Paxton *et al.* (1989), Reid *et al.* (1991).

TAXONOMY: Becker (1983). See *M. lychnobium*.

HAWAIIAN RECORDS: Hawai'i Island to Laysan at 1–15? m at night, 600?–790 m during day (Gilbert, 1905; Kawaguchi *et al.*, 1972; Clarke, 1973; Reid *et al.*, 1991). Many records may refer to *M. lychnobium*.

GENERAL RANGE: Tropical and subtropical Indo-Pacific, except for the eastern Pacific, from South Africa to the Ryukyus, eastern Australia, the Hawaiian Islands, and the Marquesas, with expatriates advected into the eastern South Atlantic. Neustonic to mesopelagic at 1–15? m at night, 600?–790 m during day (Gilbert, 1905; Clarke, 1973; Wisner, 1976; Becker, 1983; Paxton *et al.*, 1989).

[*Myctophum* sp.]

*Myctophum punctatum* non Rafinesque, 1810 [a valid species not found in the Hawaiian Islands]: Borets & Sokolovsky (1978).

*Myctophum orientale* non (Gilbert, 1913) [a valid western Pacific species not found in the Hawaiian Islands except perhaps in the southern Emperor Seamounts]: Borets & Sokolovsky (1978).

Unidentified *Myctophum* species: Boehlert *et al.* (1992).

HAWAIIAN RECORDS: Borets & Sokolovsky (1978) listed *M. punctatum* and *M. orientale* from unspecified localities in the Emperor Seamounts and Hawaiian Ridge. These species are otherwise unrecorded from the region (Wisner, 1976; Nafpaktitis *et al.*, 1977; Becker, 1983) and the records are probably based on other species. *Myctophum* larvae from Johnston Atoll were not identified to species except for those of *M. asperum* and *M. aurolaternatum* (Boehlert *et al.*, 1992).

***Nannobranchium bristori* Zahuranec**

*Nannobranchium bristori* Zahuranec, 2000, p. 30, Fig. 14, central North Pacific to the north of Hawai'i Island at 27°26.6'N, 155°24.6'W.

*Nannobranchium nigrum* non Günther, 1887 [in part]: Gilbert (1905)?

*Lampanyctus niger* non (Günther, 1887) [form C]: Clarke (1973), Amesbury (1975).

*Lampanyctus niger* non (Günther, 1887) [in part?]: Fowler (1928), Gosline & Brock (1960), Borets & Sokolovsky (1978), Novikov *et al.* (1981), Tinker (1982).

*Nannobranchium bristori* Zahuranec, 2000: Zahuranec (1979, 2000).

TAXONOMY: Zahuranec (2000), who also presented evidence that *Nannobranchium* should be recognized as a genus distinct from *Lampanyctus*. See *N. nigrum* for the history of the identification of *N. nigrum*, *N. bristori*, and *N. hawaiiensis* in Hawaiian waters.

HAWAIIAN RECORDS: Hawai'i Island to Midway and the Hancock Seamounts at 700–850 m (Clarke, 1973; Amesbury, 1975; Zahuranec, 1979, 2000).

GENERAL RANGE: North Pacific endemic known from east of Japan at ca. 152°E and the Marianas at ca. 158°E to southern California and Baja California between ca. 10°–40°N. Mesopelagic at 100–1000 m at night, 640–900 m during day (Clarke, 1973; Wisner, 1976; Zahuranec, 1979, 2000).

COMMENTS: The *Lampanyctus* “big snout” of Loeb (1979) was not included in the synonymies of Zahuranec (2000). The larval morphology of *N. bristori*, the indication by Loeb (1979) that she was aware of Zahuranec's (1979) undescribed species, and her use of the name *Lampanyctus* “lacks pectorals” for *N. hawaiiensis* makes it likely that *Lampanyctus* “big snout” was *N. bristori*.

***Nannobranchium hawaiiensis* Zahuranec**

*Nannobranchium hawaiiensis* Zahuranec, 2000, p. 40, Fig. 21, central North Pacific Ocean north of Hawai'i Island at 27°24.5'N, 155°25.5'W to 27°24.9'N, 155°13.7'W.

*Lampanyctus niger* non (Günther, 1887) [form A]: Clarke (1973), Amesbury (1975).

*Lampanyctus achirus* non Andriashev, 1962 or *Lampanyctus achirus*-like “northern Pacific” form: Wisner (1976).

*Lampanyctus* “lacks pectorals”: Loeb (1979)?

*Nannobranchium hawaiiensis* Zahuranec, 2000: Zahuranec (1979, 2000).

TAXONOMY: Zahuranec (2000). See *L. niger*.

HAWAIIAN RECORDS: Hawai'i Island to the Hancock Seamounts at 675–750 m (Clarke, 1973; Amesbury, 1975; Zahuranec, 1979, 2000).

GENERAL RANGE: North Pacific endemic, found from the Philippines and Japan to the Hawaiian Islands, east of the Line Islands, and southern California. Mesopelagic at 300–850 m (Clarke, 1973; Amesbury, 1975; Wisner, 1976; Zahuranec, 1979, 2000).



*Nannobranchium lineatum* (Tåning)

- Lampanyctus lineatus* Tåning, 1928, p. 68, Caribbean Sea of St. Croix, Virgin Islands, at 17°54'N, 64°54'W.  
*Lampanyctus lineatus* Tåning, 1928: Nafpaktitis *et al.* (1977), Paxton (1979), Hulley in Quéro *et al.* (1990),  
 Olivar & Beckley (1997).  
*Nannobranchium lineatus* (Tåning, 1928): Zahuranec (1979).  
*Nannobranchium lineatum* (Tåning, 1928): Zahuranec (2000).

TAXONOMY: Paxton (1979). Zahuranec (1979) stated that at least two species were represented in Pacific Ocean material that he identified as *N. lineatus* but later treated these as belonging to a single species (Zahuranec, 2000).

HAWAIIAN RECORDS: Larvae of this species were among the unidentified myctophid larvae reported from O'ahu and the Hancock Seamounts by Boehlert & Mundy (1992, 1996) as indicated by the larvae tentatively identified and described as *N. lineatum* by Olivar & Beckley (1997). Specimens recorded from 31°45'N, 152°12'W and 2°N, 148°W (Zahuranec, 1979, 2000) indicate that *N. lineatum* occurs throughout the archipelago.

GENERAL RANGE: Circumglobal in the tropical through temperate Gulf of Mexico, North Atlantic, Indian, and Pacific oceans except perhaps the eastern Pacific near the Americas. Rare in all areas. Mesopelagic at 60–1000 m at night, 650–1150 m during day (Nafpaktitis *et al.*, 1977; Zahuranec, 1979, 2000; Hulley in Quéro *et al.*, 1990).

*Nannobranchium nigrum* Günther

- Nannobranchium nigrum* Günther, 1887, p. 199, Pl. 52 (fig. B), south of the Philippines at 4°33'N, 127°06'E.  
*Lampanyctus niger* (Günther, 1887) [form B]: Clarke (1973), Amesbury (1975).  
*Lampanyctus niger* (Günther, 1887) [larger form]: Wisner (1976).  
*Lampanyctus niger* (Günther, 1887) [smaller form]: Wisner (1976).  
*Lampanyctus niger* (Günther, 1887): Fowler (1928), Gosline & Brock (1960), Nafpaktitis *et al.* (1977), Borets & Sokolovsky (1978), Loeb (1979), Paxton (1979), Novikov *et al.* (1981), Tinker (1982) [all in part?].  
*Nannobranchium nigrum* Günther, 1887: Gilbert (1905, in part), Zahuranec (1979, 2000).

TAXONOMY: *Nannobranchium nigrum* Günther, 1887, has one of the most complicated taxonomic histories of any of Hawaii's fishes. Wisner (1976) stated that "... two forms may occur near Hawai'i ...", and that *N. atrum* (Tåning, 1928), an Atlantic and Southern Ocean species, is part of this species complex. Paxton (1979) recognized both *N. atrum* and *N. nigrum* as valid species. Wisner (1976), in his fig. 166, recognized the larger form as *N. nigrum* and the smaller as an undescribed species. Clarke (1973) identified three forms in a *N. nigrum* complex from Hawaiian waters. Nafpaktitis *et al.* (1977) stated that one of Clarke's (1973) *N. nigrum* forms was related to *N. atrum*. Zahuranec (2000) recognized Clarke's (1973) *Lampanyctus niger* "form B" as the true *N. nigrum* and concluded that the two forms mentioned by Wisner (1976) were conspecific. Zahuranec (2000) described Clarke's *L. niger* "form C" as *Nannobranchium bristori* Zahuranec, 2000, and Clarke's *L. niger* "form A" as *N. hawaiiensis* Zahuranec, 2000. He also recognized *N. atrum* as a valid species with an Atlantic, Indian, and South Pacific Ocean distribution. *Nannobranchium atrum* does not occur in Hawaiian waters.

HAWAIIAN RECORDS: The true *Nannobranchium nigrum* is known from Hawai'i Island to O'ahu at 650–750 m (Clarke, 1973; Amesbury, 1975; Zahuranec, 1979, 2000). Other records in which the species discussed above were not differentiated are from Maui to Koko Seamount at 100–310 m at night, 640–900 m during day (Gilbert, 1905; Clarke, 1973; Novikov *et al.*, 1981).

GENERAL RANGE: Pacific and eastern Indian Ocean endemic, occurring from Indonesia and Vietnam to southern Japan, New Caledonia, the Hawaiian Islands, the Tuamotu Archipelago, and 127°W at the equator. Mesopelagic at 100–1000 m at night, 640–900 m during day (Clarke, 1973; Wisner, 1976; Zahuranec, 1979, 2000).

[*Nannobranchium regale* (Gilbert)]

- Myctophum regale* Gilbert, 1892, p. 544, Santa Barbara Channel, California.  
*Lampanyctus regalis* (Gilbert, 1891): Wisner (1976), Novikov *et al.* (1981), Becker (1983).  
*Nannobranchium regalis* (Gilbert, 1891): Zahuranec (1979, 2000).

TAXONOMY: Zahuranec (2000).

COMMON NAMES: Pinpoint lampfish (AFS).

HAWAIIAN RECORDS: None but specimens identified from Koko Seamount (Novikov *et al.*, 1981) and from 30°N, 162°W (Zahuranec, 1979) indicate that *N. regale* occurs at the Hancock Seamounts. Zahuranec (2000) accepted Novikov *et al.*'s (1980) records of *N. regale* as correct identifications.

GENERAL RANGE: North Pacific subarctic, transition zone, and California Current endemic, southward in the central North Pacific through the Emperor Seamounts to 30°N, 162°W. Mesopelagic at 20 m (Wisner, 1973; Zahuranec, 1979, 2000; Becker, 1983).

***Notolychnus valdiviae*** (Brauer)

*Myctophum valdiviae* Brauer, 1904, p. 398, Fig. 6, "Atlantic and Indian oceans".

*Notolychnus valdiviae* (Brauer, 1904): Clarke (1973), Amesbury (1975), Wisner (1976), Nafpaktitis *et al.* (1977), Borets & Sokolovsky (1978), Loeb (1979), Paxton (1979), Tinker (1982), Becker (1983), Paxton *et al.* (1989), Boehlert & Mundy (1992).

TAXONOMY: Paxton (1979), Becker (1983).

HAWAIIAN RECORDS: O'ahu to the Hancock Seamounts at 80–150 m at night, 475–640 m during day (Clarke, 1973; Amesbury, 1975; Boehlert & Mundy, 1992).

GENERAL RANGE: Circumglobal but disjunct in the tropical through cold-temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans. Absent off southwestern Africa, the Indonesian internal seas, Australia, the Pacific north of 38°N, and much of the central and South Pacific (see Becker, 1983). Mesopelagic at 25–800 m at night, 375–850 m during day (Clarke, 1973; Wisner, 1976; Nafpaktitis *et al.*, 1977; Paxton *et al.*, 1989).

***Notoscopelus caudispinosus*** (Johnson)

*Scopelus caudispinosus* Johnson, 1863, p. 42, off Madeira.

*Notoscopelus caudispinosus* (Johnson, 1863): Clarke (1973), Nafpaktitis (1975), Nafpaktitis *et al.* (1977), Tinker (1982), Paxton (1979), Becker (1983), Paxton *et al.* (1989).

TAXONOMY: Paxton (1979), Becker (1983).

HAWAIIAN RECORDS: O'ahu at 75–125 m at night, 590–680 m during day (Clarke, 1973).

GENERAL RANGE: Tropical through warm-temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans but known only from southern Japan to Australia and the Hawaiian Islands in the Pacific. Mesopelagic at 1–175 m at night, 500–1150 m during day (Clarke, 1973; Nafpaktitis *et al.*, 1977; Becker, 1983; Paxton *et al.*, 1989).

***Notoscopelus japonicus*** (Tanaka)

*Macrostoma quercinum japonicum* Tanaka, 1908b, p. 5, Pl. 1 (fig. 3), off Tokyo, Japan.

*Notoscopelus japonicus* (Tanaka, 1908b): Borets & Sokolovsky (1978), Paxton (1979), Novikov *et al.* (1981), Becker (1983).

TAXONOMY: Paxton (1979), Becker (1983).

HAWAIIAN RECORDS: The Hancock Koko seamounts (Novikov *et al.*, 1981; B. Mundy, unpubl. data).

GENERAL RANGE: North Pacific Kuroshio, subarctic, and transition zone endemic. Mesopelagic (Becker, 1983).

***Notoscopelus resplendens*** (Richardson)

*Lampanyctus resplendens* Richardson, 1845a, p. 42, Pl. 27 (figs. 16–18), no type locality given, but perhaps the Gulf of Guinea.

*Notoscopelus hoffmani* (Fowler, 1934): Borets & Sokolovsky (1978).

*Notoscopelus elongatus* non (Costa, 1844) [a valid species not found in the Hawaiian Islands]: Borets & Sokolovsky (1978)?

*Notoscopelus resplendens* (Richardson, 1845a): Nafpaktitis (1975), Wisner (1976), Nafpaktitis *et al.* (1977), Loeb (1979), Paxton (1979), Novikov *et al.* (1981), Becker (1983), Hulley in Whitehead *et al.* (1984), Boehlert & Mundy (1992).

TAXONOMY: Paxton (1979), Becker (1983).

COMMON NAMES: Patchwork lampfish (AFS).

HAWAIIAN RECORDS: The Hancock to Milwaukee Seamounts (Wisner, 1976; Novikov *et al.*, 1981; Boehlert & Mundy, 1992).

GENERAL RANGE: Circumglobal but known from disjunct localities throughout the tropical through temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans from 40°N–40°S. Meso- and bathypelagic at 1–800 m at night (epipelagic in cooler waters), 25–2000 m during day (Wisner, 1976; Nafpaktitis *et al.*, 1977; Hulley in Whitehead *et al.*, 1984).

***Protomyctophum beckeri* Wisner**

*Protomyctophum (Hierops) beckeri* Wisner, 1971, p. 39, eastern North Pacific southeast of Hawai'i Island at 17°09'N, 153°57.2'W.

*Protomyctophum* species: Boehlert *et al.* (1992)?

*Protomyctophum beckeri* Wisner, 1971: Wisner (1971), Clarke (1973), Wisner (1976), Paxton (1979), Tinker (1982), Becker (1983).

TAXONOMY: Paxton (1979), Becker (1983).

HAWAIIAN RECORDS: O'ahu at 326–400 m (Wisner, 1971; Clarke, 1973). The *Protomyctophum* larvae collected at Johnston Atoll (Boehlert *et al.*, 1992) were probably *P. beckeri*.

GENERAL RANGE: Central North Pacific endemic in region of the Hawaiian and Line Islands. Mesopelagic at 1–400 m (Clarke, 1973; Wisner, 1976).

***Symbolophorus californiensis* (Eigenmann & Eigenmann)**

*Myctophum californiense* Eigenmann & Eigenmann, 1889, p. 124, Cortez Banks off San Diego, California.

*Symbolophorus californiensis* (Eigenmann & Eigenmann, 1889): Moser & Ahlstrom (1970), Wisner (1976), Borets & Sokolovsky (1978), Paxton (1979), Novikov *et al.* (1981), Becker (1983), Boehlert & Mundy (1992), Gago (1993).

TAXONOMY: Wisner (1976) suggested that populations resembling *S. californiensis* (Eigenmann & Eigenmann, 1889) from Japan and the Emperor Seamounts might be an undescribed species but Becker (1983) and subsequent researchers have considered these populations to be conspecific with *S. californiensis* from the California Current region.

HAWAIIAN RECORDS: The Hancock Koko seamounts (Wisner, 1976; Novikov *et al.*, 1981; Boehlert & Mundy, 1992).

GENERAL RANGE: North Pacific Transition zone, Kuroshio, and California Current endemic. Neustonic to mesopelagic at 1–? m (Wisner, 1976; Becker, 1983).

***Symbolophorus evermanni* (Gilbert)**

*Myctophum evermanni* Gilbert, 1905, p. 597, Pl. 70 (fig. 2), south of O'ahu, Hawaiian Islands.

*Myctophum evermanni* Gilbert, 1905: Gilbert (1905), Fowler (1949).

Undescribed *Symbolophorus* species: Wisner (1976) in part?

*Symbolophorus evermanni* (Gilbert, 1905): Clarke (1973), Amesbury (1975), Wisner (1976), Borets & Sokolovsky (1978), Novikov *et al.* (1981), Loeb (1979), Paxton (1979), Tinker (1982), Becker (1983), Uchida & Uchiyama (1986), Paxton *et al.* (1989), Reid *et al.* (1991), Boehlert *et al.* (1992), Boehlert & Mundy (1992).

TAXONOMY: Wisner (1976) stated that *S. evermanni* (Gilbert, 1905) occurs in the central and western Pacific; a related undescribed form occurs in the eastern Pacific to the Hawaiian Islands; and a third form occurs south of Hawai'i. The holotype of *S. evermanni* was collected south of O'ahu (Gilbert, 1905), so this species clearly occurs in our region. The other two species mentioned by Wisner (1976) may be *S. rufinus* (Tåning, 1928) and *S. reversus* but this need confirmation.

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Koko Seamount at 1–125 m at night, 600–1150 m during day (Gilbert, 1905; Clarke, 1973; Amesbury, 1975; Novikov *et al.*, 1981; Uchida & Uchiyama, 1986; Reid *et al.*, 1991; Boehlert *et al.*, 1992; Boehlert & Mundy, 1992).

GENERAL RANGE: Indo-transpacific from South Africa to Japan, Australia, Baja California, and northern Chile. Neustonic to mesopelagic at 1–125 m at night, 600–1150 m during day (Gilbert, 1905; Clarke, 1973; Becker, 1983; Paxton *et al.*, 1989).

[*Symbolophorus rufinus* (Tåning)]

*Myctophum rufinum* Tåning, 1928, p. 54, North Atlantic at 15°50'N, 26°32'W.

*Symbolophorus evermanni* non (Gilbert, 1905): Wisner (1976) in part?

*Symbolophorus rufinus* (Tåning, 1928): Nafpaktitis *et al.* (1977), Paxton (1979), Becker (1983).

TAXONOMY: Becker (1983).

HAWAIIAN RECORDS: None but the Hawaiian Islands are within the range of this species given by Becker (1983). See *S. evermanni*.

GENERAL RANGE: Circumglobal in the tropical and subtropical Gulf of Mexico, Atlantic, Indian, and Pacific oceans except the eastern Pacific. Neustonic and mesopelagic at 1–900 at night, 425–850 m during day (Nafpaktitis *et al.*, 1977; Becker, 1983).

***Symbolophorus reversus* Gago & Ricord**

*Symbolophorus reversus* Gago & Ricord, 2005, p. 139, Fig. 1–2, eastern Pacific west of Callao, Peru, at 11°57.5'S, 85°00.0'W.

Undescribed *Symbolophorus* species (“reverse-concavity form”): Wisner (1976, in part).

*Symbolophorus “reversus”* [not a formal species name]: Gago (1993).

*Symbolophorus reversus* Gago & Ricord, 2005: Gago & Ricord (2005).

TAXONOMY: Gago & Ricord (2002).

HAWAIIAN RECORDS: One 68.4 mm specimen was collected near Kure Atoll (“Ocean Island”) at 28° 38.0'N, 178°01.8'W, a locality well outside of the species’ normal range. Otherwise, mentioned as strays from unspecified localities and depths near the Hawaiian Islands (Wisner, 1976; Gago, 1993; Gago & Ricord, 2002).

GENERAL RANGE: Eastern tropical Pacific endemic from the American continents between 20°N–20°S to ca. 122°W, with strays to the Hawaiian Islands and the central Pacific in the North Equatorial Current. Neustonic to mesopelagic (Wisner, 1976; Gago & Ricord, 2005).

***Taaningichthys bathyphilus* (Tåning)**

*Lampadena bathyphila* Tåning, 1928, p. 63, North Atlantic at 25°11'N, 20°57'W.

*Taaningichthys bathyphilus* (Tåning, 1928): Davy (1972), Clarke (1973), Amesbury (1975), Wisner (1976), Nafpaktitis *et al.* (1977), Loeb (1979), Paxton (1979), Tinker (1982), Becker (1983), Hulley in Smith & Heemstra (1986).

TAXONOMY: Paxton (1979), Becker (1983).

HAWAIIAN RECORDS: Southeast of Hawai’i Island to O’ahu at 590–930 (Clarke, 1973; Amesbury, 1975; Wisner, 1976).

GENERAL RANGE: Circumglobal in the tropical through temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans. Meso- and bathypelagic at 400–1550 m, not migratory (Clarke, 1973; Wisner, 1976; Nafpaktitis *et al.*, 1977; Becker, 1983; Hulley in Smith & Heemstra, 1986).

***Taaningichthys minimus* (Tåning)**

*Lampadena minima* Tåning, 1928, p. 63, North Atlantic at 15°50'N, 26°32'W.

*Taaningichthys minimus* (Tåning, 1928): Davy (1972), Clarke (1973), Amesbury (1975), Wisner (1976), Nafpaktitis *et al.* (1977), Loeb (1979), Paxton (1979), Tinker (1982), Becker (1983).

TAXONOMY: Paxton (1979), Becker (1983).

HAWAIIAN RECORDS: Hawai’i Island to the Hancock Seamounts at 150–475 m at night, 640–875 m during day (Davy, 1972; Clarke, 1973; Amesbury, 1975; Wisner, 1976). The *Taaningichthys* larvae collected at Johnston Atoll were not identified to species (Boehlert *et al.*, 1992).

GENERAL RANGE: Circumglobal in the tropical through temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans except perhaps near Central and South America. Mesopelagic at 1–600 m at night, 1–875 m during day (Clarke, 1973; Wisner, 1976; Nafpaktitis *et al.*, 1977).

***Taaningichthys paurolychnus* Davy**

*Taaningichthys paurolychnus* Davy, 1972, p. 71, Fig. 4, off Baja California, Mexico, at 31°N, 119°W.

*Taaningichthys paurolychnus* Davy, 1972: Davy (1972), Clarke (1973), Wisner (1976), Nafpaktitis *et al.* (1977), Paxton (1979), Tinker (1982), Becker (1983).

TAXONOMY: Paxton (1979), Becker (1983).

HAWAIIAN RECORDS: O’ahu at 1000–1175 m (Clarke, 1973).

GENERAL RANGE: Circumglobal but rare in the tropical and subtropical Gulf of Mexico, North Atlantic,

Indian, and Pacific oceans. In the Pacific, known from the Philippines, the Hawaiian Islands, and the eastern Pacific from California to northern Chile. Bathypelagic at 900–2000 m, not migratory (Clarke, 1973; Wisner, 1976; Nafpaktitis *et al.*, 1977; Becker, 1983).

***Triphoturus nigrescens* (Brauer)**

*Myctophum (Lampanyctus) nigrescens* Brauer, 1904, p. 403, west of the Seychelles, Indian Ocean, at 2°38'09"N, 3°24'06" S.

*Triphoturus micropterus* (Brauer, 1906): Borets & Sokolovsky (1978).

*Triphoturus nigrescens* (Brauer, 1904): Clarke (1973), Amesbury (1975), Wisner (1976), Loeb (1979), Paxton (1979), Tinker (1982), Hulley (1986), Paxton *et al.* (1989), Reid *et al.* (1991), Boehlert *et al.* (1992), Boehlert & Mundy (1992).

TAXONOMY: Paxton (1979), Hulley (1986).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to the Hancock Seamounts at 25–75 m at night, 532–790 m during day (Clarke, 1973; Amesbury, 1975; Reid *et al.*, 1991; Boehlert *et al.*, 1992; Boehlert & Mundy, 1992).

GENERAL RANGE: Indo-Pacific from east Africa to southern Japan and Australia, eastward through most of the Pacific but replaced by *T. mexicanus* (Gilbert, 1890) in the eastern tropical Pacific and near the American continents. Mesopelagic at 20–1000 m at night, 532–1000 m during day (Clarke, 1973; Becker, 1983; Hulley, 1986; Paxton *et al.*, 1989).

## Lampridiformes

### Veliferidae

***Metavelifer multiradiatus* (Regan)**

*Velifer multiradiatus* Regan, 1907, p. 633, northwest coast of Australia.

*Velifer multispinosus* Smith, 1951: Gosline & Brock (1960), Clarke (1972), Struhsaker (1973a), Iwai (1976), Tinker (1982), Humphreys *et al.* (1984), Uchida & Uchiyama (1986).

*Velifer multiradiatus* Regan, 1907: Paxton *et al.* (1989).

*Metavelifer multiradiatus* (Regan, 1907): Walters (1960), Fujii *in* Masuda *et al.* (1984), Heemstra *in* Smith & Heemstra (1986).

TAXONOMY: Olney *et al.* (1993).

HAWAIIAN RECORDS: O'ahu to Ladd Seamount at 30–110 m (Walters, 1960; Gosline & Brock, 1960; Clarke, 1972; Struhsaker, 1973a; Humphreys *et al.*, 1984; Uchida & Uchiyama, 1986).

GENERAL RANGE: Indo-Pacific from South Africa to Japan, Australia, New Zealand, and the Hawaiian Islands. Engyobenthic at 31–110 m (Fujii *in* Masuda *et al.*, 1984; Heemstra *in* Smith & Heemstra, 1986; Uchida & Uchiyama, 1986).

## Lamproidei

### Lamprididae — Opahs

***Lampris guttatus* (Brünnich)**

*Zeus guttatus* Brünnich, 1788, p. 398, Pl. A, off Elsinore, Denmark.

*Lampris regius* (Bonnaterre, 1788): Jordan & Evermann (1905), Fowler (1928, 1934), Gosline & Brock (1960), Tinker (1982).

*Lampris guttatus* (Brünnich, 1788): Parin & Kukuyev (1983), Quéro & Gayet *in* Quéro *et al.* (1990), Boehlert *et al.* (1992).

TAXONOMY: Parin & Kukuyev (1983).

COMMON NAMES: Opah (AFS), Ocean moonfish (DLNR), Moonfish.

HAWAIIAN RECORDS: Johnston Atoll and O'ahu to French Frigate (Jordan & Evermann, 1905; Boehlert *et al.*, 1992; D. Hawn, pers. comm., June 2003) The species occurs much further north in the central Pacific but there are no records as yet from the northwestern part of the 200-nmi EEZ.

GENERAL RANGE: Circumglobal in all tropical through cold-temperate seas except the Red Sea, the

Antarctic convergence, and the polar oceans. Epi- and mesopelagic at <100–400 m (Parin & Kukuyev, 1983; Quéro & Gayet in Quéro *et al.*, 1990).

### Stylephoridae — Tube-eyes or Thread-tails

#### *Stylephorus chordatus* Shaw

*Stylephorus chordatus* Shaw, 1791, p. 90, Pl. 6, between Cuba and Martinique Island, Caribbean Sea.

*Stylephorus chordatus* Shaw, 1791: Clarke & Wagner (1976), Pietsch (1978a), Loeb (1979), Novikov *et al.* (1981), Johnson & Berman in Whitehead *et al.* (1984), Pietsch in Quéro *et al.* (1990).

TAXONOMY: Pietsch (1978b), Johnson & Berman in Whitehead *et al.* (1984).

COMMON NAMES: Tube-eye (AFS; FAO), Thread-tail.

HAWAIIAN RECORDS: O'ahu at 300–600 m at night, 625–800 m during day (Clarke & Wagner, 1976).

GENERAL RANGE: Circumglobal in the tropical and subtropical Atlantic, Indian, and Pacific oceans. Mesopelagic at 300–600 m at night, 625–800 m during day (Clarke & Wagner, 1976; Johnson & Berman in Whitehead *et al.*, 1984; Pietsch in Quéro *et al.*, 1990).

### Lophotidae — Crestfishes

#### [*Eumecichthys fiski* (Günther)]

*Lophotes fiski* Günther, 1890, p. 244, Pls. 19–20, off Kalk Bay, Cape of Good Hope, South Africa.

*Eumecichthys fiski* (Günther, 1890): King & Ikehara (1956), Tinker (1982), Fujii in Masuda *et al.* (1984), Heemstra in Smith & Heemstra (1986).

TAXONOMY: Heemstra in Smith & Heemstra (1986).

COMMON NAMES: Unicornfish (AFS).

HAWAIIAN RECORDS: None. Tinker's (1982) inclusion of this species is based upon the capture of a specimen at the surface from 3°04'N, 159°W (King & Ikehara, 1956), outside of Hawaiian waters.

GENERAL RANGE: Tropical Indo-transpacific from South Africa to Japan, India, the equator south of the Hawaiian Islands, and Mexico. Epipelagic, perhaps mesopelagic (King & Ikehara, 1956; Fujii in Masuda *et al.*, 1984; Heemstra in Smith & Heemstra, 1986).

#### *Lophotus capellei* Temminck & Schlegel

*Lophotes capellei* Temminck & Schlegel, 1845, p. 132, Pl. 71 (fig. 2), "Seas of Japan".

*Lophotus capellei* Temminck & Schlegel, 1845: Fowler (1928), Gosline & Brock (1960), Borets & Sokolovsky (1978), Novikov *et al.* (1981), Fujii in Masuda *et al.* (1984), Olney (1984), Uchida & Uchiyama (1986), Paxton *et al.* (1989), Quiniou & Quéro in Quéro *et al.* (1990).

TAXONOMY: Olney (1984), Paxton *et al.* (1989), Quiniou & Quéro in Quéro *et al.* (1990).

HAWAIIAN RECORDS: Laysan to Milwaukee Seamount (Fowler, 1928; Novikov *et al.*, 1981). An unidentified lophotid was collected from the Hancock Seamounts at 256 m (Uchida & Uchiyama, 1986).

GENERAL RANGE: Perhaps circumglobal but definitely recorded from the southeastern Atlantic, both sides of Australia, Japan, and the Hawaiian Archipelago; range uncertain because of confusion in taxonomy with *L. lacepede*. Mesopelagic (Fujii in Masuda *et al.*, 1984; Paxton *et al.*, 1989; Quiniou & Quéro in Quéro *et al.*, 1990).

#### [*Lophotus lacepede* Bosc]

*Lophotus lacepede* Giorna, 1809, p. 179, pl. 2 (fig. 1), named from the description given with the vernacular name "Lophote-Lacepede" by Giorna, 1809, no type locality given [see Eschmeyer, 1998].

*Lophotus cristatus* Johnson, 1863: Tinker (1982).

*Lophotus lacepedei* Bosc, 1817: Olney (1984), Paxton *et al.* (1989), Quiniou & Quéro in Quéro *et al.* (1990).

*Lophotus lacepede* Bosc, 1817: Heemstra in Smith & Heemstra (1986).

TAXONOMY: Olney (1984), Paxton *et al.* (1989), Quiniou & Quéro in Quéro *et al.* (1990).

COMMON NAMES: Crestfish (AFS), Crested oarfish, Unicorn fish.

HAWAIIAN RECORDS: Tinker (1982) listed *L. cristatus* without comment. *Lophotus cristatus* Johnson, 1863, is a synonym of *L. lacepede* Bosc (*ex* Giorna), 1817, (see Quiniou & Quéro in Quéro *et al.*, 1990). The occurrence of this species in Hawaiian waters needs verification.

GENERAL RANGE: Mediterranean, eastern North Atlantic, and eastern Pacific off California; probably cir-

cumglobal but range uncertain because of confusion in taxonomy. Mesopelagic (Heemstra *in* Smith & Heemstra, 1986; Quiniou & Quéro *in* Quéro *et al.*, 1990).

### Radiicephalidae — Taper tails

#### [*Radiicephalus elongatus* Osório]

*Radiicephalus elongatus* Osório, 1917, p. 114, Pl. 2 (figs. 2–4) [= Pl. 30 (figs. 2–4)], off Morocco.

*Radiicephalus* sp.: Loeb (1979).

*Radiicephalus elongatus* Osório, 1917: Harrison & Palmer (1968), Heemstra & Kannemeyer (1984), Olney (1984), Aguiar & Quéro *in* Quéro *et al.* (1990).

TAXONOMY: Harrison & Palmer (1968), Olney (1984). Aguiar & Quéro *in* Quéro *et al.* (1990) included *Radiicephalus* in the Trachipteridae.

COMMON NAMES: Taper tail (FAO).

HAWAIIAN RECORDS: None but Loeb (1979) recorded *Radiicephalus* sp. from 28°N, 155°W. The genus is monotypic (Olney, 1984). Loeb's record indicates that the species can be expected in the northern Hawaiian Ridge.

GENERAL RANGE: Eastern and central Atlantic to the western, central, and eastern North Pacific oceans. Epi- and mesopelagic at 0?–200–600 m (Harrison & Palmer, 1968; Loeb, 1979; Heemstra & Kannemeyer, 1984).

### Trachipteridae — Ribbonfishes<sup>33</sup>

#### [*Desmodema lorum* Rosenblatt & Butler]

*Desmodema lorum* Rosenblatt & Butler, 1977, p. 851, Figs. 3–6, eastern North Pacific at 29°05–03'N, 126°38–42'W.

*Desmodema* sp. (prob. *lorum*): Loeb (1979)?

*Desmodema polystictum* non (Ogilby, 1898) [a valid species]: Tinker (1982) in part?

*Desmodema lorum* Rosenblatt & Butler, 1977: Rosenblatt & Butler (1977), Fujii *in* Masuda *et al.* (1984).

TAXONOMY: Rosenblatt & Butler (1977).

COMMON NAMES: Whiptail ribbonfish (AFS).

HAWAIIAN RECORDS: None but records from 27°22'N, 155°23'W and 28°10'N, 160°00'E (Rosenblatt & Butler, 1977) indicate that *D. lorum* occurs at the Hancock Seamounts.

GENERAL RANGE: North Pacific Kuroshio, transition zone, and California Current endemic. Epi- and mesopelagic at 0–500 m (Rosenblatt & Butler, 1977; Fujii *in* Masuda *et al.*, 1984).

#### *Desmodema polystictum* (Ogilby)

*Trachipterus jacksoniensis polystictus* Ogilby, 1898a, p. 649, off Newcastle, New South Wales, Australia.

*Trachipterus woodi* Smith, 1953: King & Ikehara (1956), Tinker (1982).

*Desmodema polystictum* (Ogilby, 1898a): Rosenblatt & Butler (1977), Tinker (1982), Heemstra & Kannemeyer (1984), Paxton *et al.* (1989), Aguiar & Quéro *in* Quéro *et al.* (1990).

TAXONOMY: Rosenblatt & Butler (1977), Heemstra & Kannemeyer (1984).

COMMON NAMES: Polka-dot ribbonfish (AFS).

HAWAIIAN RECORDS: The Hancock Seamounts at unrecorded depths (R. Moffitt, pers. comm., Jan. 2001). Tinker (1982) recorded *D. polystictum* based in part on a specimen collected away from the Hawaiian Islands at 4°41'N, 159°53'W (King & Ikehara, 1956; see Heemstra & Kannemeyer, 1984) and in part without locality data.

GENERAL RANGE: Circumglobal in the tropical through temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans. Epi- and mesopelagic at 0–500 m (Rosenblatt & Butler, 1977; Heemstra & Kannemeyer, 1984; Paxton *et al.*, 1989; Aguiar & Quéro *in* Quéro *et al.*, 1990).

#### [*Trachipterus fukuzakii* Fitch]

*Trachipterus fukuzakii* Fitch, 1964, p. 236, Fig. 5, Ceralbo Island, Gulf of California, Mexico.

*Trachipterus fukuzakii* Fitch, 1964: Fitch (1964), Miller *et al.* (1979)?, Olney (1984).

TAXONOMY: Olney (1984).

COMMON NAMES: Tapertail ribbonfish (AFS).

HAWAIIAN RECORDS: Miller *et al.* (1979) identified larvae of this species from the Hawaiian Islands. The record needs to be verified. The *Trachipterus* sp. of Boehlert & Mundy (1992) from the Hancock Seamounts and of Loeb (1979) were not identified to species.

GENERAL RANGE: Eastern tropical and central North Pacific endemic, from Baja California and Ecuador, perhaps to the Hawaiian Islands. Epi- and mesopelagic at 0–300 m (Fitch, 1964).

[*Trachipterus ishikawae* Jordan & Snyder]

*Trachipterus ishikawae* Jordan & Snyder, 1901a, p. 310, Pl. 17 (fig. 10), off the mouth of Tokyo Bay between Misaki and Boshu, Japan.

*Trachipterus ishikawae*: Olney (1984), Ishii in Masuda *et al.* (1984), Boggs (1992), Parin *et al.* (1995).

TAXONOMY: Olney (1984) although Parin *et al.* (1995) stated that *T. ishikawae* Jordan & Snyder, 1901a, may be a junior synonym of *T. trachipterus* (Gmelin, 1789).

HAWAIIAN RECORDS: Boggs (1992) recorded four specimens of *T. ishikawae* from 14–20°N, 148–159°W. Although some of this area is within the Hawaiian 200-nmi EEZ near Hawai'i Island, the precise capture localities of the *T. ishikawae* were not specified. Voucher specimens are needed to confirm the presence of this species in Hawaiian waters. The Bishop Museum has two specimens, 1540 mm TL and 1490 mm SL, captured in Feb. 1992 and May 2003 respectively.

GENERAL RANGE: Perhaps a western and central North Pacific endemic, known from the Kuril Islands, Japan and the Hawaiian Islands. Epipelagic at unspecified depths (Ishii in Masuda *et al.*, 1984; Boggs, 1992; Parin *et al.*, 1995).

[*Trachipterus trachipterus* (Gmelin)]

*Cepola trachyptera* Gmelin, 1789, p. 1187, Adriatic Sea.

*Trachipterus iris* (Walbaum, 1792): Tinker (1982), Humphreys *et al.* (1982).

*Trachipterus trachipterus* (Gmelin, 1789): Olney (1984), Heemstra & Kannemeyer (1984), Palmer in Whitehead *et al.* (1984), Fujii in Masuda *et al.* (1984), Aguiar & Quéro in Quéro *et al.* (1990).

TAXONOMY: Olney (1984), Heemstra & Kannemeyer (1984).

COMMON NAMES: Ribbon fish, Deal fish.

HAWAIIAN RECORDS: None but *T. trachipterus* has been collected from Milwaukee Seamount (Humphreys *et al.*, 1984).

GENERAL RANGE: Perhaps circumglobal in tropical and subtropical waters but definitely known from the Mediterranean Sea, eastern Atlantic, South Africa, Japan, New Zealand, and the central Pacific Ocean. Epi- and mesopelagic at 0–500 m (Heemstra & Kannemeyer, 1984; Palmer in Whitehead *et al.*, 1984; Fujii in Masuda *et al.*, 1984; Aguiar & Quéro in Quéro *et al.*, 1990).

***Zu cristatus* (Bonelli)**

*Trachipterus cristatus* Bonelli, 1819, p. 487, Pl. 9, off Lerici, Gulf of Spezia, Italy.

*Zu cristatus* (Bonelli, 1819): Miller *et al.* (1979), Olney (1984), Heemstra & Kannemeyer (1984), Fujii in Masuda *et al.* (1984), Paxton *et al.* (1989), Kuitert (1993), Boehlert & Mundy (1992).

TAXONOMY: Olney (1984), Heemstra & Kannemeyer (1984).

COMMON NAMES: Scalloped ribbonfish (AFS).

HAWAIIAN RECORDS: Known from larvae collected at unspecified localities in the main Hawaiian Islands and at the Hancock Seamounts (Miller *et al.*, 1979; Boehlert & Mundy, 1992).

GENERAL RANGE: Probably circumglobal in the tropical through temperate Mediterranean Sea, Atlantic, Indian, and Pacific oceans. Epipelagic at 0–>6 m (Heemstra & Kannemeyer, 1984; Fujii in Masuda *et al.*, 1984; Paxton *et al.*, 1989; Kuitert, 1993).



**Regalecidae — Oarfishes***[Regalecus glesne* Ascanius]

*Regalecus glesne* Ascanius, 1772, p. 5, Pl. 11, Glesvaer, near Bergen, Norway.

*Regalecus glesne* Ascanius, 1772: Tinker (1982), Olney (1984), Palmer *in* Whitehead *et al.* (1984), Heemstra *in* Smith & Heemstra (1986), Paxton *et al.* (1989), Eschmeyer (1990).

TAXONOMY: Olney (1984), Heemstra *in* Smith & Heemstra (1986).

COMMON NAMES: Oarfish (AFS; FAO), King of the Herrings.

HAWAIIAN RECORDS: Although Tinker (1982) included this species, there are no verified records of its occurrence in the Hawaiian Islands.

GENERAL RANGE: Circumglobal in the Atlantic, Indian and Pacific oceans. Epi- and mesopelagic at 20–1000 m (Palmer *in* Whitehead *et al.*, 1984; Heemstra *in* Smith & Heemstra, 1986; Paxton *et al.*, 1989).

**Polymixiiformes****Polymixiidae — Beardfishes***Polymixia berndti* Gilbert

*Polymixia berndti* Gilbert, 1905, p. 616, Pl. 78, Honolulu fish market, O'ahu, Hawaiian Islands.

*Polymixia japonica* non Günther, 1877 [a valid species recorded from the Northwestern Hawaiian Islands]: Fowler (1928, in part), Gosline & Brock (1960).

*Polymixia berndti* Gilbert, 1905: Gilbert (1905), Clarke (1972), Struhsaker (1973a), Tinker (1982), Humphreys *et al.* (1984), Kotlyar (1984), Paxton *et al.* (1989), Kotlyar (1992), Randall *et al.* (1997a).

TAXONOMY: Kotlyar (1984, 1992).

COMMON NAMES: Berndt's beardfish (Randall *et al.*, 1997a), Deepsea moi.

HAWAIIAN RECORDS: Cross Seamount and Hawai'i Island to Koko Seamount at 99–441 m (Gilbert, 1905; Struhsaker, 1973a; Humphreys *et al.*, 1984). The exact ranges and areas of sympatry of *P. berndti* and *P. japonica* in the region are unknown.

GENERAL RANGE: Indo-Pacific from South Africa to Japan, Australia, and the Hawaiian Islands. Benthic at 18–585 m (Gilbert, 1905; Struhsaker, 1973a; Kotlyar, 1984, 1992; Paxton *et al.*, 1989; Randall *et al.*, 1997a).

*Polymixia japonica* Günther

*Polymixia japonica* Günther, 1877b, p. 436, off Inoshima, Japan.

*Polymixia japonica* Günther, 1877b: Fowler (1928, in part), Kotlyar (1984), Borets (1986), Uchida & Uchiyama (1986), Kotlyar (1992).

TAXONOMY: Kotlyar (1984, 1992).

HAWAIIAN RECORDS: Necker to the Hancock and Koko seamounts at 160–438 m (Kotlyar, 1984; Borets, 1986; Uchida & Uchiyama, 1986). According to J.E. Randall (pers. comm., Mar. 2005) the records of Uchida & Uchiyama (1986) from the Northwestern Hawaiian Islands are misidentifications of *P. berndti*, opening the question as to whether *P. japonicus* occurs south of the Emperor Seamounts.

GENERAL RANGE: Western North Pacific Kuroshio and transition zone endemic, from Okinawa, Japan, the Emperor Seamounts, and perhaps the Hawaiian Ridge. Benthic at 160–628 m (Kotlyar, 1984, 1992; Borets, 1986; Uchida & Uchiyama, 1986).

*[Polymixia* sp.]

*Polymixia* sp.: Struhsaker (1973a).

TAXONOMY: Struhsaker (1973a).

HAWAIIAN RECORDS: Struhsaker (1973a) reported one specimen from “Hawaiian waters” that was not referable to any described species known at that time. The identity of this specimen is unknown.

GENERAL RANGE: Unknown.

**Ophidiiformes**  
**Ophidioidei**

**Carapidae — Pearlfishes<sup>34</sup>**

***Carapus mourlani* (Petit)**

*Fierasfer mourlani* Petit, 1934, p. 393, Fig. 1, Cannonier's Point, Mauritius.

*Fierasfer homei* non (Richardson, 1846): Jordan & Evermann (1905, addendum).

*Carapus homei* non (Richardson, 1846) [a valid *Encheliophis* species not found in the Hawaiian Islands]: Fowler (1928, 1931, 1934, 1949) in part?, Gosline & Brock (1960) in part?, Strasburg (1961), Tinker (1982, in part).

*Carapus mourlani* (Petit, 1934): Williams (1984), Randall *et al.* (1985a), Myers (1989), Machida (1989b), Markle & Olney (1990).

TAXONOMY: Smith (1964) suggested that this species is merely a host-induced color variant of *Carapus homei* (Richardson, 1846) (= *Encheliophis homei*) but Markle & Olney (1990) confirmed its validity.

COMMON NAMES: Pincushion star pearlfish (Myers, 1999).

HAWAIIAN RECORDS: Johnston Atoll and O'ahu at 12–116 m (Jordan & Evermann, 1905; Strasburg, 1961; Williams, 1984; Randall *et al.*, 1985b).

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to the Ryukyus, New Caledonia, Micronesia, the Hawaiian Islands, and the Society Islands. Benthic and inquiline in starfish and occasionally holothurians at 3–116 m (Randall *et al.*, 1985b; Machida, 1989b; Myers, 1989; Markle & Olney, 1990).

COMMENTS: The *Carapus* sp. recorded by Humphreys *et al.* (1984) from the Northwestern Hawaiian Islands was not identified. The record could refer to any of the Hawaiian carapid genera.

[*Echiodon* sp.]

*Echiodon* unnamed species: Markle & Olney (1990).

TAXONOMY: Markle & Olney (1990).

HAWAIIAN RECORDS: Markle & Olney (1990) considered larvae collected at ca. 30°N, 143°W to be an undescribed species whose adults are unknown. The species is unknown from the Hawaiian Islands but the archipelago is the nearest locality with depths within the range of adult *Echiodon* species.

GENERAL RANGE: Indo-Pacific, known only from collections of larvae in the Persian Gulf, the Philippines to the Ryukyus, and northeast of the Hawaiian Islands. Other *Echiodon* species are benthic and free-living at 18–2000 m (Markle & Olney, 1990).

***Encheliophis dubius* (Putnam)**

*Fierasfer dubius* Putnam, 1874, p. 344, "Bay of Panama, eastern Pacific".

*Fierasfer microdon* Gilbert, 1905: Gilbert (1905).

*Carapus homei* non (Richardson, 1846) [a valid *Encheliophis* species not found in the Hawaiian Islands]: Fowler (1928, 1931, 1934, 1949, in part), Gosline & Brock (1960, in part), Tinker (1982, in part).

*Fierasfer arenicola* Jordan & Gilbert, 1882: Borodin (1930).

*Encheliophis dubius* (Putnam, 1874): Markle & Olney (1990), Allen & Robertson (1994), Robertson & Allen (2002).

TAXONOMY: Markle & Olney (1990).

COMMON NAMES: Pacific pearlfish.

HAWAIIAN RECORDS: Known in the region only from the holotype of *Fierasfer microdon*, collected between Maui and Lāna'i at 58–77 m (Gilbert, 1905) and a doubtful record by Borodin (1930) that was likely a misidentification or a locality error. All other records that might be attributed to *E. dubius* in the Hawaiian Islands are either repetitions of Gilbert's record or probable misidentifications of other species. Strasburg's (1961) records of juvenile and adult *Encheliophis homei*, which might be attributed to this species, were probably misidentified *Carapus mourlani*, based on their occurrence in starfish hosts (J.E. Randall, pers. comm., May 2003). Strasburg's (1961) larval specimens are unidentifiable, except that they could have been either *Carapus* or *Encheliophis*. Pending the collection of other specimens and verification of their identifications, *E. dubius* is best considered to be a waif in the Hawaiian Islands.

GENERAL RANGE: Eastern and central North Pacific endemic, from the Gulf of California to Ecuador, recorded as a waif in the Hawaiian Islands, but perhaps also in the China Sea. Benthic at 12–79 m and inquiline in bivalves (Gilbert, 1905; Strasburg, 1961; Markle & Olney, 1990; Allen & Robertson, 1994; Robertson & Allen, 2002).

***Encheliophis gracilis*** (Bleeker)

*Oxybeles gracilis* Bleeker, 1856d, p. 105, Banda, Indonesia.

*Fierasfer umbratilis* Jordan & Evermann, 1903: Jordan & Evermann (1903a, 1905 text), Jordan & Snyder (1904a).

*Jordanicus umbratilis* (Jordan & Evermann, 1903): Gilbert (1905), Jordan & Evermann (1905 plate).

*Jordanicus gracilis* (Bleeker, 1856d): Fowler (1928, 1931, 1934, 1949).

*Encheliophis gracilis* (Bleeker, 1856d): Gosline & Brock (1960), Strasburg (1961), Tinker (1982), Williams (1984), Myers (1989), Markle & Olney (1990).

TAXONOMY: Williams (1984), Markle & Olney (1990).

COMMON NAMES: Graceful pearlfish (Myers, 1999), Slender pearlfish (J.E. Randall, pers. comm., Mar. 2005).

HAWAIIAN RECORDS: Hawai'i Island to O'ahu at 1–2 m, inquiline in sea cucumbers (Jordan & Evermann, 1905; Fowler, 1928; Strasburg, 1961).

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to the Marianas Islands, northern Australia, Samoa, Micronesia, and the Hawaiian and Line Islands. Benthic at 1–2 m and inquiline in sea cucumbers (Myers, 1989; Markle & Olney, 1990).

***Onuxodon fowleri*** (Smith)

*Jordanicus fowleri* Smith, 1955, p. 403, Christmas Island (Kiritimati), Line Islands.

*Carapus margaritiferae* non (Rendahl, 1921) [a valid endemic Australian *Onuxodon* species]: Gosline & Brock (1960), Strasburg (1961), Tinker (1982).

*Onuxodon margaritiferae* non (Rendahl, 1921): Govoni *et al.* (1984), Myers (1989).

*Onuxodon fowleri* (Smith, 1955): Markle & Olney (1990), Randall *et al.* (1990a).

TAXONOMY: Markle & Olney (1990).

COMMON NAMES: Fowler's pearlfish (Randall *et al.*, 1997a), Bivalve pearlfish (Myers, 1999).

HAWAIIAN RECORDS: Hawai'i Island to O'ahu (Gosline & Brock, 1960; Strasburg, 1961; Govoni *et al.*, 1984).

GENERAL RANGE: Indo-Pacific from South Africa to Indonesia, Okinawa, southeastern Australia, Micronesia, the Hawaiian Islands, and Pitcairn Island. Benthic, probably at 1–30 m, and inquiline in bivalves or rarely in holothurians (Myers, 1989; Markle & Olney, 1990; Randall *et al.*, 1990a).

***Onuxodon parvibrachium*** (Fowler)

*Carapus parvibrachium* Fowler, 1927, p. 31, Fig. 6, Suva Bay, Fiji.

*Onuxodon parvibrachium* (Fowler, 1927): Markle & Olney (1990).

TAXONOMY: Markle & Olney (1990).

HAWAIIAN RECORDS: Hawai'i Island to O'ahu (Markle & Olney, 1990).

GENERAL RANGE: Indo-Pacific from South Africa to Okinawa, southeastern Australia, Fiji, and the Hawaiian Islands. Benthic, probably at 1–30 m, and inquiline in bivalves (Markle & Olney, 1990).

***Pyramodon ventralis*** Smith & Radcliffe

*Pyramodon ventralis* Smith & Radcliffe *in* Radcliffe, 1913, p. 175, Pl. 17 (fig. 3), near Dowarra Island, Indonesia, at 0°50'00"S, 128°12'00"E.

*Pyramodon ventralis* Smith & Radcliffe, 1913: Markle & Olney (1980), Williams (1983), Uchida & Uchiyama (1986), Markle & Olney (1990), Chave & Mundy (1994), Nielsen (1997).

TAXONOMY: Williams (1983), Markle & Olney (1990).

HAWAIIAN RECORDS: O'ahu to the Hancock Seamounts at 79–367 m (Markle & Olney, 1980; Uchida & Uchiyama, 1986; Chave & Mundy, 1994; B. Mundy, unpubl. data).

GENERAL RANGE: Indo-Pacific from South Africa to Japan, New Guinea, New Caledonia and the Hawaiian Islands. Free-living and benthic or pelagic at 79–470 m (Uchida & Uchiyama, 1986; Markle & Olney, 1990; Chave & Mundy, 1994; Nielsen, 1997).

***Snyderidia canina*** Gilbert

*Snyderidia canina* Gilbert, 1905, p. 655, Pl. 92, vicinity of Kaua'i, Hawaiian Islands.

*Snyderidia canina* Gilbert, 1905: Gilbert (1905 — in Lycodapidae [= Zoarcidae]), Fowler (1928), Gosline & Brock (1960), Strasburg (1961, 1965), Struhsaker (1973a), Clarke & Wagner (1976), Markle & Olney (1980), Tinker (1982), Williams (1983), Markle & Olney (1990).

TAXONOMY: Markle & Olney (1990).

HAWAIIAN RECORDS: Hawai'i Island to Kaua'i at 1–914 m (Gilbert, 1905; Strasburg, 1965, Struhsaker, 1973a; Clarke & Wagner, 1976).

GENERAL RANGE: Circumtropical and subtropical in the Gulf of Mexico, Atlantic, Indian, and Pacific oceans except the eastern Pacific. Habits unknown but probably free-living and benthic or pelagic at 1–1500 m (Gilbert, 1905; Clarke & Wagner, 1976; Williams, 1983; Markle & Olney, 1990).

**Ophidiidae — Cusk-eels****[*Acanthonus armatus* Günther]**

*Acanthonus armatus* Günther, 1878, p. 23, north of New Guinea.

*Acanthonus armatus* Günther, 1878: Nielsen (1966), Cohen & Nielsen (1978), Shcherbachev (1980), Ohta (1983), Wilson *et al.* (1985), Fine *et al.* (1987), Nielsen (1997).

TAXONOMY: Cohen & Nielsen (1978).

HAWAIIAN RECORDS: None but a collection of this abyssal, circumtropical species in 2000 m at 17°51'N, 178°25'E (Wilson *et al.*, 1985) indicates that it may be expected to occur in Hawaiian waters.

GENERAL RANGE: Circumtropical in the Gulf of Mexico, Atlantic, Indian, and Pacific oceans. Benthopelagic at 1500–4150 m (Nielsen, 1966; Shcherbachev, 1980; Ohta, 1983; Wilson *et al.*, 1985; Fine *et al.*, 1987; Nielsen, 1997).

**[*Bassozetus galathea* Nielsen & Merrett]**

*Bassozetus galathea* Nielsen & Merrett, 2000, p. 26, Figs. 14–15, eastern Indian Ocean at 3°03'S, 83°02.5'E.

*Bassozetus elongatus* non Smith & Radcliffe, 1913 [a valid species not recorded from the Hawaiian Islands]: Iwai (1976).

*Bassozetus glutinosus* non (Alcock, 1890) [a valid species not known from the Hawaiian Islands]: Nielsen (1997).

*Bassozetus galathea* Nielsen & Merrett, 2000: Nielsen & Merrett (2000).

TAXONOMY: Nielsen & Merrett (2000).

HAWAIIAN RECORDS: Iwai (1976) recorded a specimen of *Bassozetus elongatus* from 1300 m at a locality in the central North Pacific in the vicinity of the Hawaiian Ridge. Nielsen (1997) identified the specimen as *B. glutinosus* from data given in Iwai (1976) but Nielsen & Merrett (2000) suggested that it was better identified as their newly described species, *B. galathea*. Although Iwai (1976), Nielsen (1997), and Nielsen & Merrett (2000) mentioned the Hawaiian Islands as the collection locality for this specimen, Iwai (1976) did not give a precise locality. The other species included in Iwai (1976) suggest that his collections came from both the Emperor Seamounts and islands at the northern end of the Ridge. The occurrence of this species within the 200-nmi EEZ therefore needs confirmation. An ophidiid resembling a *Bassozetus* species was photographed at 5127 m off Hawai'i Island in Aug. 2002 (K. Johnson, pers. comm., Aug. 2002), but the specimen could not be collected.

GENERAL RANGE: Indo-Pacific from East Africa to northern Australia, New Caledonia Fiji, the Philippines, near Wake Island, and the Hawaiian Ridge. Engybenthic at 1100–3960 m, perhaps to 4810 m (Iwai, 1976; Nielsen, 1997; Nielsen & Merrett, 2000).

***Bassozetus zenkevitchi*** Rass

*Bassozetus zenkevitchi* Rass, 1955, p. 333, Fig. 5, Iturup Island, Kuril Islands, western North Pacific.

*Bassozetus zenkevitchi* Rass, 1955: Nielsen & Merrett (2000).

TAXONOMY: Nielsen & Merrett (2000).

HAWAIIAN RECORDS: Between Midway and Kure Atolls at unknown depths (Nielsen & Merrett, 2000).

GENERAL RANGE: Western and central North Pacific endemic from the Ogasawara Islands, Japan, the

Okhotsk Sea, the Kuril Islands, and the northern Hawaiian Ridge. Benthopelagic at fishing depths of 1–6930 m (Nielsen & Merrett, 2000).

***Brotula multibarbata*** Temminck & Schlegel

*Brotula multibarbata* Temminck & Schlegel, 1846, p. 251, Pl. 111 (fig. 2), Nagasaki, Japan.

*Brotula multicirrata* Vaillant & Sauvage, 1875: Vaillant & Sauvage (1875), Jordan & Snyder (1904a)?, Jordan & Evermann (1905, in part).

*Brotula marginalis* Jenkins, 1901: Jenkins (1901, 1903), Snyder (1904), Jordan & Evermann (1905).

*Brotula multibarbata* Temminck & Schlegel, 1846: Fowler (1928, in part), Hubbs (1944, in part), Gosline & Brock (1960), Gosline (1953), Clarke (1972), Hobson (1974), Cohen & Nielsen (1978), Tinker (1982), Uchida & Uchiyama (1986), Myers (1989), Kosaki *et al.* (1991), Belyanina (1991), Randall *et al.* (1993b), Chave & Mundy (1994), Hoover (1994, 2003), Randall (1996a), Randall *et al.* (1997a).

TAXONOMY: Cohen & Nielsen (1978).

COMMON NAMES: Pūhi-palahoana (Hoover, 1993), Pūhi palahoana (Hoover, 2003), Palahoana (Randall, 1996a), Goatsbeard brotula (FAO), Bearded cusk-eel (Hoover, 1993, 2003), Bearded brotula (Randall *et al.*, 1997a), Reef cusk eel (Myers, 1999), Large-eye brotula (Randall, 1996a; Hoover, 2003).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to Midway, more common at Midway than in the main Hawaiian Islands, at 2–220 m (Vaillant & Sauvage, 1875; Jordan & Evermann, 1905; Gosline, 1953; Clarke, 1972; Kosaki *et al.*, 1991; Randall *et al.*, 1993b; Chave & Mundy, 1994; Hoover, 1994).

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, and the Society Islands. Benthic in crevices of reefs and rocks at 1–650 m, most common above 180 m (Hubbs, 1944 in part; Cohen & Nielsen, 1978; Belyanina, 1991; Chave & Mundy, 1994; Randall *et al.*, 1997b).

***Brotula townsendi*** Fowler

*Brotula townsendi* Fowler, 1900, p. 518, Pl. 20 (fig. 3), “Hawaiian Islands”.

*Brotula multicirrata* non Vaillant & Sauvage, 1875: Jordan & Evermann (1905, in part).

*Brotula multibarbata* non Temminck & Schlegel, 1846 [a valid species also found in the Hawaiian Islands]: Fowler (1928, in part).

*Brotula townsendi* Fowler, 1900: Fowler (1900), Gosline (1953), Gosline & Brock (1960), Cohen & Nielsen (1978), Tinker (1982), Randall *et al.* (1985a), Myers (1989), Belyanina (1991), Randall (1996a).

TAXONOMY: Cohen & Nielsen (1978).

COMMON NAMES: Townsend’s cusk eel (Myers, 1999).

HAWAIIAN RECORDS: Johnston Atoll and O‘ahu (Fowler, 1900; Gosline, 1953; Randall *et al.*, 1985b).

GENERAL RANGE: Central Pacific endemic known from Micronesia, Johnston Atoll, and the Hawaiian Islands. Benthic at unrecorded depths (Myers, 1989; Belyanina, 1991).

[*Brotulotaenia nielsenii* Cohen]

*Brotulotaenia nielsenii* Cohen, 1974b, p. 144, Fig. 17, eastern North Pacific at 31°N, 127°W [spelling of genus was a *lapsus*].

*Brotulotaenia nielsenii* Cohen, 1974b: Cohen (1974).

*Brotulotaenia nielsenii* Cohen, 1974b: Kashkin (1978), Shcherbachev (1980), Okiyama & Kato (2003).

TAXONOMY: Cohen (1974a) [who misspelled the genus name], Kashkin (1978), Shcherbachev (1980).

HAWAIIAN RECORDS: Although *Brotulotaenia nielsenii* has not been recorded from the Hawaiian Islands, its general range and pelagic habits indicate that it might be expected in the region (Okiyama & Kato, 2003).

GENERAL RANGE: Indo-transPacific from the Arabian Gulf to the Banda Sea, the South China Sea, The western Pacific between the Ryukyus and New Guinea, the Solomon Islands, the equatorial central Pacific, and the eastern Pacific from southern California to Panama. Epi- and mesopelagic at fishing depths of 0–1200 m (Cohen, 1974a; Kashkin, 1978; Shcherbachev, 1980; Okiyama & Kato, 2003).

[*Dicrolene hubrechtii* Weber]

*Dicrolene hubrechtii* Weber, 1913, p. 553, Pl. 4 (fig. 1), Timor Sea at 10°48.6'N, 123°23.1'E.

*Dicrolene hubrechtii* Weber, 1913: Iwai (1976), Shcherbachev (1980), Eschmeyer *et al.* (1998).

TAXONOMY: Shcherbachev (1980), Eschmeyer *et al.* (1998).

HAWAIIAN RECORDS: Iwai (1976) published a photograph of a specimen identified as *D. hubrechtii* collected at 1300 m in the central North Pacific in the vicinity of the Hawaiian Ridge. The other species included in Iwai (1976) suggest that this record comes from seamounts or islands at the northern end of the Ridge. The occurrence of *Dicrolene hubrechtii* in the region needs confirmation.

GENERAL RANGE: Indo-Pacific from the region south of Sri Lanka to Indonesia, the Timor Sea and perhaps the Hawaiian Ridge. Eurybenthic at 918 to 1700 m (Iwai, 1976; Shcherbachev, 1980; Eschmeyer *et al.*, 1998).

[*Holcomycteropus profundissimus* (Roule)]

*Grimaldichthys profundissimus* Roule, 1913, p. 3, Fig., southwest of the Cape Verde Islands, western North Atlantic, at 12°07'30"N, 35°53'W.

*Bassogigas profundissimus* (Roule, 1913): Nielsen (1964), Stein (1978).

*Holcomycteropus profundissimus* (Roule, 1913): Cohen & Nielsen (1978), Nielsen (1980), Smith *et al.* (1992).

TAXONOMY: Nielsen (1980).

HAWAIIAN RECORDS: None but this abyssal species was collected from 31°N, 159°W at 4200 m (Smith *et al.*, 1992) which, when considered with its general range, suggests that *H. profundissimus* probably occurs in the region.

GENERAL RANGE: Probably circumglobal but known only from a few specimens collected in the North Atlantic, eastern Indian Ocean, western South Pacific, central North Pacific, and eastern North Pacific. Eurybenthic at 4200–7160 m (Nielsen, 1964; Stein, 1978; Smith *et al.*, 1992).

COMMENTS: Another hadal ophiidiid that might be expected to occur in Hawaiian waters is *Abyssobrotula galathea* Nielsen, 1977, which is benthopelagic at 2330–8370 m fishing depths (possibly also at 0–2500 m fishing depths). It probably occurs circumglobally in the tropical through temperate Atlantic, Indian, and Pacific oceans but there are no records from the Pacific Ocean north of 10°N (Nielsen, 1977; Shcherbachev, 1980).

***Lamprogrammus brunswigi* (Brauer)**

*Bassobythites brunswigi* Brauer, 1906, p. 307, Pl. 14 (fig. 7), off the northeast coast of Africa, Indian Ocean, at 6°18'08"N, 49°32'05"E.

*Bassobythites brunswigi* Brauer, 1906: Cohen & Nielsen (1978).

*Lamprogrammus brunswigi* (Brauer, 1906): Cohen *et al.* (1991).

TAXONOMY: Cohen *et al.* (1991).

HAWAIIAN RECORDS: Known in the Hawaiian Islands from one specimen found floating at the surface off O'ahu (Cohen *et al.*, 1991).

GENERAL RANGE: Circumglobal in the tropical and subtropical Atlantic, Indian, and Pacific oceans except the eastern Pacific. Benthic or eurybenthic at 800–1600 m (Cohen *et al.*, 1991).

[*Lamprogrammus niger* Alcock]

*Lamprogrammus niger* Alcock, 1891, p. 33, Fig. 2, Andaman Sea at 11°25'05"N, 92°47'06"E, and Bay of Bengal at an unspecified location.

*Lamprogrammus niger* Alcock, 1891: Cohen & Nielsen (1978), Loeb (1979), Shcherbachev (1980), Nielsen & Cohen in Smith & Heemstra (1986), Nielsen in Quéro *et al.* (1990), Cohen *et al.* (1991).

TAXONOMY: Cohen & Nielsen (1978).

HAWAIIAN RECORDS: None but Loeb's (1979) collection of a larval ophiidiid tentatively identified as *L. niger* from 28°N, 155°W suggests that this species could be expected in Hawaiian waters.

GENERAL RANGE: Perhaps circumtropical and subtropical, known from the western and eastern Atlantic, Indian, and western Pacific oceans. Juveniles meso- and bathypelagic, adults probably benthic or eurybenthic at 700–2000 m (Cohen & Nielsen, 1978; Shcherbachev, 1980; Nielsen & Cohen in Smith & Heemstra, 1986; Nielsen in Quéro *et al.*, 1990; Cohen *et al.*, 1991).

***Leptobrotula breviventralis*** Nielsen

*Leptobrotula breviventralis* Nielsen, 1986, p. 166, Fig. 1, northeast of Maui, Hawaiian Islands, at 21°05'N, 156°11'W.

Brotulid sp. B: Struhsaker (1973a).

*Glyptophidium* [— “Another recent species is being described by J.G. Nielsen ... ”]: Cohen & Nielsen (1978), accounting for their listing of Hawai'i within the range of *Glyptophidium*.

*Leptobrotula breviventralis* Nielsen, 1986: Nielsen (1986).

TAXONOMY: Nielsen (1986).

HAWAIIAN RECORDS: Maui to O'ahu at 220?–686 m (Struhsaker, 1973a; Nielsen, 1986).

GENERAL RANGE: Indo-Pacific, known only from three specimens collected in the Hawaiian Islands and one from South Africa. Engyobenthic or benthic at 220?–780 m (Nielsen, 1986).

***Luciobrotula bartschi*** Smith & Radcliffe

*Luciobrotula bartschi* Smith & Radcliffe in Radcliffe, 1913, p. 171, Pl. 16 (fig. 2), Palawan Passage, Philippines, at 10°57'45"N, 118°38'15"E.

*Luciobrotula bartschi* Smith & Radcliffe, 1913: Nielsen & Nybelin (1963), Cohen (1974), Cohen & Nielsen (1978), Tinker (1982), Nielsen & Cohen in Smith & Heemstra (1986).

TAXONOMY: Cohen & Nielsen (1978).

HAWAIIAN RECORDS: Maui at 732–786 m (Cohen, 1974a).

GENERAL RANGE: Indo-Pacific from South Africa and the Gulf of Aden to the Philippines, Japan, and the Hawaiian Islands. Benthic at 500–1022 m (Nielsen & Nybelin, 1963; Cohen, 1974a; Nielsen & Cohen in Smith & Heemstra, 1986).

***Luciobrotula lineata*** (Gosline)

*Volcanus lineatus* Gosline, 1954, p. 79, Figs. 2d, 3d, off Mauna Loa lava flow near Ho'okena, Hawai'i Island.

*Volcanus lineatus* Gosline, 1954: Gosline (1954), Gosline & Brock (1960), Tinker (1982).

*Luciobrotula lineata* (Gosline, 1954): Cohen (1974), Cohen & Nielsen (1978), Tinker (1982).

TAXONOMY: Cohen & Nielsen (1978).

HAWAIIAN RECORDS: Hawai'i Island from specimens floating at the surface near a lava flow (Gosline, 1954).

GENERAL RANGE: Hawaiian endemic. Probably benthic at unknown depths (Cohen, 1974a).

***Ophidion muraenolepis*** (Günther)

*Ophidium muraenolepis* Günther, 1880, p. 46, Pl. 20 (fig. A), Kai Island, Indonesia, Arafura Sea.

Ophidiid sp. A: Struhsaker (1973a).

*Ophidion muraenolepis* (Günther, 1880): Paxton *et al.* (1989), Robins (1991), Nielsen (1997), Randall *et al.* (1997a).

TAXONOMY: Robins (1991). Robins in Randall *et al.* (1997b) stated that *Ophidion asiro* (Jordan & Fowler, 1902a) from Japan, might be a junior synonym of *O. muraenolepis* Günther, 1880.

HAWAIIAN RECORDS: Maui to O'ahu at 102–248. The most common ophidiiform species in Hawaiian waters (Struhsaker, 1973a).

GENERAL RANGE: Eastern Indian and western-central Pacific oceans from at least western Australia to the Arafura Sea, New Caledonia, the Ogasawara Islands and the Hawaiian Islands. Benthic at 102–320 m (Struhsaker, 1973a; Paxton *et al.*, 1989; Robins, 1991).

***Pycnocraspedum armatum*** Gosline

*Pycnocraspedum armatum* Gosline, 1954, p. 80, Figs. 2e, 3e, off Mauna Loa lava flow near Ho'okena, Hawai'i Island.

*Pycnocraspedum armatum* Gosline, 1954: Gosline (1954), Gosline & Brock (1960), Struhsaker (1973a), Cohen & Nielsen (1978), Tinker (1982), Machida in Okamura & Kitajima (1984), Chave & Mundy (1994).

TAXONOMY: Cohen & Nielsen (1978), Machida in Okamura & Kitajima (1984).

HAWAIIAN RECORDS: Cross Seamount and Hawai'i Island to O'ahu at 201–1345 m (Gosline, 1954; Struhsaker, 1973a; Chave & Mundy, 1994).

GENERAL RANGE: Hawaiian endemic. Engyobenthic at 201–1345 m (Chave & Mundy, 1994).

[*Pycnocraspedum* sp.]

*Pycnocraspedum* sp. [— “It remains an open question as to whether this is an extreme variant of *P. armatum* or a distinct species”]: Struhsaker (1973a).

TAXONOMY: Struhsaker (1973a). The taxonomic status of this specimen is unknown.

HAWAIIAN RECORDS: Maui at 296 m (Struhsaker, 1973a).

GENERAL RANGE: Unknown.

*Spectrunculus grandis* (Günther)

*Sirembo grandis* Günther, 1877b, p. 437, near Yokohama, Japan.

*Spectrunculus grandis* (Günther, 1877b): Nielsen & Hureau (1980).

TAXONOMY: Nielsen & Hureau (1980).

HAWAIIAN RECORDS: Larvae have been collected near Maro Reef at the surface (B. Mundy, unpubl. data).

*Spectrunculus grandis* or another deep-dwelling ophidiid has been photographed off Hawai'i Island (19°38'N, 156°07.5'W) at 2438 m (E. Chave, unpubl. data).

GENERAL RANGE: Primarily along continental margins of the tropical through cold-temperate Atlantic and Pacific oceans. The absence of records from the central Pacific may be due to lack of sampling in deep water, since larvae have been collected near the Hawaiian and Line Islands (B. Mundy, unpubl. data). Engybenthic at 800–4255 m with most collected at 2000–3000 m (Nielsen & Hureau, 1980).

*Typhlonus nasus* Günther

*Typhlonus nasus* Günther, 1878, p. 21, from two localities — northeast of Australia and north of Sulawesi.

*Typhlonus nasus* Günther, 1878: Nielsen (1966), Shcherbachev (1980), Carter (1983).

TAXONOMY: Carter (1983).

HAWAIIAN RECORDS: Tentatively identified from a videotape taken off Kona-Kailua, Hawai'i Island at 4572 m (E. Chave, unpubl. data).

GENERAL RANGE: Indo-Pacific from the Arabian Basin to the Philippines, southern New Guinea, the central North Pacific, and the eastern South Pacific. Engybenthic at 3933–4940 m (Nielsen, 1966; Shcherbachev, 1980; Carter, 1983).

*Xyelacyba myersi* Cohen

*Xyelacyba myersi* Cohen, 1961, p. 289, Fig. 1, Gulf of Mexico at 27°48'N, 88°45'W.

*Xyelacyba myersi* Cohen, 1961: Hughes & Iwai (1978), Machida (1989a).

TAXONOMY: Machida (1989a).

HAWAIIAN RECORDS: Tentatively identified from photographs taken from submersibles at the main Hawaiian Islands (E. Chave, unpubl. data).

GENERAL RANGE: Circumtropical and subtropical in the Atlantic, Indian, and Pacific oceans; known only from Japan, the Mid-Pacific Seamounts, and the Hawaiian Islands in the Pacific. Engybenthic or benthopelagic at 1075–2148 m; perhaps associated with continental slopes, islands, or seamounts (Hughes & Iwai, 1978; Machida, 1989a).

**Bythitoidei****Bythitidae — Viviparous brotulas***Cataetyx hawaiiensis* Gosline

*Cataetyx hawaiiensis* Gosline, 1954, p. 76, Figs. 1g, 2c, 3c, off Mauna Loa lava flow near Ho'okena, Hawai'i Island.

*Cataetyx hawaiiensis* Gosline, 1954: Gosline (1954), Gosline & Brock (1969), Cohen & Nielsen (1978), Tinker (1982).

TAXONOMY: Cohen & Nielsen (1978).

HAWAIIAN RECORDS: Hawai'i Island from one specimen found floating at the surface near a lava flow (Gosline, 1954).

GENERAL RANGE: Hawaiian endemic. Benthic or engybenthic at unknown depths (Gosline, 1954).



***Diplacanthopoma* cf. *riversandersoni* Alcock**

*Diplacanthopoma Rivers-Andersoni* Alcock, 1895, p. 144, Arabian Sea at 22°14'25"N, 67°08'55"E.

*Diplacanthopoma* cf. *rivers-andersoni* Alcock, 1895: Gosline (1954).

*Diplacanthopoma rivers-andersoni* Alcock, 1895: Cohen & Nielsen (1978).

TAXONOMY: Gosline (1954), Cohen & Nielsen (1978). According to Eschmeyer (1998), the species name should not be hyphenated.

HAWAIIAN RECORDS: Hawai'i Island from one specimen found floating at the surface near a lava flow (Gosline, 1954).

GENERAL RANGE: Arabian Sea and the Hawaiian Islands? Benthic or enybenthic at unknown depths (Gosline, 1954).

***Diplacanthopoma* sp.**

*Diplacanthopoma* sp.: Gosline (1954).

TAXONOMY: Gosline (1954). The identity of this specimen should be redetermined if the specimen still exists.

HAWAIIAN RECORDS: Gosline (1954) recorded an unidentified second *Diplacanthopoma* species from one specimen found floating near a lava flow off Ho'okena at Hawai'i Island. Gosline's (1954) specimens of *Diplacanthopoma* have not otherwise been mentioned in discussions of Hawaiian fishes.

GENERAL RANGE: Unknown. Probably benthic or enybenthic at unknown depths.

***Grammonus waikiki* (Cohen)**

*Microbrotula nigra* Gosline, 1953, p. 220, Waikiki Reef, Honolulu, O'ahu, Hawaiian Islands [The placement of *Microbrotula niger* Gosline, 1953, in *Oligopus* by Cohen (1964a) made the species name secondarily preoccupied by *Oligopus niger* Risso, 1827. This necessitated a replacement name, *Oligopus waikiki* Cohen, 1953, p. 11, with its holotype the same as the holotype of *Microbrotula nigra* Gosline, 1953, from Waikiki Reef, O'ahu. *Oligopus* is a synonym of the bramid genus *Pteraclis*. The next available name for ophidiiforms placed in *Oligopus* is *Grammonus*. As a consequence of all this, this species was originally described as *Microbrotula niger* Gosline, 1953, but now takes the name *Grammonus waikiki* (Cohen, 1964).]

*Microbrotula nigra* Gosline, 1953: Gosline (1953), Gosline & Brock (1960), Tinker (1982).

*Oligopus waikiki* Cohen, 1964: Cohen (1964a), Cohen & Nielsen (1978).

*Grammonus waikiki* (Cohen, 1964): Eschmeyer (1990).

TAXONOMY: Cohen (1964a), Cohen & Nielsen (1978); generic placement follows Eschmeyer (1990, 1998) and Nielsen *et al.* (2000).

HAWAIIAN RECORDS: O'ahu at 9 m (Gosline, 1953; Nielsen *et al.*, 2000).

GENERAL RANGE: Hawaiian endemic known only from two specimens. Benthic in coral reefs at 9 m (Gosline, 1953; Cohen, 1964a; Nielsen *et al.*, 2000; D. Greenfield, pers. comm., Nov. 2001).

***Microbrotula rubra* Gosline**

*Microbrotula rubra* Gosline, 1953, p. 219, Figs. 1c, 4a-b, 5b, Kāne'ohe Bay, O'ahu, Hawaiian Islands [eastern shore, not on the north coast as stated by Eschmeyer (1998)].

*Microbrotula rubra* Gosline, 1953: Gosline (1953), Gosline & Brock (1969), Cohen & Wourms (1976), Cohen & Nielsen (1978), Tinker (1982).

TAXONOMY: Cohen & Nielsen (1978).

HAWAIIAN RECORDS: O'ahu at 1 m (Gosline, 1953).

GENERAL RANGE: Hawaiian endemic. Benthic in coral or sand at 1 m (Gosline, 1953).

***Saccogaster hawaii* Cohen & Nielsen**

*Saccogaster hawaii* Cohen & Nielsen, 1972, p. 455, Figs. 1c, 3, between Moloka'i and O'ahu, Hawaiian Islands. Brotulid sp. A: Struhsaker (1973a).

*Saccogaster hawaii* Cohen & Nielsen, 1972: Cohen & Nielsen (1972), Randall (1976a), Cohen & Nielsen (1978), Cohen (1987).

TAXONOMY: Cohen (1987).

HAWAIIAN RECORDS: Between Moloka'i and O'ahu at 234 m (Struhsaker, 1973a). A pelagic juvenile collected at the Hancock Seamounts was tentatively identified as this species (B. Mundy, unpubl. data).  
 GENERAL RANGE: Hawaiian endemic known only from the holotype and one juvenile. Benthic at 234 m (Cohen & Nielsen, 1972).

***Saccogaster tuberculata*** (Chan)

*Barbuliceps tuberculatus* Chan, 1966, p. 5, Figs. 1–2, South China Sea ca. 270 nmi north of Kuching, Sarawak State, Borneo, East Malaysia, at 6°01.8'N, 109°57.4'E.

*Saccogaster tuberculata* (Chan, 1966): Cohen & Nielsen (1972), Cohen (1987).

TAXONOMY: Cohen (1987).

HAWAIIAN RECORDS: Moloka'i at 585–640 m (Cohen & Nielsen, 1972).

GENERAL RANGE: Western and central Pacific endemic known from the South China Sea, Australia, and the Hawaiian Islands. Benthic at 585–834 m (Cohen & Nielsen, 1972; Cohen, 1987).

**Gadiformes**  
**Macrouroidei**

**Bathygadidae<sup>35</sup>**

***Bathygadus bowersi*** (Gilbert)

*Gadomus bowersi* Gilbert, 1905, p. 659, Fig. 257, near Bird Island [= Nihoa], Hawaiian Islands.

*Gadomus bowersi* Gilbert, 1905: Gilbert (1905).

*Bathygadus bowersi* (Gilbert, 1905): Fowler (1928, 1949), Gosline & Brock (1960), Marshall (1973), Tinker (1982), Howes & Crimmen (1990), Sazonov & Iwamoto (1992).

TAXONOMY: Marshall & Iwamoto (1973a), Howes & Crimmen (1990).

HAWAIIAN RECORDS: Kaua'i to French Frigate at 550–1460 m (Gilbert, 1905; Howes & Crimmen, 1990).

GENERAL RANGE: Hawaiian endemic. Engy-benthic at 550–1460 m (Howes & Crimmen, 1990; Sazonov & Iwamoto, 1992).

***Gadomus melanopterus*** Gilbert

*Gadomus melanopterus* Gilbert, 1905, p. 658, Fig. 256, vicinity of Kaua'i, Hawaiian Islands.

*Melanobranchnus micronema* Gilbert, 1905: Gilbert (1905).

*Bathygadus micronema* (Gilbert, 1905): Fowler (1928), Gosline & Brock (1960), Tinker (1982).

*Bathygadus micronemus* (Gilbert, 1905): Cohen *et al.* (1990), Sazonov & Iwamoto (1992).

*Gadomus melanopterus* Gilbert, 1905: Gilbert (1905), Fowler (1928), Gosline & Brock (1960), Borets & Sokolovsky (1978), Tinker (1982), Howes & Crimmen (1990), Cohen *et al.* (1990), Sazonov & Iwamoto (1992).

TAXONOMY: Howes & Crimmen (1990) synonymized *Melanobranchnus micronema* Gilbert, 1905, and *Gadomus melanopterus* Gilbert, 1905, but Cohen *et al.* (1990) and Sazonov & Iwamoto (1992) retained the former as a valid, endemic Hawaiian *Bathygadus* species.

HAWAIIAN RECORDS: Maui to French Frigate at 572–1602 m (Gilbert, 1905).

GENERAL RANGE: The Hawaiian Islands and perhaps the Sala y Gomez Ridge, southeastern Pacific. Engy-benthic at 572–1602 m (Gilbert, 1905; Howes & Crimmen, 1990; Sazonov & Iwamoto, 1992).

**Macrouridae — Grenadiers, Rattails<sup>36</sup>**

[*Caelorinchus anisacanthus* Sazonov]

*Caelorinchus anisacanthus* Sazonov, 1994, p. 154, Fig. 4, Emperor Seamounts, central North Pacific, at 35°21'N, 171°19'E.

*Caelorinchus anisacanthus* Sazonov, 1994: Sazonov (1994).

TAXONOMY: Sazonov (1994).

HAWAIIAN RECORDS: No Hawaiian records, but the range of *C. anisacanthus* in the southern Emperor Seamounts (34°48'–35°21'N, 171°47'–171°19'E; Sazonov 1994) indicates that it could occur at the Hancock Seamounts.

GENERAL RANGE: Central North Pacific endemic known only from the southern Emperor Seamounts. Engybenthic at 550–820 m (Sazonov, 1994).

COMMENTS: *Caelorinchus* sp. from Milwaukie Seamount was not identified to species (Humphreys *et al.*, 1984; Borets, 1986, as “*Coelorhynchus*” sp.).

***Caelorinchus aratum* Gilbert**

*Coelorhynchus aratum* Gilbert, 1905, p. 674, Fig. 264, off the south coast of O‘ahu, Hawaiian Islands.

*Coelorhynchus aratum* Gilbert, 1905: Gilbert (1905), Fowler (1928), Gosline & Brock (1960), Struhsaker (1973a), Marshall & Iwamoto (1973b), Tinker (1982).

*Caelorinchus aratum* Gilbert, 1905: Sazonov & Iwamoto (1992).

TAXONOMY: Marshall & Iwamoto (1973b).

HAWAIIAN RECORDS: Hawai‘i Island to O‘ahu at 384–686 m (Gilbert, 1905; Struhsaker, 1973a).

GENERAL RANGE: Hawaiian endemic. Engybenthic at 384–686 m (Gilbert, 1905; Struhsaker, 1973a; Sazonov & Iwamoto, 1992).

***Caelorinchus doryssus* Gilbert**

*Coelorhynchus doryssus* Gilbert, 1905, p. 675, Pl. 94, Kaiwi Channel off southern O‘ahu, Hawaiian Islands.

*Coelorhynchus doryssus* Gilbert, 1905: Gilbert (1905), Fowler (1928), Gosline & Brock (1960), Struhsaker (1973a), Marshall & Iwamoto (1973b), Tinker (1982).

*Caelorinchus doryssus* Gilbert, 1905: Sazonov & Iwamoto (1992).

TAXONOMY: Marshall & Iwamoto (1973b).

HAWAIIAN RECORDS: Maui to the Northampton Seamount at 351–867 m (Gilbert, 1905; Struhsaker, 1973a; B. Mundy, pers. observ., Sept. 2002).

GENERAL RANGE: Hawaiian endemic. Engybenthic at 351–867 m (Gilbert, 1905; Struhsaker, 1973a; Sazonov & Iwamoto, 1992).

***Caelorinchus gladius* Gilbert & Cramer**

*Coelorhynchus gladius* Gilbert & Cramer, 1897, p. 421, Pl. 41 (fig. 3), off southern O‘ahu, Hawaiian Islands, at 21°2'N, 157°49'W.

*Coelorhynchus gladius* Gilbert & Cramer, 1897: Gilbert & Cramer (1897), Gilbert (1905), Fowler (1928), Gosline & Brock (1960), Struhsaker (1973a), Marshall & Iwamoto (1973b), Tinker (1982).

*Mataeocephalus gladius* (Gilbert & Cramer, 1897): Marshall (1973).

*Caelorinchus gladius* Gilbert & Cramer, 1897: Sazonov & Iwamoto (1992).

TAXONOMY: Marshall & Iwamoto (1973b). The inclusion of *C. gladius* in *Mataeocephalus* by Marshall & Iwamoto (1973a) appears to have been an error.

HAWAIIAN RECORDS: Hawai‘i Island to Kaua‘i at 296–647 m (Gilbert & Cramer, 1897; Gilbert, 1905; Struhsaker, 1973a).

GENERAL RANGE: Hawaiian endemic. Engybenthic at 296–647 m (Gilbert, 1905; Struhsaker, 1973a; Sazonov & Iwamoto, 1992).

[*Caelorinchus matsubarai* Okamura]

*Coelorhynchus matsubarai* Okamura in Okamura *et al.*, 1982, p. 167, Pl. 101, Kyushu-Palau Ridge at 28°06.7'N, 134°39.9'E.

*Coelorhynchus matsubarai* Okamura, 1982: Okamura in Okamura *et al.* (1982), Okamura in Masuda *et al.* (1984).

*Caelorinchus matsubarai* Okamura, 1982: Sazonov (1994).

TAXONOMY: Okamura in Okamura *et al.* (1982).

HAWAIIAN RECORDS: None but *C. matsubarai* has been collected from the Koko and Milwaukie Seamounts at 315–540 m (Okamura in Okamura *et al.*, 1982; Sazonov, 1994) and could occur at the Hancock Seamounts.

GENERAL RANGE: Western and north-central Pacific endemic from the Kyushu-Palau Ridge and southern Emperor Seamounts (Kuroshio and transition zone pattern). Engybenthic at 315–600 m (Okamura in Okamura *et al.*, 1982; Okamura in Masuda *et al.*, 1984; Sazonov, 1994).

***Caelorinchus spilonotus* Sazonov & Iwamoto**

*Caelorinchus spilonotus* Sazonov & Iwamoto, 1992, p. 49, Fig. 17–18, Sala y Gomez Ridge at 25°09.9'S, 90°18.7'W.

*Caelorinchus spilonotus* Sazonov & Iwamoto, 1992; Sazonov & Iwamoto (1992), Chave & Mundy (1994).

TAXONOMY: Sazonov & Iwamoto (1992).

HAWAIIAN RECORDS: Cross Seamount and Hawai'i Island to Maui at 349–480 m (Chave & Mundy, 1994).

The original Hawaiian record (Sazonov & Iwamoto, 1992) was in error; their "Hawaiian" specimen was actually collected in the Caroline Islands (NMFS, unpubl. data).

GENERAL RANGE: Pacific endemic known from the Caroline Islands, the Hawaiian Islands, and the south-eastern Pacific. Emybenthic at 330–600 m (Sazonov & Iwamoto, 1992; Chave & Mundy, 1994; NMFS, unpubl. data).

***Caelorinchus* sp.**

*Caelorinchus* sp. and "... an undescribed species from the Hawaiian Ridge ...": Sazonov (1994).

TAXONOMY: Sazonov (1994).

HAWAIIAN RECORDS: An undescribed *Caelorinchus* species was reported from unspecified localities in the Hawaiian Islands by Sazonov (1994).

GENERAL RANGE: Unknown.

***Cetonus crassiceps* (Günther)**

*Coryphaenoides crassiceps* Günther, 1878, p. 25, north of Kermadec Island, western South Pacific.

*Cetonus crassiceps* (Günther, 1878): Sazonov & Shcherbachev (1985), Paxton *et al.* (1989), Sazonov & Iwamoto (1992), Merrett & Iwamoto (2000).

TAXONOMY: Sazonov & Shcherbachev (1985).

HAWAIIAN RECORDS: Northeast of Pearl and Hermes at 950 m (Sazonov & Shcherbachev, 1985).

GENERAL RANGE: Known from the tropical through temperate Atlantic and Pacific oceans. In the Pacific known only from Australia, the Norfolk Ridge, Vanuatu, the Loyalty Ridge, Lord Howe Rise, the Kermadec Islands, the Hawaiian Islands, and the Sala y Gomez and Nazca Ridges. Emybenthic or benthopelagic at 290–1490 m (Sazonov & Shcherbachev, 1985; Paxton *et al.*, 1989; Sazonov & Iwamoto, 1992; Merrett & Iwamoto, 2000).

**[*Coryphaenoides armatus* (Hector)]**

*Macrurus armatus* Hector, 1875, p. 81, about 200 mi. west of Cape Farewell, New Zealand.

*Coryphaenoides armatus* (Hector, 1875): Iwamoto & Stein (1974), Wilson & Waples (1983), Iwamoto & Sazonov (1988), Cohen *et al.* (1990), Geistdorfer *in* Quéro *et al.* (1990), Endo & Okamura (1992).

TAXONOMY: Wilson & Waples (1983).

COMMON NAMES: Abyssal grenadier (FAO).

HAWAIIAN RECORDS: None but *C. armatus* has been collected at the Hess Seamount, 36°10'N, 178°00'E, (Wilson & Waples, 1983) indicating that it could occur at the Hancock Seamounts.

GENERAL RANGE: Circumglobal in the subtropical and cold-temperate Atlantic, Indian, and Pacific oceans. Emybenthic and benthopelagic at 282–5200 m, but usually at 2000–4300 m (Iwamoto & Stein, 1974; Wilson & Waples, 1983; Iwamoto & Sazonov, 1988; Cohen *et al.*, 1990; Geistdorfer *in* Quéro *et al.*, 1990; Endo & Okamura, 1992).

**[*Coryphaenoides leptolepis* Günther]**

*Coryphaenoides leptolepis* Günther, 1877b, p. 441, off Pernambuco on the coast of Brazil.

*Coryphaenoides leptolepis* Günther, 1877b: Marshall & Iwamoto (1973b), Iwamoto & Stein (1974), Wilson & Waples (1983), Geistdorfer *in* Whitehead *et al.* (1984).

TAXONOMY: Iwamoto & Stein (1974).

HAWAIIAN RECORDS: None but *C. leptolepis* has been collected at the Hess Seamount, 36°10'N, 178°00'E, (Wilson & Waples, 1983) indicating that it could occur at the Hancock Seamounts.

GENERAL RANGE: Atlantic and North Pacific oceans. Engybenthic and benthopelagic at 610–4000 m, primarily at 1900–3700 m (Marshall & Iwamoto, 1973b; Iwamoto & Stein, 1974; Geistdorfer *in* Whitehead *et al.*, 1984).

***Coryphaenoides longicirrhus*** (Gilbert)

*Macrourus longicirrhus* Gilbert, 1905, p. 672, Fig. 263, vicinity of Kaua'i, Hawaiian Islands.

*Macrourus longicirrhus* Gilbert, 1905: Gilbert (1905).

*Coryphaenoides longicirrhus* (Gilbert, 1905): Fowler (1928, 1949), Gosline & Brock (1960), Marshall & Iwamoto (1973b), Tinker (1982), Wilson *et al.* (1985), Iwamoto & Sazonov (1988), Sazonov & Iwamoto (1992), Chave & Mundy (1994), Shcherbachev & Iwamoto (1995).

TAXONOMY: Marshall & Iwamoto (1973b), Iwamoto & Sazonov (1988).

HAWAIIAN RECORDS: Lō'ihi to Kaua'i at 1450–2403 m (Gilbert, 1905; Chave & Mundy, 1994).

GENERAL RANGE: Central Pacific endemic from the Hawaiian Islands and the Mid-Pacific Seamounts. Records from the Indian Ocean refer to *C. castaneus*. Engybenthic at 1450–2403 m (Gilbert, 1905; Wilson *et al.*, 1985; Sazonov & Iwamoto, 1992; Chave & Mundy, 1994; Shcherbachev & Iwamoto, 1995).

[*Coryphaenoides rudis* Günther]

*Coryphaenoides rudis* Günther, 1878, p. 24, north of Kermadec Island, western South Pacific.

*Coryphaenoides paradoxus* (Smith & Radcliffe, 1912): Wilson *et al.* (1985), Iwamoto & Sazonov (1988), Sazonov & Iwamoto (1992).

*Coryphaenoides macrocephalus* (Maul, 1951): Iwamoto & Sazonov (1988), Sazonov & Iwamoto (1992).

*Coryphaenoides rudis* Günther, 1878: Shcherbachev & Iwamoto (1995), Iwamoto & Williams (1999), Iwamoto & Graham (2001).

TAXONOMY: Shcherbachev & Iwamoto (1995).

COMMON NAMES: Bighead grenadier (FAO).

HAWAIIAN RECORDS: None verified but this species has been collected at the Darwin Seamount, 22°07.7'N, 171°36.0'E at 1600 m (Wilson *et al.*, 1985) and could occur in Hawaiian waters. The inclusion of the Hawaiian Islands in this species' range by Sazonov & Iwamoto (1992) may refer to the record from Darwin Seamount.

GENERAL RANGE: Circumglobal, known from the Gulf of Mexico, Caribbean Sea, the Indian Ocean, the Philippines, western and eastern Australia, the Tasman Sea, the Kermadec Islands, the Mid-Pacific Seamounts, and the Nazca Ridge in the southeastern Pacific. Engybenthic at 980–2380 m (Wilson *et al.*, 1985; Iwamoto & Sazonov, 1988; Sazonov & Iwamoto, 1992; Shcherbachev & Iwamoto, 1995; Iwamoto & Williams, 1999; Iwamoto & Graham, 2001).

[*Coryphaenoides yaquinae* Iwamoto & Stein]

*Coryphaenoides (Nematonurus) yaquinae* Iwamoto & Stein, 1974, p. 34, Figs. 15A, 20, Tufts Abyssal Plain, northeastern Pacific, at 44°39'54"N, 133°37'12"W.

*Coryphaenoides yaquinae* Iwamoto & Stein, 1974: Iwamoto & Stein (1974), Wilson & Waples (1983), Smith *et al.* (1992), Endo & Okamura (1992).

TAXONOMY: Wilson & Waples (1983).

HAWAIIAN RECORDS: None but collections at 36°10'N, 178°00'E at 3751 m (Wilson & Waples, 1983) and 31°N, 159°W at 4800–5200 m (Smith *et al.*, 1992) suggest that *C. yaquinae* could occur at the Hancock Seamounts.

GENERAL RANGE: Eastern South Atlantic, central tropical Pacific, and North Pacific oceans. Engybenthic and benthopelagic at 2500–6450 m, usually at >3400 m (Iwamoto & Stein, 1974; Wilson & Waples, 1983; Smith *et al.*, 1992; Endo & Okamura, 1992).

***Hymenocephalus antraeus*** Gilbert & Cramer

*Hymenocephalus antraeus* Gilbert & Cramer, 1897, p. 428, Pl. 46 (fig. 2), off the Hawaiian Islands.

*Hymenocephalus antraeus* Gilbert & Cramer, 1897: Gilbert & Cramer (1897), Gilbert (1905), Fowler (1928), Struhsaker (1973a), Marshall & Iwamoto (1973b), Gosline & Brock (1960), Tinker (1982), Sazonov & Iwamoto (1992).

TAXONOMY: Marshall & Iwamoto (1973b), Sazonov & Iwamoto (1992).

HAWAIIAN RECORDS: Hawai'i Island to O'ahu at 450–799 m. This is the most abundant macrourid in Hawaiian waters (Gilbert & Cramer, 1897; Gilbert, 1905; Struhsaker, 1973a).

GENERAL RANGE: Hawaiian endemic. Engyebenthic at 450–799 m (Gilbert, 1905; Struhsaker, 1973a; Sazonov & Iwamoto, 1992).

***Hymenocephalus aterrimus* Gilbert**

*Hymenocephalus aterrimus* Gilbert, 1905, p. 666, Pl. 93, off Kaua'i, Hawaiian Islands.

*Hymenocephalus aterrimus* Gilbert, 1905: Gilbert (1905), Fowler (1928), Gosline & Brock (1960), Struhsaker (1973a), Marshall & Iwamoto (1973b), Tinker (1982), Sazonov & Iwamoto (1992), Iwamoto & Merrett (1997), Merrett & Iwamoto (2000).

TAXONOMY: Sazonov & Iwamoto (1992).

HAWAIIAN RECORDS: Hawai'i Island to French Frigate at 536–872 m (Gilbert, 1905; Struhsaker, 1973a).

GENERAL RANGE: Circumglobal in the tropical through temperate Atlantic, Indian, and Pacific oceans except in the eastern Pacific near the American continents. Engyebenthic at 340–1348 m (Gilbert, 1905; Struhsaker, 1973a; Marshall & Iwamoto, 1973b; Sazonov & Iwamoto, 1992; Iwamoto & Merrett, 1997; Merrett & Iwamoto, 2000).

***Hymenocephalus striatulus* Gilbert**

*Hymenocephalus striatulus* Gilbert, 1905, p. 665, Figs. 259, off the southwest coast of O'ahu, Hawaiian Islands.

*Hymenocephalus striatulus* Gilbert, 1905: Gilbert (1905), Fowler (1928), Gosline & Brock (1960), Marshall & Iwamoto (1973b), Tinker (1982), Sazonov & Iwamoto (1992).

TAXONOMY: Marshall & Iwamoto (1973b), Sazonov & Iwamoto (1992).

HAWAIIAN RECORDS: O'ahu to Kaua'i at 101–662 m (Gilbert, 1905).

GENERAL RANGE: Pacific endemic known from the Hawaiian Islands and the Sala y Gomez Ridge in the SE Pacific. Engyebenthic at 101–800 m (Gilbert, 1905; Sazonov & Iwamoto, 1992).

***Hymenocephalus tenuis* Gilbert & Hubbs**

*Hymenocephalus tenuis* Gilbert & Hubbs, 1917, p. 173, off the south coast of O'ahu, Hawaiian Islands.

*Hymenocephalus tenuis* Gilbert & Hubbs, 1917: Gilbert & Hubbs (1917), Gosline & Brock (1960), Marshall & Iwamoto (1973b), Tinker (1982).

TAXONOMY: Marshall & Iwamoto (1973b), but Sazonov & Iwamoto (1992) suggested that this species might be a senior synonym of the circumglobal *H. gracilis* Gilbert & Hubbs, 1920.

HAWAIIAN RECORDS: Known only from the holotype collected off O'ahu at 485–512 m (Gilbert & Hubbs, 1917).

GENERAL RANGE: Hawaiian Islands endemic. Engyebenthic at 485–512 m (Gilbert & Hubbs, 1917; Sazonov & Iwamoto, 1992). The closely related, if not identical, *H. gracilis* is circumsubtropical at 300–450 m, and sometimes mesopelagic at 0–300 m fishing depths (Iwamoto & Merrett, 1997).

***Kumba hebetata* (Gilbert)**

*Macrourus hebetatus* Gilbert, 1905, p. 671, Fig. 262, off the south coast of O'ahu, Hawaiian Islands.

*Macrourus hebetatus* Gilbert, 1905: Gilbert (1905).

*Coryphaenoides habenatus* [*lapsus* for *hebetatus*]: Fowler (1928).

*Lionurus hebetatus* (Gilbert, 1905): Gosline & Brock (1960), Tinker (1982).

*Nezumia hebetata* (Gilbert, 1905): Iwamoto (1979), Iwamoto *in* Smith & Heemstra (1986) [probably an undescribed species], Sazonov & Iwamoto (1992).

*Kumba hebetata* (Gilbert, 1905): Iwamoto & Sazonov (1994).

TAXONOMY: Iwamoto & Sazonov (1994).

HAWAIIAN RECORDS: O'ahu at 547–591 m (Gilbert, 1905).

GENERAL RANGE: Perhaps a Hawaiian Islands endemic; known only from the holotype. Engyebenthic at 547–591 m (Gilbert, 1905; Sazonov & Iwamoto, 1992; Iwamoto & Sazonov, 1994). The South African specimen discussed by Iwamoto (*in* Smith & Heemstra, 1986) is probably an undescribed species (Iwamoto & Sazonov, 1994).

***Kuronezumia bubonis*** (Iwamoto)

*Nezumia* (*Kuronezumia*) *bubonis* Iwamoto, 1974, p. 509, Figs. 1–3, off Barra San Antonio, Mexico, western Gulf of Mexico, at 24°49'N, 96°27'W.

*Nezumia* sp.: Struhsaker (1973a).

*Nezumia bubonis* Iwamoto, 1974: Iwamoto (1974, 1979), Paxton *et al.* (1989).

*Kuronezumia bubonis* (Iwamoto, 1974): Shcherbachev *et al.* (1992).

TAXONOMY: Shcherbachev *et al.* (1992).

HAWAIIAN RECORDS: Maui to O'ahu at 585–704 m (Struhsaker, 1973a; Iwamoto, 1974; Shcherbachev *et al.*, 1992).

GENERAL RANGE: Probably circumtropical and subtropical in the Atlantic, Indian, and Pacific oceans except the eastern North Pacific. Known only from the Hawaiian Islands in the central North Pacific. Engyebenthic at 585–1300 m (Iwamoto, 1979; Paxton *et al.*, 1989; Shcherbachev *et al.*, 1992).

***Malacocephalus boretzi*** Sazonov

*Malacocephalus boretzi* Sazonov, 1985, p. 719, Fig. 1, Emperor Seamounts, central North Pacific, at 30°16'N, 178°43'E.

*Malacocephalus* sp.: Borets (1986).

*Malacocephalus boretzi* Sazonov, 1985: Sazonov (1985), Cohen *et al.* (1990).

TAXONOMY: Sazonov (1985), Cohen *et al.* (1990).

HAWAIIAN RECORDS: Recorded from seamounts on both sides of the Hancock Seamounts at 260–290 m (Sazonov, 1985; Borets, 1986).

GENERAL RANGE: Southern Emperor Seamounts and northern Hawaiian Ridge endemic. Engyebenthic at 260–290 m (Sazonov, 1985).

***Malacocephalus hawaiiensis*** Gilbert

*Malacocephalus hawaiiensis* Gilbert, 1905, p. 677, Fig. 265, off the south coast of O'ahu, Hawaiian Islands.

*Malacocephalus laevis* non (Lowe, 1843): Gilbert & Cramer (1897).

*Malacocephalus hawaiiensis* Gilbert, 1905: Gilbert (1905), Fowler (1928, 1934), Gosline & Brock (1960), Struhsaker (1973a), Marshall (1973), Iwamoto (1979), Tinker (1982), Cohen *et al.* (1990), Sazonov & Iwamoto (1992).

TAXONOMY: Marshall & Iwamoto (1973a), Iwamoto (1979), Cohen *et al.* (1990), and Sazonov & Iwamoto (1992) noted that further study is required to determine if *Malacocephalus hawaiiensis* Gilbert, 1905, is a species distinct from *M. laevis* (Lowe, 1843).

COMMON NAMES: Hawaiian softhead grenadier.

HAWAIIAN RECORDS: Hawai'i Island to French Frigate at 302–1250 m (Gilbert & Cramer, 1897; Gilbert, 1905; Struhsaker, 1973a).

GENERAL RANGE: Hawaiian endemic at 302–1250 m if *M. hawaiiensis* is a valid species. Otherwise circumglobal in the tropical to temperate Atlantic, Indian, and Pacific oceans and engyebenthic at 300–1250 m if synonymous with *M. laevis* (see Sazonov & Iwamoto, 1992).

***Mataeocephalus acipenserinus*** (Gilbert & Cramer)

*Coelocephalus acipenserinus* Gilbert & Cramer, 1897, p. 422, Pl. 42 (fig. 1), off the south coast of Moloka'i, Hawaiian Islands, at ca. 21°N, 157°W.

*Coelocephalus acipenserinus* Gilbert & Cramer, 1897: Gilbert & Cramer (1897).

*Mataeocephalus acipenserinus* (Gilbert & Cramer, 1897): Gilbert (1905), Fowler (1928, 1934), Gosline & Brock (1960), Struhsaker (1973a), Marshall (1973), Iwamoto (1979), Tinker (1982), Cohen *et al.* (1990), Sazonov & Iwamoto (1992), Iwamoto & Merrett (1997), Iwamoto & Williams (1999), Merrett & Iwamoto (2000), Iwamoto & Graham (2001).

TAXONOMY: Iwamoto & Merrett (1997).

COMMON NAMES: Sturgeon grenadier (FAO).

HAWAIIAN RECORDS: Hawai'i Island to French Frigate at 406–911 m (Gilbert & Cramer, 1897; Gilbert, 1905; Struhsaker, 1973a).

GENERAL RANGE: Eastern Indian and Pacific oceans from western and eastern Australia, the Hawaiian Islands, the southwestern Pacific in the region of New Caledonia and Vanuatu, Wallis and Futuna

Islands, and the Sala y Gomez Ridge in the southeast Pacific. Perhaps more widespread in the Indian Ocean for an Indo-Pacific distribution. Engybenthic at 406–1220 m (Gilbert, 1905; Struhsaker, 1973a; Cohen *et al.*, 1990; Sazonov & Iwamoto, 1992; Iwamoto & Merrett, 1997; Iwamoto & Williams, 1999; Merrett & Iwamoto, 2000; Iwamoto & Graham, 2001).

***Mesobius berryi*** Hubbs & Iwamoto

*Mesobius berryi* Hubbs & Iwamoto, 1977, p. 236, Figs. 1–8, 10A, central equatorial Pacific at 0°03.8–07.0'N, 154°56'W.

*Mesobius berryi* Hubbs & Iwamoto, 1977: Hubbs & Iwamoto (1977), Loeb (1979), Sazonov & Iwamoto (1992).

TAXONOMY: Hubbs & Iwamoto (1977).

HAWAIIAN RECORDS: O'ahu at 700–1150 m (Hubbs & Iwamoto, 1977).

GENERAL RANGE: Circumtropical and subtropical in the Atlantic, Indian, and Pacific oceans. Meso-, bathy- and benthopelagic at 0–2700 m fishing depths, probably at >650 m (Hubbs & Iwamoto, 1977; Sazonov & Iwamoto, 1992).

***Nezumia burragei*** (Gilbert)

*Macrourus burragei* Gilbert, 1905, p. 668, Fig. 260, off the south coast of O'ahu, Hawaiian Islands.

*Macrourus burragei* Gilbert, 1905: Gilbert (1905).

*Coryphaenoides burragei* (Gilbert, 1905): Fowler (1928).

*Lionurus burragei* (Gilbert, 1905): Gosline & Brock (1960), Tinker (1982).

*Nezumia burragei* (Gilbert, 1905): Marshall & Iwamoto (1973b), Iwamoto (1979), Okamura *in* Masuda *et al.* (1984), Sazonov & Iwamoto (1992).

TAXONOMY: Marshall & Iwamoto (1973b). The taxonomic status of *N. burragei* needs investigation (Sazonov & Iwamoto, 1992).

HAWAIIAN RECORDS: O'ahu at 538–604 m (Gilbert, 1905).

GENERAL RANGE: Western and central North Pacific endemic known from the Hawaiian Islands and Japan. Engybenthic at 538–604 m (Gilbert, 1905; Iwamoto, 1979; Okamura *in* Masuda *et al.*, 1984; Sazonov & Iwamoto, 1992).

COMMENTS: The *Nezumia* sp. A, B, and C of Struhsaker (1973a) and “Macrourid (poss. *Nezumia* sp.)” of Loeb (1979) were not identified to species.

***Nezumia ectenes*** (Gilbert & Cramer)

*Macrourus ectenes* Gilbert & Cramer, 1897, p. 423, Pl. 44 (fig. 1), Kaiwi Channel between Moloka'i and O'ahu, Hawaiian Islands, at 21°15'N, 157°30'W.

*Macrourus ectenes* Gilbert & Cramer, 1897: Gilbert & Cramer (1897), Gilbert (1905).

*Coryphaenoides ectenes* (Gilbert & Cramer, 1897): Fowler (1928).

*Lionurus ectenes* (Gilbert & Cramer, 1897): Gosline & Brock (1960), Tinker (1982).

*Nezumia ectenes* (Gilbert & Cramer, 1897): Marshall & Iwamoto (1973b), Iwamoto (1979), Sazonov & Iwamoto (1992).

TAXONOMY: Marshall & Iwamoto (1973b). The status of this species needs evaluation (Sazonov & Iwamoto, 1992).

HAWAIIAN RECORDS: Known only from the holotype collected between Moloka'i and O'ahu at 572 m (Gilbert & Cramer, 1897).

GENERAL RANGE: Hawaiian endemic. Engybenthic at 572 m (Gilbert & Cramer, 1897; Sazonov & Iwamoto, 1992).

***Nezumia holocentra*** (Gilbert & Cramer)

*Macrourus holocentrus* Gilbert & Cramer, 1897, p. 425, Pl. 43, off the southeastern coast of O'ahu at 21°08'N, 157°43'W.

*Macrourus holocentrus* Gilbert & Cramer, 1897: Gilbert & Cramer (1897), Gilbert (1905).

*Coryphaenoides holocentrus* (Gilbert & Cramer, 1897): Fowler (1928).

*Lionurus holocentrus* (Gilbert & Cramer, 1897): Gosline & Brock (1960), Tinker (1982).

*Nezumia holocentra* (Gilbert & Cramer, 1897): Marshall & Iwamoto (1973b), Iwamoto (1979), Sazonov & Iwamoto (1992).

TAXONOMY: Marshall & Iwamoto (1973b).



HAWAIIAN RECORDS: O'ahu at 563–589 m (Gilbert & Cramer, 1897; Gilbert, 1905).

GENERAL RANGE: Hawaiian endemic. Engybenthic at 563–589 m (Gilbert, 1905; Sazonov & Iwamoto, 1992).

***Nezumia obliquata*** (Gilbert)

*Macrourus obliquatus* Gilbert, 1905, p. 670, Fig. 261, off the east coast of Kaua'i, Hawaiian Islands.

*Macrourus obliquatus* Gilbert, 1905: Gilbert (1905).

*Coryphaenoides obliquatus* (Gilbert, 1905): Fowler (1928).

*Lionurus obliquatus* (Gilbert, 1905): Gosline & Brock (1960), Tinker (1982).

*Nezumia obliquata* (Gilbert, 1905): Marshall & Iwamoto (1973b), Iwamoto (1979), Sazonov & Iwamoto (1992), Sazonov (1994).

TAXONOMY: Marshall & Iwamoto (1973b), Sazonov (1994).

HAWAIIAN RECORDS: Kaua'i at 799–1156 m (Gilbert, 1905).

GENERAL RANGE: Hawaiian and Emperor Seamounts endemic. Engybenthic at 799–1400 m (Gilbert, 1905; Sazonov & Iwamoto, 1992; Sazonov, 1994).

***Nezumia propinqua*** (Gilbert & Cramer)

*Macrourus propinquus* Gilbert & Cramer, 1897, p. 424, Pl. 42 (fig. 2), off the southeastern coast of O'ahu, Hawaiian Islands, at 21°08'N, 157°43'W.

*Macrourus propinquus* Gilbert & Cramer, 1897: Gilbert & Cramer (1897), Gilbert (1905).

*Coryphaenoides propinquus* (Gilbert & Cramer, 1897): Fowler (1928, 1949).

*Lionurus propinquus* (Gilbert & Cramer, 1897): Gosline & Brock (1960), Tinker (1982).

*Nezumia propinquus* (Gilbert & Cramer, 1897): Struhsaker (1973a).

*Nezumia propinqua* (Gilbert & Cramer, 1897): Marshall & Iwamoto (1973b), Iwamoto *in* Smith & Heemstra (1986), Sazonov & Iwamoto (1992), Chave & Mundy (1994), Iwamoto & Williams (1999), Iwamoto & Graham (2001).

TAXONOMY: Marshall & Iwamoto (1973b), Iwamoto *in* Smith & Heemstra (1986), Sazonov & Iwamoto (1992).

COMMON NAMES: Aloha grenadier (FAO).

HAWAIIAN RECORDS: Hawai'i Island to Kaua'i at 350–871 m (Gilbert & Cramer, 1897; Gilbert, 1905; Struhsaker, 1973a).

GENERAL RANGE: Indo-Pacific from east Africa to western and eastern Australia, Vietnam, the Kyushu-Palau Ridge, the southwest Pacific in the region of New Caledonia, the Hawaiian Islands, and the eastern South Pacific. Engybenthic at 219–914 m (Gilbert, 1905; Sazonov & Iwamoto, 1992; Chave & Mundy, 1994; Iwamoto & Williams, 1999; Iwamoto & Merrett, 1997).

[*Nezumia tinro* Sazonov]

*Nezumia tinro* Sazonov, 1985, p. 724, Fig. 2, Emperor Seamounts, central North Pacific, at 44°33'N, 171°31'E.

TAXONOMY: Sazonov (1985, 1994), Cohen *et al.* (1990).

HAWAIIAN RECORDS: None but this poorly known species has been collected at 37°55'N, 170°53'E (Sazonov, 1994) and could occur at the Hancock Seamounts.

GENERAL RANGE: Emperor Seamounts endemic from 44°33'N, 171°31'E to 37°55'N, 170°53'E. Engy-benthic at 1240–1400 m (Sazonov, 1985, 1994).

***Pseudocetonurus septifer*** Sazonov & Shcherbachev

*Pseudocetonurus septifer* Sazonov & Shcherbachev, 1982, p. 712, Fig. 2, Sala y Gomez Ridge, southeastern Pacific, at 25°20.2'S, 93°35.5'W.

*Pseudocetonurus septifer* Sazonov & Shcherbachev, 1982: Sazonov & Iwamoto (1992).

TAXONOMY: Sazonov & Iwamoto (1992).

HAWAIIAN RECORDS: Hawai'i Island, found floating at the surface near a lava flow (Sazonov & Iwamoto, 1992).

GENERAL RANGE: Pacific endemic known from the Hawaiian Islands and the Sala y Gomez Ridge in the southeastern Pacific. Benthopelagic at 340–950 m (Sazonov & Iwamoto, 1992).

***Sphagemacrurus gibber*** (Gilbert & Cramer)

*Macrourus gibber* Gilbert & Cramer, 1897, p. 426, Pl. 44 (fig. 2), off the southeastern coast of O'ahu, Hawaiian Islands, at 21°08'N, 157°43'W [Eschmeyer (1998) erroneously gave the latitude as 6°08'N].

*Macrourus gibber* Gilbert & Cramer, 1897: Gilbert & Cramer (1897), Gilbert (1905).

*Coryphaenoides gibber* (Gilbert & Cramer, 1897): Fowler (1928, 1934).

*Lionurus gibber* (Gilbert & Cramer, 1897): Gosline & Brock (1960), Tinker (1982).

*Sphagemacrurus gibber* (Gilbert & Cramer, 1897): Struhsaker (1973a), Marshall (1973), Sazonov & Iwamoto (1992).

TAXONOMY: Marshall & Iwamoto (1973a).

HAWAIIAN RECORDS: Hawai'i Island to French Frigate at 384–1463 m (Gilbert & Cramer, 1897; Gilbert, 1905; Struhsaker, 1973a).

GENERAL RANGE: Hawaiian Islands endemic. Engyebenthic at 384–1463 m (Gilbert, 1905; Struhsaker, 1973a; Sazonov & Iwamoto, 1992).

***Trachonurus sentipellis*** Gilbert & Cramer

*Trachonurus sentipellis* Gilbert & Cramer, 1897, p. 429, Pl. 45 (fig. 1), Kaiwi Channel between Moloka'i and O'ahu, Hawaiian Islands, at 21°12'00"N, 157°38'30"W.

*Trachonurus villosus* non (Günther, 1877) [a valid species not known from the Hawaiian Islands]: Marshall & Iwamoto (1973a), Geistdorfer *in* Whitehead *et al.* (1984), Iwamoto *in* Smith & Heemstra (1986), Paxton *et al.* (1989), Cohen *et al.* (1990), Sazonov & Iwamoto (1992) — all for mention of Hawaiian Islands specimens only.

*Trachonurus* [sic] *sentipellis* Gilbert & Cramer, 1897: Fowler (1928).

*Trachonurus sentipellis* Gilbert & Cramer, 1897: Gilbert & Cramer (1897), Gilbert (1905), Fowler (1949), Gosline & Brock (1960), Struhsaker (1973a), Tinker (1982), Iwamoto (1997), Iwamoto & Merrett (1997), Iwamoto & Williams (1999), Merrett & Iwamoto (2000), Iwamoto & Graham (2001).

TAXONOMY: Between 1984 and 1997, *T. sentipellis* Gilbert & Cramer, 1897, was regarded as a junior synonym of *T. villosus* (Günther, 1877). Iwamoto (1997) recognized several populations of *Trachonurus* as distinct species, including *T. sentipellis*.

HAWAIIAN RECORDS: Hawai'i Island to Kaua'i at 613–1470 m (Gilbert & Cramer, 1897; Gilbert, 1905; Struhsaker, 1973a).

GENERAL RANGE: Eastern Indian and Pacific oceans from western and eastern Australia, New Caledonia, Vanuatu, the Loyalty and Norfolk Ridges, and the Hawaiian Islands. Engyebenthic and benthopelagic at 500–1470 m (Gilbert, 1905; Struhsaker, 1973a; Sazonov & Iwamoto, 1992; Iwamoto, 1997; Iwamoto & Merrett, 1997; Iwamoto & Williams, 1999; Merrett & Iwamoto, 2000; Iwamoto & Graham, 2001).

***Ventrifossa atherodon*** (Gilbert & Cramer)

*Optonurus atherodon* Gilbert & Cramer, 1897, p. 431, Pl. 46 (fig. 1), Kaiwi Channel between Moloka'i and O'ahu, Hawaiian Islands, at 21°12'00"N, 157°38'30"W.

*Optonurus atherodon* Gilbert & Cramer, 1897: Gilbert & Cramer (1897), Gilbert (1905).

*Ventrifossa atherodon* (Gilbert & Cramer, 1897): Fowler (1928), Gosline & Brock (1960), Struhsaker (1973a), Marshall (1973), Tinker (1982), Okamura *in* Masuda *et al.* (1984), Cohen *et al.* (1990), Sazonov & Iwamoto (1992), Iwamoto & Merrett (1997), Merrett & Iwamoto (2000).

TAXONOMY: Marshall & Iwamoto (1973a), Sazonov & Iwamoto (1992).

COMMON NAMES: Arrowtooth grenadier (FAO).

HAWAIIAN RECORDS: Hawai'i Island to French Frigate at 302–936 m (Gilbert & Cramer, 1897; Gilbert, 1905; Struhsaker, 1973a; Cohen *et al.*, 1990).

GENERAL RANGE: Pacific endemic known only from the Hawaiian Islands and the southwest Pacific near New Caledonia and Vanuatu. Engyebenthic and benthopelagic at 280–950 m (Struhsaker, 1973a; Cohen *et al.*, 1990; Sazonov & Iwamoto, 1992; Iwamoto & Merrett, 1997; Merrett & Iwamoto, 2000).

***Ventrifossa ctenomelas*** (Gilbert & Cramer)

*Chalinura ctenomelas* Gilbert & Cramer, 1897, p. 430, Pl. 45 (fig. 2), off the south coast of Moloka'i, Hawaiian Islands, at ca. 21°N, 157°W.

*Chalinura ctenomelas* Gilbert & Cramer, 1897: Gilbert & Cramer (1897), Gilbert (1905).  
*Ventrifossa ctenomelas* (Gilbert & Cramer, 1897): Fowler (1928), Gosline & Brock (1960), Struhsaker (1973a), Marshall (1973), Iwamoto (1979), Tinker (1982), Cohen *et al.* (1990), Sazonov & Iwamoto (1992).

TAXONOMY: Marshall & Iwamoto (1973a), Iwamoto (1979).

COMMON NAMES: Hawaiian grenadier (FAO).

HAWAIIAN RECORDS: Hawai'i Island to Kaua'i at 351–673 m (Gilbert & Cramer, 1897; Gilbert, 1905; Struhsaker, 1973a).

GENERAL RANGE: Hawaiian Islands endemic. Engybenthic and benthopelagic at 351–673 m (Struhsaker, 1973a; Cohen *et al.*, 1990; Sazonov & Iwamoto, 1992).

## Gadoidei

### Moridae — Codlings, Morid cods, Moras

#### *Antimora microlepis* Bean

*Antimora microlepis* Bean, 1890, p. 38, off Cape St. James, Queen Charlotte Islands, British Columbia, at 51°23'N, 130°34'W.

*Antimora rostrata* non (Günther, 1878) [a valid species not found in the North Pacific]: Iwamoto (1975, in part), Prosser *et al.* (1975), Rigby & Prosser (1975), Novikov *et al.* (1981).

*Antimora microlepis* Bean, 1890: Gilbert (1905), Fowler (1928), Gosline & Brock (1960), Small (1981), Tinker (1982), Wilson *et al.* (1985), Borets (1986), Cohen *et al.* (1990), Chave & Mundy (1994).

TAXONOMY: Small (1981).

COMMON NAMES: Pacific flatnose (AFS), Finescale antimora (FAO).

HAWAIIAN RECORDS: Lō'ihi to Kaua'i at 1828–2403 m (Gilbert, 1905; Prosser *et al.*, 1975; Chave & Mundy, 1994). A record from 3000 m (Rigby & Prosser, 1975) needs confirmation.

GENERAL RANGE: North Pacific endemic from southern Japan to the Aleutians, the Gulf of California, the Emperor Seamounts, Hawai'i, and the Mid-Pacific Seamounts. Engybenthic or benthopelagic at 510–2940 m (Small, 1981; Wilson *et al.*, 1985; Borets, 1986; Cohen *et al.*, 1990).

#### *Gadella molokaiensis* Paulin

*Gadella molokaiensis* Paulin, 1989, p. 100, Figs. 3, 5, Mamala Bay off Pearl Harbor, O'ahu, Hawaiian Islands.

*Brosmiculus* sp.: Struhsaker (1973a).

Morid sp. A: Struhsaker (1973a).

*Physiculus edelmanni* non Brauer, 1906 [a valid Indian Ocean *Gadella* species]: Humphreys *et al.* (1984)?, Uchida & Uchiyama (1986)?

*Gadella molokaiensis* Paulin, 1989: Paulin (1989b), Chave & Mundy (1994).

TAXONOMY: Records of “*Physiculus edelmanni*” Brauer, 1906, from the Hancock Seamounts may refer to *G. molokaiensis* Paulin, 1989, or *Gadella jordani* (Böhlke & Mead, 1951), a species known from Japan and the Kyushu-Palau Ridge. *Gadella edelmanni* is a valid Indian Ocean species; both it and *G. jordani* are very similar to *G. molokaiensis* (see Paulin, 1989b). *Gadella* specimens from the Hancock Seamounts in the NMFS collection are intermediate in character states between *G. molokaiensis* and *G. jordani*, suggesting that further examination of Emperor Seamounts *Gadella* is needed to reevaluate the status of these two species (R. Moffitt and B. Mundy, pers. observ., July 2001).

HAWAIIAN RECORDS: Hawai'i Island to the Hancock Seamounts at 181–686 m (Struhsaker, 1973a; Humphreys *et al.*, 1984; Uchida & Uchiyama, 1986; Chave & Mundy, 1994).

GENERAL RANGE: Hawaiian Islands endemic. Benthic in crevices of rocky habitats at 180–686 m (Struhsaker, 1973a; Paulin, 1989b; Chave & Mundy, 1994).

#### [*Halargyreus johnsonii* Günther]

*Halargyreus johnsonii* Günther, 1862, p. 342, stomach content sample taken off Madeira, eastern Atlantic.

*Halargyreus* sp.: Humphreys *et al.* (1984)?

*Halargyreus johnsonii* Günther, 1862: Kanayama *et al.* (1978), Novikov *et al.* (1981), Paulin (1984, 1989a), Borets (1986), Paxton *et al.* (1989), Cohen *et al.* (1990), Trunov (1992).

TAXONOMY: The genus is monotypic (Paulin (1989a, Trunov 1992).

COMMON NAMES: Slender codling (FAO).

HAWAIIAN RECORDS: None but a record from Milwaukee Seamount (Humphreys *et al.*, 1984) indicates that it could be expected at Hancock.

GENERAL RANGE: Known from the Atlantic Ocean, the Antarctic Ocean, and the Pacific Ocean from Japan, Australia, New Zealand, off southern South America, and from the Emperor Seamounts. Benthopelagic at 508–1550 m (Kanayama *et al.*, 1978; Novikov *et al.*, 1981; Paulin, 1984; Borets, 1986; Paxton *et al.*, 1989; Cohen *et al.*, 1990; Trunov, 1992).

[*Laemonema longipes* Schmidt]

*Laemonema longipes* Schmidt, 1938, p. 655, Sea of Okhotsk at 55°13.30'N, 146°34'E.

*Podonema longipes* (Schmidt, 1938): Humphreys *et al.* (1984).

*Laemonema longipes* Schmidt, 1938: Cohen *et al.* (1990), Melendez & Markle (1997).

TAXONOMY: Melendez & Markle (1997).

COMMON NAMES: Longfin codling (FAO).

HAWAIIAN RECORDS: None. Humphreys *et al.* (1984) recorded this species from Koko Seamount, but this record needs verification.

GENERAL RANGE: Subarctic Pacific from Japan to the Okhotsk and Bering Seas. Ephybenthic or benthopelagic at 200–1400 m (Cohen *et al.*, 1990; Melendez & Markle, 1997).

*Laemonema rhodochir* Gilbert

*Laemonema rhodochir* Gilbert, 1905, p. 657, Fig. 255, off the south coast of O'ahu, Hawaiian Islands.

*Laemonema palauense* Okamura, 1982: Okamura *in* Okamura *et al.* (1982).

*Laemonema rhodochir* Gilbert, 1905: Gilbert (1905), Fowler (1928), Gosline & Brock (1960), Tinker (1982), Okamura *in* Okamura *et al.* (1982), Humphreys *et al.* (1984), Parin (1984), Uchida & Uchiyama (1986), Parin & Sazonov (1990), Cohen *et al.* (1990), Chave & Mundy (1994), Melendez & Markle (1997).

TAXONOMY: Melendez & Markle (1997).

HAWAIIAN RECORDS: Hawai'i Island to the Hancock Seamounts at 97–507 m (Gilbert, 1905; Humphreys *et al.*, 1984; Uchida & Uchiyama, 1986).

GENERAL RANGE: Pacific endemic known from the Kyushu-Palau Ridge, the Hawaiian Islands, and the Sala y Gomez Ridge in the SE Pacific. Benthic in or near crevices of rocky habitats at 95–600 m (Gilbert, 1905; Okamura *in* Okamura *et al.*, 1982; Parin & Sazonov, 1990; Chave & Mundy, 1994; Melendez & Markle, 1997).

*Laemonema robustum* Johnson

*Laemonema robustum* Johnson, 1862, p. 171, off Madeira, eastern Atlantic.

*Laemonema filodorsale* Okamura, 1982: Okamura *in* Okamura *et al.* (1982), Cohen *et al.* (1990).

*Laemonema robustum* Johnson, 1862: Melendez & Markle (1997).

TAXONOMY: Melendez & Markle (1997). See Eschmeyer (1998) for the authorship of this species.

HAWAIIAN RECORDS: Specimens identified as *L. filodorsale* Okamura, 1982, now considered a synonym of *L. robustum* Johnson, 1862, have been collected at unspecified depths from Gardner Pinnacles to the Hancock Seamounts (R. Moffitt, unpubl. data).

GENERAL RANGE: Atlantic and Pacific oceans, known from Madeira, Saint Helena Island, Australia, New Caledonia, the Kyushu-Palau Ridge, and the Hawaiian Ridge. Benthic at 336–1200 m (Okamura *in* Okamura *et al.*, 1982; Cohen *et al.*, 1990; Melendez & Markle, 1997).

*Lepidion inosimae* (Günther)

*Haloporphyrus inosimae* Günther, 1887, p. 92, Pl. 20 (fig. B), off Inosima, Japan.

*Lepidion inosimae* (Günther, 1887): Nakaya *et al.* (1980), Humphreys *et al.* (1984), Borets (1986), Paxton *et al.* (1989), Cohen *et al.* (1990).

TAXONOMY: Nakaya *et al.* (1980), Cohen *et al.* (1990).

HAWAIIAN RECORDS: Unpublished records from French Frigate to the Hancock and Koko seamounts at 250–675 m (Humphreys *et al.*, 1984; R. Moffitt, unpubl. data).

GENERAL RANGE: Anti-tropical and -subtropical western and central Pacific endemic known from Australia, Ramapo Bank (26°38'N, 140°53'E), Japan, and the southern Emperor Seamounts as far south as Koko. Benthic or engyebenthic at 580–1100 m (Nakaya *et al.*, 1980; Borets, 1986; Paxton *et al.*, 1989).

COMMENTS: The *Lepidion* sp. of Novikov *et al.* (1981) was not identified to species.

[*Lepidion schmidti* Svetovidov]

*Lepidion schmidti* Svetovidov, 1936, p. 266, Fig. 1, Sagami Bay, Misaki, Japan.

*Lepidion schmidti* Svetovidov, 1936: Nakaya *et al.* (1980), Humphreys *et al.* (1984), Cohen *in* Whitehead *et al.* (1984), Borets (1986), Paxton *et al.* (1989), Cohen *et al.* (1990).

TAXONOMY: Nakaya *et al.* (1980).

HAWAIIAN RECORDS: None but Nakaya *et al.* (1980) and Humphreys *et al.* (1984) recorded this species from the Koko Seamount.

GENERAL RANGE: Known from the North Atlantic and the western Pacific from Australia and Japan to Kamchatka and the Emperor Seamounts south to Koko Seamount. Benthic or engyebenthic at 375–2000 m (Cohen *in* Whitehead *et al.*, 1984; Borets, 1986; Paxton *et al.*, 1989; Cohen *et al.*, 1990).

***Physiculus cynodon* Sazonov**

*Physiculus cynodon* Sazonov, 1986, p. 305, fig'd, Emperor Seamounts, central North Pacific, at 31°03'N, 175°53'W.

*Lotella* sp.: Iwai (1976).

*Physiculus cynodon* Sazonov, 1986: Sazonov (1986), Paulin (1989b).

TAXONOMY: Paulin (1989b).

HAWAIIAN RECORDS: The Hancock to Colahan Seamounts (Sazonov, 1986; R. Moffitt, pers. comm., Dec. 2000). Iwai (1976) presented a photograph and brief description in Japanese of a specimen identified as a *Lotella* that was collected at 365 m in the region of the Hawaiian Ridge. The other species included in Iwai's (1976) collection indicate that this was probably from seamounts or islands of the northwestern end of the Ridge. *Lotella* has otherwise not been recorded from the region and is known only from Japan, New Zealand, temperate Australia, and Juan Fernandez Island (Cohen *et al.*, 1990). It is most likely that Iwai's (1976) *Lotella* is a misidentified *Physiculus cynodon* because both taxa have an enlarged outer row of teeth on the upper jaw that has been used as an identifying character in the literature. Specimens from the Hancock Seamounts in the NMFS PIFSC collection identified as "*Lotella*" by this character proved to be *P. cynodon* upon reexamination after the description of that species was published (R. Moffitt, pers. comm., Dec. 2000).

GENERAL RANGE: Northern Hawaiian Ridge endemic. Benthic at 300–500 m (Sazonov, 1986; Paulin, 1989b).

***Physiculus grinnelli* Jordan & Jordan**

*Physiculus grinnelli* Jordan & Jordan, 1922, p. 22, Pl. 1 (fig. 3), Honolulu market, O'ahu, Hawaiian Islands.

*Physiculus kaupi* non Poey, 1865 [a valid Atlantic species]: Fowler (1928, in part).

*Physiculus grinnelli* Jordan & Jordan, 1922: Jordan & Jordan (1922), Gosline & Brock (1960), Clarke (1972), Struhsaker (1973a), Novikov *et al.* (1981), Tinker (1982), Humphreys *et al.* (1984), Randall *et al.* (1985), Uchida & Uchiyama (1986), Paulin (1989b), Chave & Mundy (1994).

TAXONOMY: Paulin (1989b).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to the Hancock and Milwaukee Seamounts at 97–320 m (Jordan & Jordan, 1922; Clarke, 1972; Humphreys *et al.*, 1984; Randall *et al.*, 1985b; Uchida & Uchiyama, 1986; Chave & Mundy, 1994). Some of these records could well refer to more recently described Hawaiian Islands species of *Physiculus*. *Physiculus grinnelli* has been seen at scuba diving depths (<40 m) at Midway Atoll (K. Stender, pers. comm., 1999).

GENERAL RANGE: Johnston Atoll and Hawaiian Archipelago endemic. Benthic in crevices of rocky habitats at 97–400 m (Struhsaker, 1973a; Novikov *et al.*, 1981; Randall *et al.*, 1985b; Uchida & Uchiyama, 1986; Paulin, 1989b; Chave & Mundy, 1994).

[*Physiculus japonica* Hilgendorf]

*Physiculus japonicus* Hilgendorf, 1879, p. 80, Yokohama, Japan.

*Lotella maximowiczi* Herzenstein, 1896: Borets & Sokolovsky (1978), Humphreys *et al.* (1984).

*Physiculus maximowiczi* (Herzenstein, 1896): Novikov *et al.* (1981).

*Physiculus japonica* Hilgendorf, 1879: Borets (1986), Paulin (1989b), Cohen *et al.* (1990).

TAXONOMY: Paulin (1989b).

COMMON NAMES: Japanese codling (FAO).

HAWAIIAN RECORDS: Borets & Sokolovsky (1978), Novikov *et al.* (1981), Humphreys *et al.* (1984) and Borets (1986) recorded *P. japonica* from the Academician Berg (28°50'N, 178°36'W = Bank 10?), Hancock, Milwaukee, and Koko seamounts just northwest of Kure Atoll, but Paulin (1989b) recorded it only from Japanese waters. Hawaiian Archipelago records of *P. japonica* may refer to more recently described species in the genus.

GENERAL RANGE: Known with certainty from Japan and the Ryukyus but perhaps also at the Emperor Seamounts and northern Hawaiian Ridge (see above). Benthic at 20–880 m (Borets, 1986; Paulin, 1989b; Cohen *et al.*, 1990).

[*Physiculus nigripinnis* Okamura]

*Physiculus nigripinnis* Okamura *in* Okamura *et al.*, 1982, p. 127, Pl. 80, Kyushu-Palau Ridge at 26°46.0'N, 135°24.0'E.

*Physiculus nigripinnis* Okamura, 1982: Okamura *in* Okamura *et al.* (1982), Paulin (1989b), Cohen *et al.* (1990).

TAXONOMY: Paulin (1989b).

HAWAIIAN RECORDS: None but *Physiculus* observed from submersible and ROV transects from unspecified locations in the Hawaiian Islands resemble *P. nigripinnis* in color pattern (C. Kelley, pers. comm., Sept. 2001). In contrast, *Physiculus* specimens from the Hancock Seamounts previously identified as *P. nigripinnis* have proven not to be that species upon closer examination (R. Moffitt, pers. comm., July 2001). More Hawaiian Archipelago specimens of the *Physiculus* with the color pattern of *P. nigripinnis* are needed to investigate the questionable occurrence of this species in the region.

GENERAL RANGE: North Pacific endemic known with certainty only from the Kyushu-Palau Ridge. Benthic at 320–520 m (Okamura *in* Okamura *et al.*, 1982; Cohen *et al.*, 1990).

*Physiculus rhodopinnis* Okamura

*Physiculus rhodopinnis* Okamura *in* Okamura *et al.*, 1982, p. 119, Pl. 78, Kyushu-Palau Ridge at 26°12'N, 135°45'E.

*Physiculus rhodopinnis* Okamura, 1982: Okamura *in* Okamura *et al.* (1982), Paulin (1989b).

TAXONOMY: Paulin (1989b).

HAWAIIAN RECORDS: Unpublished records from Raita Bank to the Hancock Seamounts (R. Moffitt, unpubl. data).

GENERAL RANGE: Indo-Pacific from Madagascar to the Marianas, the Kyushu-Palau Ridge, and northern Hawaiian Ridge. Benthic at 320–540 m (Okamura *in* Okamura *et al.*, 1982; Paulin, 1989b).

*Physiculus sterops* Paulin

*Physiculus sterops* Paulin, 1989, p. 123, Figs. 11, 14, Kealai Kahiki off Lāna'i, Hawaiian Islands, at 20°44'N, 156°52'W.

*Physiculus* sp.: Struhsaker (1973a).

*Physiculus sterops* Paulin, 1989: Paulin (1989b).

TAXONOMY: Paulin (1989b).

HAWAIIAN RECORDS: Hawai'i Island to O'ahu at 95–300 m (Struhsaker, 1973a; Paulin, 1989b).

GENERAL RANGE: Hawaiian Islands endemic. Benthic at 95–300 m (Struhsaker, 1973a; Paulin, 1989b).

**Melanonidae — Pelagic cods***Melanonus zugmayeri* Norman

*Melanonus zugmayeri* Norman, 1930, p. 341, Fig. 35, southeastern Atlantic at 13°58'30"S, 11°43'30"E.

*Melanonus zugmayeri* Norman, 1930: Loeb (1979), Cohen *in* Whitehead *et al.* (1984), Cohen *in* Smith & Heemstra (1986), Cohen *et al.* (1990), Howes (1993).

TAXONOMY: Cohen *in* Smith & Heemstra (1986), Cohen *et al.* (1990), Howes (1993).

HAWAIIAN RECORDS: Pearl and Hermes Reef to the Hancock Seamounts at 0–200 m at night (M.P. Seki & C.D. Wilson, unpubl. data). Loeb (1979) recorded *M. zugmayeri* from 28°N, 155°W.

GENERAL RANGE: Circumtropical and subtropical in the Atlantic, Indian, and Pacific oceans. Meso- and bathypelagic at ca. 100–3000 m (Cohen *in* Whitehead *et al.*, 1984; Cohen *et al.*, 1990; Howes, 1993).

### Bregmacerotidae — Codlets

#### *Bregmaceros* sp.

*Bregmaceros atlanticus* non Goode & Bean, 1886: D'Ancona & Cavinato (1965), Belyanina (1974), Boehlert & Mundy (1992).

*Bregmaceros mccllellandi* non Thompson, 1840: Fowler (1928, 1931), D'Ancona & Cavinato (1965), Belyanina (1974), Amesbury (1975), Clarke & Wagner (1976).

TAXONOMY: The taxonomic status of *Bregmaceros* species in Hawaiian waters needs investigation and the systematics of the family worldwide remains confused despite recent work (Houde, 1984; Cohen *et al.*, 1990; Torii *et al.*, 2003). At least two species are present, one of which has been identified as *B. japonicus* Tanaka, 1908, from all life history stages (Clarke & Wagner, 1976; Boehlert & Mundy, 1992; B. Mundy, unpubl. data). Clarke & Wagner (1976) identified juveniles and adults of a second species from O'ahu as similar to *B. mccllellandi* Thompson, 1840. Larvae from O'ahu (B. Mundy, unpubl. data) are most similar to those described as *B. atlanticus* Goode & Bean, 1886, and are unlike larvae described as *B. mccllellandi* (see Houde, 1984). *Bregmaceros mccllellandi* was shown by Torii *et al.* (2003) to be restricted to the Indian Ocean, with the Pacific species identified as *B. mccllellandi* now of unresolved status. The nominal *B. atlanticus* is probably a complex of related populations whose species identities are undefined (Ozawa *in* Gloerfelt-Tarp & Kailola, 1984). A revision of the genus is needed to resolve the identities of the species found in Hawaiian waters.

COMMON NAMES: Codlet.

HAWAIIAN RECORDS: O'ahu to the Hancock Seamounts at 100–250 m at night, 600–1400 m during day (Belyanina, 1974; Amesbury, 1975; Clarke & Wagner, 1976; Boehlert & Mundy, 1992; B. Mundy, unpubl. data).

GENERAL RANGE: The geographic range of this species will not be known until its taxonomy is resolved. *Bregmaceros* species are epi- and mesopelagic at 0–4000 m, usually at 25–300 m at least at night (D'Ancona & Cavinato, 1965; Belyanina, 1974; Houde, 1984; Cohen *in* Whitehead *et al.*, 1984; Smith *in* Smith & Heemstra, 1986; Cohen *in* Quérou *et al.*, 1990; Grove & Lavenberg, 1997).

COMMENTS: Larval *Bregmaceros* sp. collected at Johnston Atoll (Boehlert *et al.*, 1992) and the *Bregmaceros* sp. of Struhsaker (1973a), Loeb (1979), and Tinker (1982) were not identified to species.

#### *Bregmaceros japonicus* Tanaka

*Bregmaceros atlanticus japonicus* Tanaka, 1908a, p. 42, Figured, Samai Sea, Japan.

*Bregmaceros atlanticus* non Goode & Bean, 1886 [a valid species]: Belyanina (1974, in part).

*Bregmaceros japonicus* Tanaka, 1908a: D'Ancona & Cavinato (1965), Clarke & Wagner (1976), Borets & Sokolovsky (1978), Masuda & Ozawa (1979), Houde (1984), Cohen *et al.* (1990), Boehlert & Mundy (1992).

TAXONOMY: Masuda & Ozawa (1979), Houde (1984), Cohen *et al.* (1990).

HAWAIIAN RECORDS: O'ahu to the Hancock Seamounts at 25–200 m at night, <300–800 m during day (Clarke & Wagner, 1976; Boehlert & Mundy, 1992).

GENERAL RANGE: Indo-transPacific from the central Indian Ocean to Japan, Australia, Samoa, the Hawaiian Islands, and the eastern Pacific. Epi- and mesopelagic at 0–800 m, perhaps to 4000 m (D'Ancona & Cavinato, 1965; Belyanina, 1974; Clarke & Wagner, 1976; Masuda & Ozawa, 1979; Houde, 1984).

**Lophiiformes**  
**Lophioidei**

**Lophiidae — Goosefishes**

***Lophiodes bruchius*** Caruso

*Lophiodes bruchius* Caruso, 1981, p. 539, Fig. 13B, off the north coast of Maui, Hawaiian Islands, at 21°03.5'N, 156°29.1'W.

*Lophiomus miacanthus* non Gilbert, 1905 [a valid *Lophiodes* species that also occurs in the Hawaiian Islands]: Struhsaker (1973a, in part).

*Lophiomus* sp.?: Uchida & Uchiyama (1986).

*Lophiodes bruchius* Caruso, 1981: Caruso (1981).

TAXONOMY: Caruso (1981).

HAWAIIAN RECORDS: Maui to Necker at 274–384 m (Caruso, 1981; Uchida & Uchiyama, 1986).

GENERAL RANGE: Hawaiian Islands endemic. Benthic at 274–384 m (Caruso, 1981; Uchida & Uchiyama, 1986).

***Lophiodes miacanthus*** (Gilbert)

*Lophiomus miacanthus* Gilbert, 1905, p. 691, Fig. 273, off the northwest coast of O'ahu, Hawaiian Islands.

*Lophiomus miacanthus* Gilbert, 1905: Gilbert (1905), Fowler (1928), Gosline & Brock (1960), Clarke (1972), Struhsaker (1973a in part), Iwai (1976)?, Novikov *et al.* (1981), Tinker (1982), Humphreys *et al.* (1984), Borets (1986), Uchida & Uchiyama (1986).

*Lophiodes miacanthus* (Gilbert, 1905): Caruso (1981), Okamura *et al.* (1982), Nakabo *in* Masuda *et al.* (1984), Chave & Jones (1991), Chave & Mundy (1994).

TAXONOMY: Caruso (1981).

HAWAIIAN RECORDS: Hawai'i Island to Koko Seamount at 110–960 m (Gilbert, 1905; Novikov *et al.*, 1981; Caruso, 1981; Humphreys *et al.*, 1984; Borets, 1986; Uchida & Uchiyama, 1986; Chave & Jones, 1991; Chave & Mundy, 1994).

GENERAL RANGE: Western and central Pacific endemic from the Kyushu-Palau Ridge, the southern Emperor Seamounts, and the Hawaiian Archipelago. Benthic at 110–960 m (Caruso, 1981; Okamura *et al.*, 1982; Humphreys *et al.*, 1984; Nakabo *in* Masuda *et al.*, 1984; Chave & Jones, 1991; Chave & Mundy, 1994).

***Sladenia remiger*** Smith & Radcliffe

*Sladenia remiger* Smith & Radcliffe *in* Radcliffe, 1912, p. 199, Pl. 16 (fig. 1), Gulf of Tomini, Sulawesi, Indonesia, at 0°21'33"N, 121°34'10"E.

*Sladenia remiger* Smith & Radcliffe, 1912: Caruso & Bullis (1976), Chave & Jones (1991), Chave & Mundy (1994).

TAXONOMY: Caruso & Bullis (1976).

COMMON NAMES: Celebes monkfish (FAO).

HAWAIIAN RECORDS: Cross and Lō'ihi Seamounts, Hawai'i Island, and Northampton Seamount at 780–1540 m (Chave & Jones, 1991; Chave & Mundy, 1994; B. Mundy, pers. observ., Sept. 2002).

GENERAL RANGE: Perhaps a Pacific endemic, known only from Sulawesi and the Hawaiian Islands. Benthic at 780–1540 m (Caruso & Bullis, 1976; Chave & Mundy, 1994).

**Antennaroidei**

**Antennariidae — Frogfishes<sup>37</sup>**

***Antennarius analis*** (Schultz)

*Abantennarius analis* Schultz, 1957, p. 67, Fig. 2, Waikiki, O'ahu, Hawaiian Islands.

*Abantennarius analis* Schultz, 1957: Schultz (1957), Gosline & Brock (1960), Tinker (1982).

*Antennarius analis* (Schultz, 1957): Pietsch & Grobecker (1987), Myers (1989).

TAXONOMY: Pietsch & Grobecker (1987). See Kon & Yoshino (1999) for clarification of authorship of this species' first description.



COMMON NAMES: Pygmy frogfish, Dwarf frogfish (Myers, 1999).

HAWAIIAN RECORDS: Hawai'i Island to O'ahu at 9 m (Schultz, 1957; Gosline & Brock, 1960).

GENERAL RANGE: Eastern Indian and west-central Pacific oceans from Christmas Island and northwestern Australia to the Ryukyu Islands, Belau, Enewetak, the Hawaiian Islands, Fiji, and Samoa. Benthic at 1.5–21 m with an average depth of 11.8 m (Pietsch & Grobecker, 1987; Myers, 1989; Kon & Yoshino, 1999).

### *Antennarius commerson* (Latreille)

*Lophius commerson* Latreille, 1804, p. 74, Mauritius, Indian Ocean.

*Chironectes rubro-fuscus* Garrett, 1863: Garrett (1863).

*Antennarius commersonii* (Latreille, 1804): Günther (1876), Steindachner (1900), Fowler (1900, 1928, 1931, 1934, 1949), Jenkins (1903), Snyder (1904), Jordan & Evermann (1905, in part), Randall (1985a), Pietsch & Grobecker (1987), Myers (1989), Severns & Fiene-Severns (1993), Randall *et al.* (1993b), Hoover (1993), Robertson & Allen (2002).

*Antennarius commersoni* (Latreille, 1804): Jordan & Snyder (1904b), Hoover (2003).

*Antennarius hispidus* non (Bloch & Schneider, 1801) [a valid species not found in the Hawaiian Islands]: Fowler (1928, in part).

*Antennarius moluccensis* Bleeker, 1855: Gosline & Brock (1960) [this listing of *A. commersoni* (Latreille) refers to *A. pictus* (Shaw) – see Pietsch & Grobecker 1987], Tinker (1982).

*Antennarius commerson* (Latreille, 1804): Randall (1996a), Randall *et al.* (1997a).

TAXONOMY: Pietsch & Grobecker (1987).

COMMON NAMES: Commerson's frogfish (Hoover, 1993, 2003; Randall, 1996a), Giant frogfish (Hoover, 1993, 2003).

HAWAIIAN RECORDS: Hawai'i Island to Midway at ca. 9–20 m (Garrett, 1863; Jordan & Evermann, 1905 in part; Severns & Fiene-Severns, 1993; Randall *et al.*, 1993b; Hoover, 1993).

GENERAL RANGE: Indo-transPacific from South Africa and the Red Sea to southern Japan, Ogasawara Islands, Australia, the Hawaiian Islands, the Society Islands, and the eastern Pacific at the Revillagigedos, Cocos Island, central Mexico, Panama, and Colombia. Unrecorded from most archipelagos of the Pacific Plate, except Fiji, the Hawaiian Islands, and the Society Islands. Benthic at 0–45 m, with an average depth of ca. 20 m (Pietsch & Grobecker, 1987; Robertson & Allen, 2002).

### *Antennarius drombus* Jordan & Evermann

*Antennarius drombus* Jordan & Evermann, 1903a, p. 207, Waikiki, Honolulu, Hawaiian Islands.

*Antennarius nexilis* Snyder, 1904: Snyder (1904), Jordan & Evermann (1905), Fowler (1928).

*Antennarius nummifer* non (Cuvier, 1817) [a valid species that also occurs in the Hawaiian Islands]: Fowler (1928, 1931, 1934, 1949, in part).

*Antennarius leucus* Fowler, 1934: Fowler (1934).

*Antennarius coccineus* non (Lesson, 1831) [a valid species that does not occur in the Hawaiian Islands]: Pietsch & Grobecker (1987, in part), Kosaki *et al.* (1991).

*Antennarius drombus* Jordan & Evermann, 1903a: Jordan & Evermann (1903a, 1905), Gosline & Brock (1960), Tinker (1982), Uchida & Uchiyama (1986), Williams (1989), Randall (1996a).

TAXONOMY: Williams (1989), Randall (1996a). Pietsch & Grobecker (1987) considered *A. drombus* Jordan & Evermann, 1903, to be a junior synonym of *A. coccineus* (Lesson ex Cuvier, 1831). Williams (1989) argued that differences in escal morphology not discussed by Pietsch & Grobecker (1987) as well as modal pectoral-ray numbers supported recognition of *A. drombus* as a distinct species. Randall (1996a) agreed with Williams (1989) by listing *Antennarius drombus* as a valid endemic Hawaiian species.

COMMON NAMES: Freckled frogfish (Randall, 1996a), Freckled anglerfish (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at 8–104 m (Jordan & Evermann, 1903a, 1905; Uchida & Uchiyama, 1986; Pietsch & Grobecker, 1987; Kosaki *et al.*, 1991; Randall *et al.*, 1993b).

GENERAL RANGE: Hawaiian Islands and Johnston Atoll endemic. Benthic at 0–104 m but usually at <10 m (Uchida & Uchiyama, 1986; Pietsch & Grobecker, 1987; Myers, 1989; Randall *et al.*, 1993b).

### *Antennarius duescus* Snyder

*Antennarius duescus* Snyder, 1904, p. 537, Pl. 13 (fig. 24), between Maui and Lāna'i, Hawaiian Islands.

*Abantennarius duescus* (Snyder, 1904): Gosline & Brock (1960), Tinker (1982).

*Antennarius duescus* Snyder, 1904: Snyder (1904), Jordan & Evermann (1905), Fowler (1928), Pietsch & Grobecker (1987).

TAXONOMY: Pietsch & Grobecker (1987).

HAWAIIAN RECORDS: Maui to Kaua'i at 59–137 m (Snyder, 1904; Jordan & Evermann, 1905; Pietsch & Grobecker, 1987).

GENERAL RANGE: Pacific endemic known from three specimens from the Hawaiian Islands and a record from Papua New Guinea. Benthic at 59–137 m (Pietsch & Grobecker, 1987; J.E. Randall, pers. comm., Nov. 1994).

### *Antennarius nummifer* (Cuvier)

*Chironectes nummifer* Cuvier, 1817, p. 430, Pl. 17 (fig. 4), type locality unknown.

*Antennarius nummifer* (Cuvier, 1817): Fowler (1928, 1931, 1934, 1949, in part) [except Hawaiian Islands specimen], Randall (1980a), Tinker (1982), Pietsch & Grobecker (1987), Myers (1989), Paxton *et al.* (1989), Randall *et al.* (1990a, 1997a).

TAXONOMY: Pietsch & Grobecker (1987).

COMMON NAMES: Spotfin frogfish (Myers, 1999), White-finger anglerfish (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: O'ahu at 25–38 m (Randall, 1981a). The Hawaiian record of *A. nummifer* by Fowler (1928, 1931, 1934a, 1949) refers to a misidentified specimen of *A. drombus* (*vide* J.E. Randall, pers. comm.).

GENERAL RANGE: Eastern Atlantic and Indo-Pacific from the Azores, Canaries, and Saint Helena to South Africa, the Red Sea and east to Japan, the Ogasawara Islands, Australia, New Zealand, Micronesia, the Hawaiian Islands, and the Society Islands but absent from the eastern Pacific. Benthic at 0–293 m, but in the Pacific usually at <50 m (Pietsch & Grobecker, 1987; Paxton *et al.*, 1989; Randall *et al.*, 1990a, 1997b).

### *Antennarius pictus* (Shaw)

*Lophius pictus* Shaw in Shaw & Nodder, 1794, pl. 176, Tahiti, Society Islands.

*Lophius sandvicensis* Bennett, 1840: Bennett (1840).

*Chironectes leprosus* Eydoux & Souleyet, 1850: Eydoux & Souleyet (1850).

*Antennarius multiocellatus* var. *leprosa* (Eydoux & Souleyet, 1850): Günther (1861).

*Chironectes niger* Garrett, 1864: Garrett (1864), Jordan & Evermann (1905) [who incorrectly placed this taxon as a synonym of *A. commersoni*].

*Antennarius rubrofuscus* non (Garrett, 1863) [a synonym of *A. commersoni*, a valid species that also occurs in the Hawaiian Islands]: Jenkins (1903)?, Snyder (1904)?

*Antennarius commersonii* non (Latreille, 1804) [a valid species also found in the Hawaiian Islands]: Jordan & Evermann (1905, in part), Fowler (1928, 1931, in part).

*Antennarius leprosus* (Eydoux & Souleyet, 1850): Jordan & Evermann (1905, in part), Fowler (1928, in part).

*Antennarius sandvicensis* (Bennett, 1840): Jordan & Snyder (1904a), Jordan & Evermann (1905), Fowler (1928).

*Antennarius laysanius* Jordan & Snyder, 1904: Jordan & Snyder (1904a), Jordan & Evermann (1905).

*Antennarius hispidus* non (Bloch & Schneider, 1801) [a valid species not found in the Hawaiian Islands]: Fowler (1928, in part, 1931).

*Antennarius phymatodes* non Bleeker, 1857 [a junior synonym of *A. maculatus* (Desjardins, 1840), a valid species]: Fowler (1928).

*Antennarius chironectes* (Latreille, 1804): Gosline & Brock (1960), Tinker (1982).

*Antennarius pictus* (Shaw in Shaw & Nodder, 1794): Randall (1985a, 1996a), Pietsch & Grobecker (1987), Myers (1989), Randall *et al.* (1990a), Kuitert (1993), Randall *et al.* (1993b).

TAXONOMY: Pietsch & Grobecker (1987).

COMMON NAMES: Painted frogfish (Randall, 1996a), Spotted frogfish, Painted anglerfish (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Hawai'i Island to Midway at unrecorded depths (Bennett, 1840; Jordan & Evermann, 1905; Pietsch & Grobecker, 1987; Randall *et al.*, 1993b).

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to Australia, the Philippines, the Marianas, the Hawaiian Islands, and Tonga. Benthic at 0–75 m, with an average depth of 16 m (Pietsch & Grobecker, 1987; Myers, 1989; Randall *et al.*, 1990a; Kuitert, 1993).

***Antennarius randalli*** Allen

*Antennarius randalli* Allen, 1970, p. 518, Figs. 1, 2a, off Motu Tautara, west coast of Easter Island.

*Antennarius randalli* Allen, 1970: Pietsch & Grobecker (1987), Myers (1989), Randall *et al.* (1993a), Randall (1996a).

TAXONOMY: Pietsch & Grobecker (1987).

COMMON NAMES: Randall's frogfish (Randall, 1996a).

HAWAIIAN RECORDS: O'ahu at 15 m (Randall *et al.*, 1993a).

GENERAL RANGE: Pacific endemic known from only eleven specimens collected at Indonesia, the Philippines, Taiwan, Fiji, the Marshall Islands, the Hawaiian Islands, and Easter Island. Benthic at 8–31 m, usually at <20 m (Pietsch & Grobecker, 1987; Myers, 1989; Randall *et al.*, 1993a).

***Antennarius striatus*** (Shaw)

*Lophius striatus* Shaw in Shaw & Nodder, 1794, pl. 175, Tahiti, Society Islands.

*Antennarius cunninghami* Fowler, 1941: Fowler (1941, 1949).

*Phrynelox cunninghami* (Fowler, 1941): Gosline & Brock (1960), Struhsaker (1973a), Tinker (1982).

*Antennarius striatus* (Shaw in Shaw & Nodder, 1794): Fowler (1928), Pietsch & Grobecker (1987), Williams (1989), Randall *et al.* (1990a), Kuitert (1993), Randall (1996a), Randall *et al.* (1997a).

TAXONOMY: Pietsch & Grobecker (1987) [see also Williams (1989)].

COMMON NAMES: Striated frogfish (Randall, 1996a), Striped anglerfish (AFS; Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Maui to Pearl and Hermes Reef at 90–181 m, average depth in Hawai'i at 119 m (Fowler, 1941; Struhsaker, 1973a; Pietsch & Grobecker, 1987).

GENERAL RANGE: Circumglobal in the tropical through warm temperate Gulf of Mexico, Red Sea, Atlantic, Indian, and Pacific oceans except the eastern Pacific, although Williams (1989) argued that this nominal species would be better treated as a complex of species with more limited ranges. Benthic at 1–219 m, usually at >30 m (Pietsch & Grobecker, 1987; Randall *et al.*, 1990a; Kuitert, 1993; Randall *et al.*, 1997b).

***Antennatus linearis*** Randall & Holcom

*Antennatus linearis* Randall & Holcom, 2001, p. 138, figs. 1–4, Kahe Point, O'ahu, Hawaiian Islands.

*Antennatus tuberosus* non (Cuvier, 1817) [a valid species also found in the Hawaiian Islands]: Pietsch in Smith & Heemstra (1986, in part), Pietsch & Grobecker (1987).

*Antennatus linearis* Randall & Holcom, 2001: Randall & Holcom (2001).

TAXONOMY: Randall & Holcom (2001).

HAWAIIAN RECORDS: Maui to O'ahu at 14–21.5 m (Randall & Holcom, 2001).

GENERAL RANGE: Indo-Pacific from isolated localities including South Africa, Mozambique, Indonesia, and the Hawaiian Islands. Benthic in coral and coral rubble at 4.5–33 m (Randall & Holcom, 2001).

***Antennatus tuberosus*** (Cuvier)

*Chironectes tuberosus* Cuvier, 1817, p. 432, Mauritius, Indian Ocean.

*Chironectes reticulatus* Eydoux & Souleyet, 1850: Eydoux & Souleyet (1850).

*Antennarius bigibbus* (Latreille, 1804): Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949).

*Antennarius reticulatus* (Eydoux & Souleyet, 1850): Borodin (1930) [with an erroneous citation of Gilbert as the author of the species name].

*Antennatus bigibbus* (Latreille, 1804): Gosline & Brock (1960), Tinker (1982).

*Antennatus tuberosus* (Cuvier, 1817): Randall (1985a, 1996a), Pietsch & Grobecker (1987), Myers (1989), Randall *et al.* (1990a), Severns & Fiene-Severns (1993), Randall *et al.* (1993b).

TAXONOMY: Pietsch & Grobecker (1987).

COMMON NAMES: Reticulated frogfish (Randall, 1996a), Bandfin frogfish (Myers, 1999), Tuberculated anglerfish (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at 22–26 m (Eydoux & Souleyet, 1850; Jordan & Evermann, 1905; Pietsch & Grobecker, 1987; Severns & Fiene-Severns, 1993; Randall *et al.*, 1993b).

GENERAL RANGE: Indo-Pacific from South and east Africa to the Philippines, Australia, Micronesia, the

Hawaiian Islands, and the Society Islands but not in the eastern Pacific. Benthic at 0–73 m, usually at <20 m and often at < 6 m (Pietsch & Grobecker, 1987; Myers, 1989; Randall *et al.*, 1990a).

***Histrio histrio*** (Linnaeus)

*Lophius histrio* Linnaeus, 1758, p. 237, no type locality given, but type collection described as “Habitat in Pelago inter Fucum natantem”.

*Histrio histrio* (Linnaeus, 1758): Fowler (1928, 1931, 1934), Schultz (1957), Springer (1982), Pietsch & Grobecker (1987), Myers (1989), Randall *et al.* (1990a), Pietsch *et al.* (1992), Kuitert (1993), Randall *et al.* (1997a).

TAXONOMY: Pietsch & Grobecker (1987).

COMMON NAMES: Sargassumfish (AFS; Randall *et al.*, 1997a), Sargassum anglerfish.

HAWAIIAN RECORDS: Hawai‘i Island to Kure on objects floating at the surface (Schultz, 1957; Pietsch & Grobecker, 1987; Pietsch *et al.*, 1992; T. Clarke & J. Henderson, pers. comm.). Recent records of *Histrio* in Hawai‘i corroborate the validity of earlier records discussed as problematical by Springer (1982) and Pietsch & Grobecker (1987).

GENERAL RANGE: Tropical and subtropical Gulf of Mexico, Atlantic, Indian, and western Pacific oceans with northern records in areas warmed by western boundary currents. In the central Pacific, recorded only from the Hawaiian and Galapagos Islands, with no records from the Pacific coasts of the Americas. Epipelagic but sedentary on floating material, usually *Sargassum*, at 0–50 m with most found at 0–2 m (Pietsch & Grobecker, 1987; Randall *et al.*, 1990a; Kuitert, 1993; Randall *et al.*, 1997b).

## Ogcocephaloidei

### Chaunacidae — Gapers, Coffinfishes, Sea Toads

***Chaunax fimbriatus*** Hilgendorf

*Chaunax fimbriatus* Hilgendorf, 1879, p. 80, off Tokyo, Japan.

*Chaunax fimbriatus* Hilgendorf, 1879: Novikov *et al.* (1981), Ohta (1983), Humphreys *et al.* (1984), Okamura *in* Masuda *et al.* (1984), Okamura (1985), Caruso (1989), Paxton *et al.* (1989), Chave & Mundy (1994).

TAXONOMY: Caruso (1989). Pietsch *in* Quéro *et al.* (1990) listed *C. fimbriatus* Hilgendorf, 1879, as a junior synonym of *C. pictus* Lowe, 1846. This was contradicted by the identification of a valid *Chaunax fimbriatus* species group by Caruso (1989), who stated that taxonomic problems exist within the group but recognized *C. fimbriatus* and *C. umbrinus* Gilbert, 1905, as nominal species. The identities of *Chaunax* specimens from the Hawaiian Ridge must be considered provisional until the genus is revised.

HAWAIIAN RECORDS: Cross and Lō‘ihi Seamounts to Koko Seamount at 1247–1985 m (Novikov *et al.*, 1981; Humphreys *et al.*, 1984; Chave & Mundy, 1994).

GENERAL RANGE: Eastern Indian Ocean and Pacific Ocean, from western Australia to Japan, the Okinawa Trough, the Kyushu-Palau Ridge, the southern Emperor Seamounts, and the Hawaiian Islands. Perhaps circum-subtropical and tropical if a synonym of *C. pictus*. Benthic at 147–1985 m (Ohta, 1983; Okamura *in* Masuda *et al.*, 1984; Humphreys *et al.*, 1984; Okamura *et al.*, 1985; Paxton *et al.*, 1989; Chave & Mundy, 1994).

***Chaunax umbrinus*** Gilbert

*Chaunax umbrinus* Gilbert, 1905, p. 693, Fig. 274, Pailolo Channel between Maui and Moloka‘i, Hawaiian Islands.

*Chaunax umbrinus* Gilbert, 1905: Gilbert (1905), Fowler (1928), Gosline & Brock (1960), Clarke (1972), Struhsaker (1973a), Novikov *et al.* (1981), Tinker (1982), Borets (1986), Uchida & Uchiyama (1986), Caruso (1989), Chave & Mundy (1994).

TAXONOMY: Caruso (1989).

HAWAIIAN RECORDS: Hawai‘i Island to Koko Seamount at 183–400 m (Gilbert, 1905; Clarke, 1972; Struhsaker, 1973a; Novikov *et al.*, 1981; Borets, 1986; Uchida & Uchiyama, 1986; Chave & Mundy, 1994).

GENERAL RANGE: Central Pacific endemic from the Hawaiian Islands and the southern Emperor Seamounts. Benthic at 183–400 m (Chave & Mundy, 1994).

**Ogcocephalidae — Batfishes*****Halieutaea retifera* Gilbert**

*Halieutaea retifera* Gilbert, 1905, p. 696, Pl. 101, off the north coast of Maui, Hawaiian Islands.

*Halieutaea retifera* Gilbert, 1905: Gilbert (1905), Fowler (1928), Gosline & Brock (1960), Bradbury (1967), Struhsaker (1973a), Tinker (1982), Uchida & Uchiyama (1986).

TAXONOMY: Bradbury (1967) stated that this genus is badly in need of revision and was unable to ascertain the status of the nominal species.

HAWAIIAN RECORDS: Hawai'i Island to Kure Atoll at 75–386 m (Gilbert, 1905; Struhsaker, 1973a; Uchida & Uchiyama, 1986).

GENERAL RANGE: Hawaiian endemic. Benthic at 75–386 m (Gilbert, 1905; Bradbury, 1967; Struhsaker, 1973a; Uchida & Uchiyama, 1986).

**[*Halieutopsis bathyoreos* Bradbury]**

*Halieutopsis bathyoreos* Bradbury, 1988, p. 18, Figs. 2, 3B, 6, Horizon Guyot, central North Pacific, at 19° 14.3'N, 169°07.3'W.

*Halieutopsis* n. sp.: Wilson *et al.* (1985).

*Halieutopsis bathyoreos* Bradbury, 1988: Bradbury (1988).

TAXONOMY: Bradbury (1988).

HAWAIIAN RECORDS: No Hawaiian records but the only known specimen was captured nearby at 1500 m at Horizon Guyot, (19°14.3'N, 169°07.3'W; Wilson *et al.*, 1985; Bradbury, 1988) suggesting that this species could occur in Hawai'i. Label notes on two specimens at BPBM, from Maui and French Frigate, indicate that another, as-yet undescribed *Halieutopsis* species may occur in the 200-nmi EEZ (Bradbury *vide* A. Suzumoto, pers. comm., Jan. 2004).

GENERAL RANGE: Known only from the type specimen collected in the central North Pacific. Bathybenthic at 1500 m (Bradbury, 1988).

***Malthopsis jordani* Gilbert**

*Malthopsis jordani* Gilbert, 1905, p. 695, Pl. 100, off the south coast of Moloka'i, Hawaiian Islands.

*Malthopsis jordani* Gilbert, 1905: Gilbert (1905), Fowler (1928), Gosline & Brock (1960), Bradbury (1967), Struhsaker (1973a), Tinker (1982), Okamura & Kitajima (1984), Okamura *in* Masuda *et al.* (1984), Uchida & Uchiyama (1986), Chave & Mundy (1994).

TAXONOMY: Bradbury (1967).

HAWAIIAN RECORDS: Hawai'i Island to Laysan at 210–520 m (Gilbert, 1905; Struhsaker, 1973a; Uchida & Uchiyama, 1986; Chave & Mundy, 1994).

GENERAL RANGE: Western and central North Pacific endemic known from the Okinawa Trough, Japan, and the Hawaiian Islands. Benthic at 210–520 m (Bradbury, 1967; Okamura & Kitajima, 1984; Okamura *in* Masuda *et al.*, 1984; Chave & Mundy, 1994).

***Malthopsis mitrigeria* Gilbert & Cramer**

*Malthopsis mitrigeria* Gilbert & Cramer, 1897, p. 434, Pl. 48 (figs. 1–2), off the Hawaiian Islands.

*Malthopsis mitrigeria* Gilbert & Cramer, 1897: Gilbert & Cramer (1897), Jordan & Evermann (1905), Fowler (1928, 1934).

*Malthopsis mitrigeria* Gilbert & Cramer, 1897: Gilbert (1905), Gosline & Brock (1960), Bradbury (1967), Struhsaker (1973a), Tinker (1982), Mochizuki *in* Okamura *et al.* (1982), Okamura *in* Masuda *et al.* (1984), Bradbury *in* Smith & Heemstra (1986).

TAXONOMY: Bradbury (1967).

HAWAIIAN RECORDS: Maui to Kaua'i at 330–604 m (Gilbert & Cramer, 1897; Gilbert, 1905; Struhsaker, 1973a).

GENERAL RANGE: Indo-Pacific from South Africa to Japan, the Kyushu-Palau Ridge, the Philippines, Samoa, and the Hawaiian Islands. Benthic at 300–650 m (Gilbert & Cramer, 1897, Gilbert, 1905; Bradbury, 1967; Struhsaker, 1973a; Mochizuki *in* Okamura *et al.*, 1982; Okamura *in* Masuda *et al.*, 1984; Bradbury *in* Smith & Heemstra, 1986).

**[*Malthopsis tiarella* Jordan]**

*Malthopsis tiarella* Jordan, 1902, p. 378, Fig. 7, Suruga Bay near Numazu, Japan.

*Malthopsis tiarella* Jordan, 1902 [*lapsus* for *tiarella*]: Humphreys *et al.* (1984).

*Malthopsis tiarella* Jordan, 1902: Bradbury (1967), Mochizuki *in* Okamura *et al.* (1982), Okamura *in* Masuda *et al.* (1984), Bradbury *in* Smith & Heemstra (1986).

TAXONOMY: Bradbury (1967).

HAWAIIAN RECORDS: A record from the Milwaukee Seamount (Humphreys *et al.*, 1984) needs to be confirmed. This species is otherwise unrecorded from the central North Pacific.

GENERAL RANGE: Indo-Pacific known only from east Africa and Japan. Benthic at 80–370 m (Bradbury, 1967; Mochizuki *in* Okamura *et al.*, 1982; Okamura *in* Masuda *et al.*, 1984; Bradbury *in* Smith & Heemstra, 1986).

### *Solocisquama erythrina* (Gilbert)

*Dibranchus erythrinus* Gilbert, 1905, p. 697, Fig. 275, vicinity of Kaua'i, Hawaiian Islands.

*Dibranchus erythrinus* Gilbert, 1905: Gilbert (1905), Fowler (1928), Gosline & Brock (1960), Bradbury (1967), Amaoka & Toyoshima (1981), Tinker (1982).

*Solocisquama erythrina* (Gilbert, 1905): Bradbury (1999).

TAXONOMY: Bradbury (1999).

HAWAIIAN RECORDS: Maui to Kaua'i at 786–872 m and fishing depths of 100–800 m (Gilbert, 1905; Bradbury, 1999).

GENERAL RANGE: Hawaiian Islands endemic. Benthic at 786–872 m (Gilbert, 1905; Amaoka & Yoyoshima, 1981; Bradbury, 1967, 1999).

### *Solocisquama stellulata* (Gilbert)

*Dibranchus stellulatus* Gilbert, 1905, p. 698, Fig. 276, off the north coast of Maui, Hawaiian Islands.

*Dibranchus stellulatus* Gilbert, 1905: Gilbert (1905), Fowler (1928), Gosline & Brock (1960), Bradbury (1967), Struhsaker (1973a), Amaoka & Toyoshima (1981), Mochizuki *in* Okamura *et al.* (1982), Tinker (1982), Mochizuki *in* Masuda *et al.* (1984), Bradbury *in* Smith & Heemstra (1986).

*Solocisquama stellulata* (Gilbert, 1905): Bradbury (1999).

TAXONOMY: Bradbury (1999). Bradbury (1967) suggested that *S. stellulata* (Gilbert, 1905) might be the young of *S. erythrina* (Gilbert, 1905) but apparently later rejected this hypothesis (Bradbury, 1999).

HAWAIIAN RECORDS: Hawai'i Island to Maui at 296–369 m (Gilbert, 1905; Struhsaker, 1973a).

GENERAL RANGE: Indo-Pacific, known only from South Africa, the Philippine Sea, the South China Sea, the Kyushu-Palau Ridge, and the Hawaiian Islands. Benthic at 274–550 m (Gilbert, 1905; Bradbury, 1967; Struhsaker, 1973a; Mochizuki *in* Okamura *et al.*, 1982; Mochizuki *in* Masuda *et al.*, 1984; Bradbury *in* Smith & Heemstra, 1986; Bradbury, 1999).

## Ceratioidei

### Caulophrynidae

#### [*Caulophryne jordani* Goode & Bean]

*Caulophryne jordani* Goode & Bean, 1896, p. 496, Pl. 121 (fig. 409), Gulf Stream off of Long Island, New York, in the western North Atlantic at 39°27'N, 71°15'W.

*Caulophryne jordani* Goode & Bean, 1896: Bertelsen (1951, in part), Loeb (1979)?, Pietsch (1979), Paxton *et al.* (1989).

TAXONOMY: Pietsch (1979).

HAWAIIAN RECORDS: None. Although this species was reported from 28°N, 155°W (Loeb, 1979), its occurrence in the region is unverified because the family was considered monotypic between the revisions of Bertelsen (1951) and Pietsch (1979). Both *C. jordani* Goode & Bean, 1896, and *C. pelagica* (Brauer, 1902) have circumglobal ranges, which indicate that they might occur in the central North Pacific.

GENERAL RANGE: North Atlantic, western Indian Ocean, southern Australia, eastern North Pacific, and Antarctic Ocean. Meso- and bathypelagic at 1235–1510 m, 0–3000 m fishing depths (Pietsch, 1979).

[*Caulophryne pelagica* (Brauer)]

*Melanocetus pelagicus* Brauer, 1902, p. 295, west of the Chagos Archipelago, Indian Ocean.

*Caulophryne jordani* non Goode & Bean, 1896: Bertelsen (1951, in part).

*Caulophryne pelagica* (Brauer, 1902): Pietsch (1979).

TAXONOMY: Pietsch (1979).

HAWAIIAN RECORDS: see *Caulophryne jordani*.

GENERAL RANGE: Indo-Pacific, known from the western Indian Ocean, the Halmahera Sea, Japan, Guadalupe Island, and the Gulf of Panama. Meso- and bathypelagic at 1250–1500 m, 0–2500 m fishing depths (Pietsch, 1979; Paxton *et al.*, 1989).

***Caulophryne polynema* Regan**

*Caulophryne polynema* Regan, 1930, p. 191, Figs. 1–3, Funchal Bay, Madeira, eastern North Atlantic.

*Caulophryne jordani* non Goode & Bean, 1896: Bertelsen (1951, in part).

*Caulophryne polynema* Regan, 1930: Pietsch (1979), Bertelsen in Whitehead *et al.* (1984), Bertelsen in Quéro *et al.* (1990).

TAXONOMY: Pietsch (1979).

HAWAIIAN RECORDS: O‘ahu at 0–1150 m fishing depths (Pietsch, 1979). Larval *Caulophryne* collected at Johnston Atoll and the Hancock Seamounts were not identified to species (Boehlert *et al.*, 1992; Boehlert & Mundy, 1992).

GENERAL RANGE: Circumglobal, known from the North Atlantic, Indian Ocean, the Hawaiian Islands, and Baja California. Meso- and bathypelagic at 900–1250 m, 0–2000 m fishing depths (Pietsch, 1979; Bertelsen in Whitehead *et al.*, 1984; Bertelsen in Quéro *et al.*, 1990).

**Neoceratiidae*****Neoceratias spinifer* Pappenheim**

*Neoceratias spinifer* Pappenheim, 1914, p. 198, Fig. 10, South Atlantic at 12°11'S, 6°16'W.

*Neoceratias spinifer* Pappenheim, 1914: Bertelsen & Pietsch (1983), Paxton *et al.* (1989), Boehlert & Mundy (1992).

TAXONOMY: Bertelsen & Pietsch (1983).

HAWAIIAN RECORDS: The Hancock Seamounts from a single larva collected at 100–200 m (Boehlert & Mundy, 1992).

GENERAL RANGE: Circumglobal in the tropical through warm temperate Atlantic, Indian, and Pacific oceans. Meso- and bathypelagic at 0–1200 m fishing depths (Bertelsen & Pietsch, 1983; Paxton *et al.*, 1989).

**Melanocetidae*****Melanocetus johnsonii* Günther**

*Melanocetus johnsonii* Günther, 1864c, p. 302, Pl. 25, off Madeira, eastern North Atlantic.

*Melanocetus johnsonii* Günther, 1864c: Fowler (1949), Loeb (1979), Pietsch & Van Duzer (1980), Boehlert *et al.* (1992), Cowles & Childress (1995).

TAXONOMY: Pietsch & Van Duzer (1980).

HAWAIIAN RECORDS: Johnston Atoll from collections of larvae and O‘ahu from collections of adults at 600–1000 m (Pietsch & Van Duzer, 1980; Boehlert *et al.*, 1992; Cowles & Childress, 1995). The *Melanocetus* sp. collected off Hawai‘i Island at 823 m by Struhsaker (1973a) was not identified to species. Tinker (1982) listed the family but did not assign species to the Hawaiian Islands records.

GENERAL RANGE: Circumglobal in the tropical through cold-temperate Atlantic, Indian, and Pacific oceans. Meso- and bathypelagic at 100–2700 m fishing depths, usually at 100–1500 m (Pietsch & Van Duzer, 1980).

***Melanocetus murrayi* Günther**

*Melanocetus murrayi* Günther, 1887, p. 57, Pl. 11 (fig. A), Central Atlantic at 1°47'N, 24°26'W.

*Melanocetus murrayi* Günther, 1887: Fowler (1949), Loeb (1979), Pietsch & Van Duzer (1980).

TAXONOMY: Pietsch & Van Duzer (1980).

HAWAIIAN RECORDS: Recorded from unspecified locations and depths in the main Hawaiian Islands (Pietsch & Van Duzer, 1980).

GENERAL RANGE: Tropical through cold-temperate Gulf of Mexico, Atlantic, and Pacific oceans but not known from the Indian Ocean. Meso- and bathypelagic at 100–6370 m fishing depths, usually at 1000–2500 m (Pietsch & Van Duzer, 1980).

### Himantolophidae — Footballfishes

[*Himantolophus nigricornis* Bertelsen & Krefft]

*Himantolophus nigricornis* Bertelsen & Krefft, 1988, p. 50, Fig. 17, San Clemente basin off southern California at 33°N, 118°W.

*Himantolophus nigricornis* Bertelsen & Krefft, 1988: Bertelsen & Krefft (1988).

TAXONOMY: Bertelsen & Krefft (1988).

HAWAIIAN RECORDS: None but collections on both sides of the Pacific within the latitudes of the Hawaiian Islands (Bertelsen & Krefft, 1988) indicate that this species can be expected in the region.

GENERAL RANGE: Pacific endemic known only from the Marianas and southern California. Meso- and bathypelagic at 0–2500 m fishing depths (Bertelsen & Krefft, 1988).

*Himantolophus sagamius* (Tanaka)

*Corynolophus sagamius* Tanaka, 1918b, p. 491, Pl. 134 (fig. 377), Sagami Sea, Japan.

*Lipactis tumidus* non Regan, 1925 [based on the male of an unidentified *Himantolophus* species from the Atlantic Ocean]; Fowler (1949)?

*Himantolophus sagamius* (Tanaka, 1918b): Bertelsen & Krefft (1988).

TAXONOMY: Bertelsen & Krefft (1988).

HAWAIIAN RECORDS: O'ahu at 630–670 m (Bertelsen & Krefft, 1988). Unidentified larval *Himantolophus* have been collected at the Hancock Seamounts and off O'ahu (Boehlert & Mundy, 1992; B. Mundy, unpubl. data).

GENERAL RANGE: Pacific endemic known from New Guinea, Japan, the Hawaiian Islands, southern California, and Ecuador. Meso- and bathypelagic at 613–1000 m (Bertelsen & Krefft, 1988).

### Diceratiidae

*Diceratias pileatus* Uwate

*Diceratias pileatus* Uwate, 1979, p. 140, Figs. 1–8, off Suriname, western Atlantic, at 7°37'N, 53°32'W.

*Diceratias pileatus* Uwate, 1979: Uwate (1979), Pietsch & Randall (1987), Balushkin & Federov (1986), Bertelsen *in* Quéro *et al.* (1990).

TAXONOMY: Uwate (1979), Balushkin & Fedorov (1986).

HAWAIIAN RECORDS: Hawai'i Island from a single specimen found floating at the surface (Pietsch & Randall, 1987). The specimen is no longer in the BPBM collection (A. Suzumoto, pers. comm., July 2001).

GENERAL RANGE: Known only from the tropical and subtropical North Atlantic between 0°–25°N and off the Hawaiian Islands. Benthic-, meso- and bathypelagic at 640–1430 m (Pietsch & Randall, 1987; Bertelsen *in* Quéro *et al.*, 1990).

### Oneirodidae<sup>38</sup>

*Chaenophryne draco* Beebe

*Chaenophryne draco* Beebe, 1932, p. 84, Fig. 22, 10 mi. southeast of Nonsuch Island, Bermuda, at 32°12'N, 64°36'W.

*Chaenophryne macractis* Regan & Trewavas, 1932: Fowler (1949).

*Chaenophryne parvicornis* Regan & Trewavas, 1932: Novikov *et al.* (1981).

*Chaenophryne draco* Beebe, 1932: Pietsch (1975), Bertelsen *in* Whitehead *et al.* (1984), Paxton *et al.* (1989), Bertelsen *in* Quéro *et al.* (1990).



TAXONOMY: Pietsch (1975).

HAWAIIAN RECORDS: Main Hawaiian Islands, probably O‘ahu, depth unspecified (Pietsch, 1975).

GENERAL RANGE: Circumglobal in the tropical and subtropical Atlantic, Indian, and Pacific oceans. Meso- and bathypelagic at 350–1750 m (Pietsch, 1975; Bertelsen *in Whitehead et al.*, 1984; Paxton *et al.*, 1989; Bertelsen *in Quéro et al.*, 1990).

***Chaenophryne longiceps* Regan**

*Chaenophryne longiceps* Regan, 1925b, p. 564, Gulf of Panama, eastern tropical Pacific, at 7°30'N, 79°19'W.

*Chaenophryne longiceps* Regan, 1925b: Pietsch (1975), Loeb (1979), Bertelsen *in Whitehead et al.* (1984), Bertelsen *in Quéro et al.* (1990).

TAXONOMY: Pietsch (1975).

HAWAIIAN RECORDS: Main Hawaiian Islands, probably O‘ahu, depth unspecified (Pietsch, 1975).

GENERAL RANGE: Circumglobal in the tropical through cold-temperate Atlantic, Indian, and Pacific oceans. Meso- and bathypelagic at 500–>950 m (Pietsch, 1975; Bertelsen *in Whitehead et al.*, 1984; Bertelsen *in Quéro et al.*, 1990).

***Dolopichthys longicornis* Parr**

*Dolopichthys longicornis* Parr, 1927, p. 18, Fig. 6, Caicos Passage, Bahamas, western Atlantic, at 21°46'N, 72°49'W.

*Dolopichthys longicornis* Parr, 1927: Pietsch (1972), Loeb (1979), Bertelsen *in Whitehead et al.* (1984), Bertelsen *in Quéro et al.* (1990).

TAXONOMY: Pietsch (1972).

HAWAIIAN RECORDS: Northeast of Bank 11 at an unrecorded depth (Pietsch, 1972).

GENERAL RANGE: Circumtropical through temperate Atlantic, Indian, and Pacific oceans except perhaps the eastern tropical and South Pacific. Meso- and bathypelagic at 0–2200 m fishing depths, one with an opening closing net at 1000–2000 m (Pietsch, 1972; Bertelsen *in Whitehead et al.*, 1984; Bertelsen *in Quéro et al.*, 1990).

***Dolopichthys pullatus* Regan & Trewavas**

*Dolopichthys pullatus* Regan & Trewavas, 1932, p. 79, Pl. 3 (fig. 1); Fig. 123, Moluccas Islands, Indonesia, at 2°22'S, 126°58.5'E.

*Dolopichthys pullatus* Regan & Trewavas, 1932: Pietsch (1972), Paxton *et al.* (1989), Bertelsen *in Quéro et al.* (1990).

TAXONOMY: Pietsch (1972).

HAWAIIAN RECORDS: O‘ahu to north of Kure at 0–800 m fishing depths (Pietsch, 1972).

GENERAL RANGE: Circumglobal in the tropical through warm-temperate Gulf of Mexico, Gulf of California, Atlantic, Indian, and Pacific oceans. Meso- and bathypelagic at 0–2080 m fishing depths (Pietsch, 1972; Paxton *et al.*, 1989; Bertelsen *in Quéro et al.*, 1990).

***Leptacanthichthys gracilispinis* (Regan)**

*Dolopichthys gracilispinis* Regan, 1925, p. 563, eastern tropical Pacific at 6°40'N, 80°47'W.

*Leptacanthichthys gracilispinis* (Regan, 1925b): Pietsch (1978b), Bertelsen *in Whitehead et al.* (1984).

TAXONOMY: Pietsch (1978a).

HAWAIIAN RECORDS: O‘ahu at 0–1250 m fishing depths (Pietsch, 1978a).

GENERAL RANGE: Western North Atlantic and Pacific Ocean from Japan to the Hawaiian Islands, the central equatorial Pacific, and the Gulf of Panama. Bathypelagic at >1000–1265 m, 0–3000 m fishing depths (Pietsch, 1978a; Bertelsen *in Whitehead et al.*, 1984).

***Lophodolos indicus* Lloyd**

*Lophodolos indicus* Lloyd, 1909, p. 167, southwest of Cape Comorin, off Trevancore, India, at 7°28'30"N, 76°26'30"E.

*Lophodolos indicus* Lloyd, 1909: Pietsch (1974b), Bertelsen *in Quéro et al.* (1990).

TAXONOMY: Pietsch (1974b).

HAWAIIAN RECORDS: Main Hawaiian Islands, probably O‘ahu, depth unspecified (Pietsch, 1974b).

GENERAL RANGE: Tropical and subtropical between 30°N–20°S in the eastern Atlantic Ocean, Indian Ocean, and throughout the Pacific Ocean. Meso- and bathypelagic at 750–>1500 m (Pietsch, 1974b; Bertelsen *in* Quéro *et al.*, 1990).

***Microlophichthys microlophus*** (Regan)

*Dolopichthys microlophus* Regan, 1925b, p. 563, Atlantic Ocean at 17°5'N, 24°35'W.

*Microlophichthys microlophus* (Regan, 1925b): Bertelsen (1951), Bertelsen & Pietsch (1977), Loeb (1979), Pietsch & Siegel (1980), Bertelsen *in* Whitehead *et al.* (1984), Bertelsen *in* Quéro *et al.* (1990).

TAXONOMY: Bertelsen (1951).

HAWAIIAN RECORDS: Larvae have been collected off O'ahu at 0–200 m (B. Mundy, unpubl. data).

GENERAL RANGE: Circumglobal in the Atlantic, Indian, and Pacific oceans. There has been no recent review of the distribution of this species. Meso and bathypelagic (Bertelsen & Pietsch, 1977; Pietsch & Seigel, 1980; Bertelsen *in* Whitehead *et al.*, 1984; Bertelsen *in* Quéro *et al.*, 1990).

***Oneiroides acanthias*** (Gilbert)

*Monoceratias acanthias* Gilbert, 1915, p. 379, Pl. 22 (fig. 24), off Santa Cruz Island, California.

*Oneiroides acanthias* (Gilbert, 1915): Pietsch (1974a), Childress *et al.* (1990)?, Orr (1991).

TAXONOMY: Pietsch (1974a), Orr (1991).

HAWAIIAN RECORDS: O'ahu at ca. 800 m (Childress *et al.*, 1990)? The identity of this specimen needs confirmation.

GENERAL RANGE: Eastern Pacific endemic from central California to southern Baja California, west to 37°48'–26°51'N, 126°37.5'W and perhaps the Hawaiian Islands. Meso- and bathypelagic at 0–1750 m with most at 500–1250 m (Pietsch, 1974a; Childress *et al.*, 1990; Orr, 1991).

COMMENTS: An unidentified *Oneiroides* species was recorded from O'ahu at >900 m by Cowles & Childress (1995). The *Oneiroides* sp. of Borets & Sokolovsky (1978) was not identified to species.

***Oneiroides macronema*** (Regan & Trewavas)

*Dolopichthys macronema* Regan & Trewavas, 1932, p. 66, Fig. 91, off St. Croix, Virgin Islands, Caribbean Sea, at 17°43'N, 64°56'W.

*Oneiroides macronema* (Regan & Trewavas, 1932): Pietsch (1974a), Bertelsen *in* Whitehead *et al.* (1984), Orr (1991).

TAXONOMY: Pietsch (1974a), Orr (1991).

HAWAIIAN RECORDS: One record from an unspecified locality and depth “off Hawaii” (Bertelsen *in* Whitehead *et al.*, 1984).

GENERAL RANGE: Known only from three specimens collected in the Caribbean Sea, near the Azores, and the Hawaiian Islands. Mesopelagic, one collection with 1000 m wire out (Pietsch, 1974a; Bertelsen *in* Whitehead *et al.*, 1984; Orr, 1991).

***Oneiroides pietschi*** Ho & Shao

*Oneiroides pietschi* Ho & Shao, 2004, p. 74, Fig. 1–3, Taiwan, South China Sea.

*Oneiroides pietschi* Ho & Shao, 2004: Ho & Shao (2004).

TAXONOMY: Ho & Shao (2004).

HAWAIIAN RECORDS: North of Necker Island (26°59.6'N, 164°29.1'W) at 0–400 m fishing depths (Ho & Shao, 2004).

GENERAL RANGE: Western and central Pacific endemic, known from Japan, Taiwan, and the Hawaiian Islands. Benthopelagic at 1250–1635m, and mesopelagic at 0–400 m fishing depths (Ho & Shao, 2004).

### Thaumatichthyidae

***Lasiognathus beebei*** Regan & Trewavas

*Lasiognathus beebei* Regan & Trewavas, 1932, p. 90, near Nonsuch Island, Bermuda.

*Lasiognathus beebei* Regan & Trewavas, 1932: Nolan & Rosenblatt (1975), Bertelsen & Pietsch (1996).

TAXONOMY: Bertelsen & Pietsch (1996).

HAWAIIAN RECORDS: O'ahu at 0–950 m (Bertelsen & Pietsch, 1996).

GENERAL RANGE: Known only from four specimens collected in the eastern and western North Atlantic Ocean between 20°–34°N and near the Hawaiian Islands. Mesopelagic from unknown depths, collected in nets fishing from the surface to 1100 m (Bertelsen & Pietsch, 1996).

### *Lasiognathus saccoctoma* Regan

*Lasiognathus saccoctoma* Regan, 1925b, p. 563, Caribbean Sea at 18°50'N, 79°07'W.

*Lasiognathus saccoctoma* Regan, 1925b: Nolan & Rosenblatt (1975), Tinker (1982), Bertelsen *in* Whitehead *et al.* (1984), Bertelsen & Pietsch (1996).

TAXONOMY: Nolan & Rosenblatt (1975), Bertelsen & Pietsch (1996).

HAWAIIAN RECORDS: O'ahu at 0–1100 m fishing depths (Bertelsen & Pietsch, 1996). Tinker (1982) listed this species without collection data.

GENERAL RANGE: Known only from four specimens collected in the western North Atlantic east of the Bahamas, the Caribbean Sea south of Cuba, the eastern North Atlantic at Madeira, and the central North Pacific at O'ahu. Mesopelagic at 1–1800 m fishing depths (Nolan & Rosenblatt, 1975; Bertelsen *in* Whitehead *et al.*, 1984).

### *Lasiognathus waltoni* Nolan & Rosenblatt

*Lasiognathus waltoni* Nolan & Rosenblatt, 1975, p. 64, Figs. 4, 5A-B, central North Pacific northeast of the Hawaiian Islands at 30°39.1'N, 155°23.4'W.

*Lasiognathus waltoni* Nolan & Rosenblatt, 1975: Nolan & Rosenblatt (1975), Tinker (1982), Bertelsen & Pietsch (1996).

TAXONOMY: Nolan & Rosenblatt (1975), Bertelsen & Pietsch (1996).

HAWAIIAN RECORDS: Nolan & Rosenblatt (1975) described this species from north of Hawai'i Island (30°39.1'N, 155°23.4'W) at 0–1350 m fishing depths and recorded three unidentified *Lasiognathus* specimens from south of O'ahu at 625–1000 m. Loeb (1979) tentatively identified larvae of *Lasiognathus* from 28°N, 155°W.

GENERAL RANGE: *Lasiognathus waltoni* is known only from the holotype and may be a central North Pacific endemic. Mesopelagic at 0–1350 m fishing depths (Nolan & Rosenblatt, 1975; Bertelsen & Pietsch, 1996).

## Ceratiidae — Seadevils

### *Ceratias holboelli* Krøyer

*Ceratias holboelli* Krøyer, 1845, p. 639, off Greenland.

*Miopsaras myops* Gilbert, 1905: Gilbert (1905)?

*Ceratias holboelli* Krøyer, 1845: Bertelsen (1951, in part), Loeb (1979) in part?, Novikov *et al.* (1981) in part?, Pietsch (1986b).

TAXONOMY: The identities of *Ceratias* specimens recorded as *C. holboelli* Krøyer, 1845, between the revisions of Bertelsen (1951) and Pietsch (1986b) are uncertain because the genus was considered monotypic during that time.

HAWAIIAN RECORDS: O'ahu to Milwaukee Seamount at unspecified depths (Novikov *et al.*, 1981; Pietsch, 1986). The first record of the genus from the Hawaiian Islands, as *Miopsaras myops* Gilbert, 1905, from Kaua'i at 748–823 m, cannot be referred to species because the diagnostic esca was missing from the specimen (also listed by Fowler, 1928; Gosline & Brock, 1960; and Tinker, 1982). *Ceratias* larvae collected at the Hancock Seamounts were not identified to species (Boehlert & Mundy, 1992).

GENERAL RANGE: Circumglobal between 65°N–35°S in the tropical through cold-temperate Atlantic, Indian, and Pacific oceans except the eastern tropical and eastern South Pacific. Meso- and bathypelagic at 150–3400 m, usually 400–2000 m (Pietsch 1986).

### *Ceratias uranoscopus* Murray

*Ceratias uranoscopus* Murray *in* Thompson, 1877, p. 70, Fig. 20 on p. 69, eastern North Atlantic.

*Miopsaras myops* Gilbert, 1905: Gilbert (1905)?

*Ceratias holboelli* non Krøyer, 1845 [a valid species that also occurs at the Hawaiian Islands]: Bertelsen (1951, in part), Loeb (1979) in part?, Novikov *et al.* (1981) in part?  
*Ceratias uranoscopus* Murray, 1877: Pietsch (1986b).

TAXONOMY: Pietsch (1986b). See *Ceratias holboelli*.

HAWAIIAN RECORDS: O'ahu at unspecified depths (Pietsch, 1986b). The record of Fowler (1949) is based on *Miopsaras myops* (see above).

GENERAL RANGE: Circumglobal in the tropical and subtropical Atlantic, Indian, and Pacific oceans except the eastern tropical and eastern South Pacific near the Americas. Meso- and bathypelagic at 95–4000 m, usually 500–1000 m (Pietsch, 1986).

### *Cryptosaras couesii* Gill

*Cryptosaras couesii* Gill, 1883a, p. 284, off New York, western North Atlantic, 39°18'30"N, 68°24'00"W.

*Cryptosaras couersi* Gill, 1883a [*lapsus* for *couesii*]: Borets & Sokolovsky (1978).

*Cryptosaras couesii* Gill, 1883a: Fowler (1949), Loeb (1979), Miller *et al.* (1979), Novikov *et al.* (1981), Pietsch (1986b), Boehlert & Mundy (1992).

TAXONOMY: Pietsch (1986b).

COMMON NAMES: Triplewart seadevil (AFS).

HAWAIIAN RECORDS: O'ahu to Milwaukee Seamount at unspecified depths (Borets & Sokolovsky, 1978; Novikov *et al.*, 1981; Pietsch, 1986b; Boehlert & Mundy, 1992).

GENERAL RANGE: Circumglobal between 65°N–45°S in the tropical through cold-temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans except perhaps the western South Atlantic and eastern South Pacific oceans. Meso- and bathypelagic at 75–4000 m, usually at 500–1250 m (Pietsch, 1986).

## Gigantactinidae<sup>39</sup>

### *Gigantactis gargantua* Bertelsen, Pietsch, & Lavenberg

*Gigantactis gargantua* Bertelsen, Pietsch & Lavenberg, 1981, p. 46, Figs. 1D, 4H, 45–46, San Clemente basin off California at 32°16'N, 117°43'W.

*Gigantactis gargantua* Bertelsen, Pietsch & Lavenberg, 1981: Bertelsen *et al.* (1981), Amaoka in Masuda *et al.* (1984).

TAXONOMY: Bertelsen *et al.* (1981).

HAWAIIAN RECORDS: O'ahu at 0–1000 m fishing depths (Bertelsen *et al.*, 1981).

GENERAL RANGE: Indo-transPacific but known only from the southeastern Indian Ocean, Japan, the Hawaiian Islands, and off southern California. Meso- and bathypelagic at 0–1850 m fishing depths (Bertelsen *et al.*, 1981; Amaoka in Masuda *et al.*, 1984).

### *Gigantactis golovani* Bertelsen, Pietsch, & Lavenberg

*Gigantactis golovani* Bertelsen, Pietsch & Lavenberg, 1981, p. 44, Figs. 4J, 43–44, South Atlantic at 2°27'S, 19°00'W.

*Gigantactis golovani* Bertelsen, Pietsch & Lavenberg, 1981: Bertelsen *et al.* (1981), Bertelsen in Quéro *et al.* (1990).

TAXONOMY: Bertelsen *et al.* (1981).

HAWAIIAN RECORDS: Bertelsen *et al.* (1981) tentatively referred a juvenile collected off O'ahu at 0–2100 m fishing depths to this species.

GENERAL RANGE: Eastern tropical Atlantic and perhaps the Hawaiian Islands. Meso- and bathypelagic at 0–2100 m fishing depths (Bertelsen *et al.*, 1981; Bertelsen in Quéro *et al.*, 1990).

### *Gigantactis macronema* Regan

*Gigantactis macronema* Regan, 1925b, p. 565, North Atlantic at 31°47'N, 41°41'W.

*Gigantactis macronema* Regan, 1925b: Bertelsen *et al.* (1981).

TAXONOMY: Bertelsen *et al.* (1981).

HAWAIIAN RECORDS: Hawai'i Island to O'ahu at 0–1100 m fishing depths (Bertelsen *et al.*, 1981).

GENERAL RANGE: Known only from the central North Atlantic, eastern South Atlantic, central North Pa-

cific, and eastern North Pacific. Meso- and bathypelagic at 0–2500 m fishing depths (Bertelsen *et al.*, 1981).

***Gigantactis microdantis*** Bertelsen, Pietsch, & Lavenberg

*Gigantactis microdantis* Bertelsen, Pietsch & Lavenberg, 1981, p. 54, Figs. 56–58, eastern South Pacific at 15°12'S, 75°44'W.

*Gigantactis microdantis* Bertelsen, Pietsch & Lavenberg, 1981: Bertelsen *et al.* (1981).

TAXONOMY: Bertelsen *et al.* (1981).

HAWAIIAN RECORDS: O'ahu at 0–1175 m fishing depths (Bertelsen *et al.*, 1981).

GENERAL RANGE: Eastern and central Pacific endemic known only from California, the Hawaiian Islands, and Peru. Meso- and bathypelagic at 0–1175 m fishing depths (Bertelsen *et al.*, 1981).

***Gigantactis perlatus*** Beebe & Crane

*Gigantactis perlatus* Beebe & Crane, 1947, p. 167, Pl. 2 (fig. 3); Fig. 13, 11 mi. southwest by west of Jicarón Island off Panama, eastern tropical Pacific, at 7°08'N, 81°57'W.

*Gigantactis perlatus* Beebe & Crane, 1947: Bertelsen *et al.* (1981), Amaoka *in* Masuda *et al.* (1984).

TAXONOMY: Bertelsen *et al.* (1981).

HAWAIIAN RECORDS: O'ahu at 670–805 m, 0–800 m fishing depths (Bertelsen *et al.*, 1981).

GENERAL RANGE: Circumtropical and subtropical, known from the western North Atlantic, eastern South Atlantic, Indonesia, Japan, the Hawaiian Islands, Gulf of Panama, and the eastern South Pacific. Meso- and bathypelagic at 670–800 m, 0–2000 m fishing depths (Bertelsen *et al.*, 1981; Amaoka *in* Masuda *et al.*, 1984).

***Gigantactis savagei*** Bertelsen, Pietsch, & Lavenberg

*Gigantactis savagei* Bertelsen, Pietsch & Lavenberg, 1981, p. 53, Figs. 54–55, Cortez Bank off California at 31°40'N, 120°23'W.

*Gigantactis savagei* Bertelsen, Pietsch & Lavenberg, 1981: Bertelsen *et al.* (1981).

TAXONOMY: Bertelsen *et al.* (1981).

HAWAIIAN RECORDS: O'ahu at 0–1250 m fishing depths (Bertelsen *et al.*, 1981).

GENERAL RANGE: Eastern and central North Pacific endemic from southern California to the Hawaiian Islands, but perhaps also in the western North Pacific. Meso- and bathypelagic at 0–1250 m fishing depths (Bertelsen *et al.*, 1981).

[*Gigantactis vanhoeffeni* Brauer]

*Gigantactis vanhoeffeni* Brauer, 1902, p. 296, east of Zanzibar, Indian Ocean.

*Gigantactis vanhoeffeni* Brauer, 1902: Loeb (1979), Bertelsen *et al.* (1981), Amaoka *in* Masuda *et al.* (1984), Bertelsen *in* Whitehead *et al.* (1984), Bertelsen *in* Quéro *et al.* (1990).

TAXONOMY: Bertelsen *et al.* (1981).

HAWAIIAN RECORDS: None but records of this cosmopolitan species from 31°N, 155°W and 5°N, 164°W (Bertelsen *et al.*, 1981) indicate that it occurs throughout the region.

GENERAL RANGE: Circumglobal in the tropical through temperate Atlantic, Indian and Pacific oceans. Meso- and bathypelagic at 700–1300 m, 300–5300 m fishing depths (Bertelsen *et al.*, 1981; Amaoka *in* Masuda *et al.*, 1984; Bertelsen *in* Whitehead *et al.*, 1984; Bertelsen *in* Quéro *et al.*, 1990).

***Rhynchactis leptonema*** Regan

*Rhynchactis leptonema* Regan, 1925b, p. 566, North Atlantic at 8°19'N, 44°35'W.

*Rhynchactis leptonema* Regan, 1925b: Bertelsen *et al.* (1981), Bertelsen *in* Quéro *et al.* (1990), Bertelsen & Pietsch (1998).

TAXONOMY: Bertelsen & Pietsch (1998).

HAWAIIAN RECORDS: South of Gardner Pinnacles and perhaps O'ahu at 0–1100 m fishing depths (Bertelsen *et al.*, 1981; Bertelsen & Pietsch, 1998).

GENERAL RANGE: Known with certainty only from the central tropical Atlantic and the Pacific Ocean near

the Hawaiian Islands. Meso- and bathypelagic at 0–1100 m fishing depths (Bertelsen *et al.*, 1981; Bertelsen *in* Quéro *et al.*, 1990; Bertelsen & Pietsch, 1998).

### Linophryinidae<sup>40</sup>

#### [*Haplophryne mollis* (Brauer)]

*Aceratias mollis* Brauer, 1902, p. 297, central Indian Ocean.

*Edriolychnus schmidti* Regan, 1925: Bertelsen (1951), Pietsch & Siegel (1980).

*Haplophryne mollis* (Brauer, 1902): Bertelsen & Pietsch (1983), Bertelsen *in* Whitehead *et al.* (1984), Paxton *et al.* (1989), Bertelsen *in* Quéro *et al.* (1990).

TAXONOMY: Bertelsen & Pietsch (1983), Bertelsen *in* Quéro *et al.* (1990).

HAWAIIAN RECORDS: None but the general range indicates that *H. mollis* can be expected in the region.

GENERAL RANGE: Circumglobal. Mesopelagic at 0–900 m fishing depths (Pietsch & Seigel, 1980; Bertelsen & Pietsch, 1983; Bertelsen *in* Whitehead *et al.*, 1984; Paxton *et al.*, 1989; Bertelsen *in* Quéro *et al.*, 1990).

#### [*Linophryne andersoni* Gon]

*Linophryne andersoni* Gon, 1992, p. 139, Figs. 1–5, southeast of the Hawaiian Islands at 11°49'N, 144°51'W.

*Linophryne andersoni* Gon, 1992: Gon (1992).

TAXONOMY: Gon (1992).

HAWAIIAN RECORDS: None but the occurrence of this species southeast of Hawai'i Island (Gon, 1992) indicates that it can be expected in the main Hawaiian Islands.

GENERAL RANGE: Known only from the holotype. Epi- and probably mesopelagic at 50 m (Gon, 1992).

#### [*Linophryne coronata* Parr]

*Linophryne coronata* Parr, 1927, p. 13, Fig. 4, off Samana Cay, Bahamas, at 22°42'N, 74°23'W.

*Linophryne coronata* Parr, 1927: Bertelsen (1982), Bertelsen *in* Whitehead *et al.* (1984), Bertelsen *in* Quéro *et al.* (1990).

TAXONOMY: Bertelsen (1982).

HAWAIIAN RECORDS: None but a specimen tentatively identified as *L. coronata* collected at 27°05'N, 138°25'W (Bertelsen, 1982) indicates that this species could be expected in Hawaiian waters.

GENERAL RANGE: North Atlantic, eastern tropical Atlantic, and eastern North Pacific. Meso- and bathypelagic, and perhaps benthopelagic, at 0–1500 m (Bertelsen, 1982; Bertelsen *in* Whitehead *et al.*, 1984; Bertelsen *in* Quéro *et al.*, 1990).

#### *Linophryne densiramus* Imai

*Linophryne densiramus* Imai, 1941, p. 247, Figs. 14–17, Suruga Bay, Japan, at 35°00'N, 138°30'E.

*Linophryne densiramus* Imai, 1941: Bertelsen (1980, 1982), Bertelsen & Pietsch (1983), Paxton *et al.* (1989).

TAXONOMY: Bertelsen (1980, 1982).

HAWAIIAN RECORDS: O'ahu at 820–1400 m (Bertelsen, 1980).

GENERAL RANGE: Known from the Gulf of Mexico, western Atlantic, Japan, Australia, Banda Sea, the Hawaiian Islands, and off Chile. Meso- and bathypelagic at 0–2250 m fishing depths (Bertelsen, 1980; Bertelsen & Pietsch, 1983; Paxton *et al.*, 1989).

#### *Linophryne escaramosa* Bertelsen

*Linophryne escaramosa* Bertelsen, 1982, p. 69, Figs. 8, 13, off O'ahu, Hawaiian Islands, at 21°20'–30'N, 158°20'–30'W.

*Linophryne escaramosa* Bertelsen, 1982: Bertelsen (1982).

TAXONOMY: Bertelsen (1982).

HAWAIIAN RECORDS: Collected off O'ahu at 500–1200 m (Bertelsen, 1982).

GENERAL RANGE: Known only from the holotype. Meso- and bathypelagic at 500–1200 m (Bertelsen, 1982).

#### *Linophryne indica* (Brauer)

*Aceratias macrorhinus indicus* Brauer, 1902, p. 297, Indian Ocean at 2°43'S, 61°12'E.

*Linophryne corymbifera* Regan & Trewavas, 1932: Loeb (1979).

*Linophryne indica* (Brauer, 1902): Bertelsen (1981, 1982), Paxton *et al.* (1989).

TAXONOMY: Bertelsen (1981, 1982).

HAWAIIAN RECORDS: O'ahu to east of Necker at 630–1150 m (Bertelsen, 1981).

GENERAL RANGE: Indo-transPacific from the Seychelles to southern Japan, northern Australia, the Hawaiian Islands, and the Gulf of Panama. Meso- and bathypelagic, and perhaps benthopelagic, at 630–1900 m, 0–1900 m fishing depths (Bertelsen, 1981; Paxton *et al.*, 1989).

### *Linophryne pennibarbata* Bertelsen

*Linophryne pennibarbata* Bertelsen, 1980, p. 45, Figs. 4A, 5A, 6, 7, off Florida, U.S.A., at 29°58'N, 80°10'W.

*Linophryne pennibarbata* Bertelsen, 1980: Bertelsen (1980), Bertelsen *in* Quérou *et al.* (1990).

TAXONOMY: Hawaiian specimens were identified as this species with reservation in the original description (Bertelsen, 1980).

HAWAIIAN RECORDS: O'ahu to west of Lisianski at 750–1150 m (Bertelsen, 1980).

GENERAL RANGE: Known only from the western and eastern North Atlantic, and the Hawaiian Islands. Meso- and bathypelagic, and perhaps benthopelagic, at 325–1500 m (Bertelsen, 1980; Bertelsen *in* Quérou *et al.*, 1990).

## Mugiliformes

### Mugilidae — Mulletts, Grey mulletts<sup>41</sup>

#### *Chaenomugil leuciscus* (Günther)

*Myxus leuciscus* Günther, 1872a, p. 666, Pl. 65 (fig. A), Rarotonga, Cook Islands.

*Myxus (Neomyxus) sclateri* Steindachner, 1878: Steindachner (1878).

*Chaenomugil chaptalii* non (Eydoux & Souleyet, 1850) [a junior synonym of *Mugil cephalus* Linnaeus, 1758, a species that also occurs in the Hawaiian Islands]: Jenkins (1903), Jordan & Evermann (1905).

*Myxus leuciscus* Günther, 1872a: Fowler (1928, 1934).

*Neomyxus chaptalii* non (Eydoux & Souleyet, 1850): Fowler (1928, 1934, 1949), Gosline & Brock (1960), Tinker (1982).

*Neomyxus leuciscus* (Günther, 1872a): Senou *in* Nakabo (1993), Randall *et al.* (1993b), Hoover (1993, 1994 — except photograph on p. 90; 2003), Randall (1996a), Randall *et al.* (1997a), Harrison & Senou (1999).

*Chaenomugil leuciscus* (Günther, 1872a): Yoshino & Senou *in* Masuda *et al.* (1984), Randall *et al.* (1985a), Myers (1989), Thomson (1997).

TAXONOMY: Thomson (1997). Senou *in* Nakabo (1993) and Harrison & Senou (1999) maintained this species in *Neomyxus* but Thomson (1997) argued that the character that distinguishes *Neomyxus* from *Chaenomugil* is so subtle as to be unusable at the generic level. Thomson (1997) also noted that records of *Mugil chaptalii* Eydoux & Souleyet, 1850, under various generic names listed above refer to *Chaenomugil leuciscus* (Günther, 1872a) although the holotype of *Mugil chaptalii* Eydoux & Souleyet itself was actually a juvenile *Mugil cephalus* Linnaeus.

COMMON NAMES: Uouoa (Hoover, 1993, 2003; Randall, 1996a), Acute-jawed mullet (FAO; Hoover, 1993, 2003), Sharpnose mullet (Randall, 1996a; Hoover, 2003), False 'ama'ama, False mullet (both DLNR; Hoover, 2003).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at 1–3 m (Steindachner, 1878; Jordan & Evermann, 1905; Randall *et al.*, 1985b; Randall *et al.*, 1993b; Hoover, 1993, 1994).

GENERAL RANGE: Pacific endemic found from the Ogasawara and Marianas Islands to the Marshalls, the Hawaiian Islands, Samoa and Ducie Island. Benthopelagic in shallow, sandy lagoons and over reef flats (Tinker, 1982; Yoshino & Senou *in* Masuda *et al.*, 1984; Myers, 1989; Randall *et al.*, 1997b; Thomson, 1997).

#### [*Crenimugil crenilabis* (Forsskål)]

*Mugil crenilabis* Forsskål, 1775, p. 73, Red Sea.

*Mugil crenilabis* Forsskål, 1775: Fowler (1928, 1931, 1934).

*Crenimugil crenilabrus* (Forsskål, 1775) [*lapsus for crenilabis*]: Eschmeyer (1990), Kuitert (1993).

*Crenimugil crenilabis* (Forsskål, 1775): Fowler (1949), Tinker (1982), Smith & Smith *in* Smith & Heemstra (1986), Myers (1989), Randall *et al.* (1990a, 1997a), Senou *in* Nakabo (1993), Thomson (1997), Harrison & Senou (1999).

TAXONOMY: Thomson (1997).

COMMON NAMES: Fringelip mullet (AFS; FAO; Randall *et al.*, 1997a), Warty-lipped mullet.

HAWAIIAN RECORDS: Tinker (1982) stated that this species occurs in the Hawaiian Islands. There are no other records from the region so Tinker's record must be regarded as invalid.

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to southern Japan, Australia, the Ogasawara Islands, Lord Howe Island, Micronesia, the Line Islands, and Tuamotu Islands. Benthopelagic in shallow, sandy lagoons and over reef flats (Smith & Smith *in* Smith & Heemstra, 1986; Myers, 1989; Randall *et al.*, 1990a, 1997b; Kuitert, 1993; Thomson, 1997).

[*Liza vaigiensis* (Quoy & Gaimard)]

*Mugil vaigiensis* Quoy & Gaimard, 1825, p. 337, Pl. 59 (fig. 2), Waigeo (or Waigiou), Indonesia.

*Mugil vaigiensis* Quoy & Gaimard, 1825: Fowler (1928, 1931, 1934).

*Ellochelon vaigiensis* (Quoy & Gaimard, 1825): Fowler (1949), Senou *in* Nakabo (1993).

*Liza vaigiensis* (Quoy & Gaimard, 1825): Tinker (1982), Smith & Smith *in* Smith & Heemstra (1986), Myers (1989), Randall *et al.* (1990a), Thomson (1997), Harrison & Senou (1999).

TAXONOMY: Thomson (1997).

COMMON NAMES: Squartail mullet (AFS; FAO), Diamond-scaled mullet (FAO; Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Tinker (1982) stated that this species occurs in the Hawaiian Islands. There are no other records from the region so Tinker's record must be regarded as invalid.

GENERAL RANGE: Indo-Pacific from South Africa to southern Japan, Australia, Micronesia, and the Tuamotu Islands. Benthopelagic in estuaries, shallow lagoons, and over reef flats (Smith & Smith *in* Smith & Heemstra, 1986; Myers, 1989; Randall *et al.*, 1990a; Thomson, 1997).

***Mugil cephalus* Linnaeus**

*Mugil cephalus* Linnaeus, 1758, p. 316, "Habitat in Oceano Europaeo, fluvius subiens".

*Mugil cephalotus* Valenciennes *in* Cuvier & Valenciennes, 1836: Eydoux & Souleyet (1850), Streets (1877).

*Mugil chaptalii* Eydoux & Souleyet, 1850: Eydoux & Souleyet (1850) [based on a juvenile *M. cephalus*; see Thomson (1997)].

*Mugil dobula* Günther, 1877: Günther (1880), Steindachner (1900).

*Myxus pacificus* Steindachner, 1900: Steindachner (1900)? [the identity of this specimen remains uncertain].

*Mugil kelaartii* non Günther, 1861 [a junior synonym of *Valamugil perusii* (Valenciennes *in* Cuvier & Valenciennes, 1836), a species not found in the Hawaiian Islands]: Fowler (1900).

*Mugil albula* Linnaeus, 1766: Snyder (1904).

*Mugil pacificus* (Steindachner, 1900): Jordan & Evermann (1905)?

*Mugil trichilus* Vaillant & Sauvage, 1875: Vaillant & Sauvage (1875), Fowler (1928).

*Neomyxus leuciscus* non (Günther, 1872) [a valid species also found in the Hawaiian Islands]: Hoover (1993, 1994 — photograph on p. 90 is of *M. cephalus* but text refers correctly to *N. leuciscus*).

*Mugil cephalus* Linnaeus, 1758: Jenkins (1903), Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Martin & Drewry (1979), Tinker (1982), Uchida & Uchiyama (1986), Smith & Smith *in* Smith & Heemstra (1986), Hoover (1993, 1994 text only), Crosetti *et al.* (1993, 1994), Thomson *in* Quéro *et al.* (1990), Randall *et al.* (1993b), Senou *in* Nakabo (1993), Kuitert (1993), Hoover (1993, 2003), Allen & Robertson (1994), Corti & Crosetti (1996), Randall (1996a), Randall *et al.* (1997a), Thomson (1997), Rossi *et al.* (1998a, 1998b), Harrison & Senou (1999), Yamamoto & Tagawa (2000).

TAXONOMY: Senou *in* Nakabo (1993), Thomson (1997). Populations of *Mugil cephalus*, including the one in the Hawaiian Islands, are genetically differentiated at a level comparable to the level found between species of other fish families (Crosetti *et al.*, 1993, 1994; Corti & Crosetti, 1996). The magnitude of genetic differentiation between species of Mugilidae is exceptionally large, however. The level of genetic differentiation between *M. cephalus* populations is therefore low relative to that between mullet species and this, in combination with the lack of morphological differentiation between populations from around the world, has led to the conclusion that the *Mugil cephalus* as traditionally recognized should not be split into regional species (Rossi *et al.*, 1998a, b). If the Hawaiian Islands population were to be recognized as a distinct species, it would take the name *Mugil trichilus* Vaillant & Sauvage, 1875.



COMMON NAMES: ‘Ama‘ama (Hoover, 1993, 2003 - the general name for the species, but also used specifically for 8–12 inch fish; Randall, 1996a), Pua‘ama (finger-length juveniles; Hoover, 2003), Kahala (hand-length juveniles; Hoover, 2003), ‘Anaé (full-sized fish; Hoover, 2003); Striped mullet (AFS; Hoover, 1993, 2003; Randall, 1996a), Flathead mullet (FAO), Sea mullet, Gray mullet (Yamamoto & Tagawa, 2000; Hoover, 2003).

HAWAIIAN RECORDS: Hawai‘i Island to Midway from the open ocean but usually coastal, and into the lower reaches of freshwater rivers and streams at 0–3 m (Eydoux & Souleyet, 1850; Jordan & Evermann, 1905; Uchida & Uchiyama, 1986; Englund *et al.*, 2000a; Yamamoto & Tagawa, 2000).

GENERAL RANGE: Circumtropical and subtropical in the Mediterranean, Atlantic, Indian, and Pacific with northward extensions in warm, western boundary currents but rare in some parts of the world including the Philippines, East Indies, West Indies, and eastern tropical Atlantic. Benthopelagic, common in shallow areas with freshwater influence but also in saline and hypersaline lagoons, usually in the upper few meters but recorded to 329 m (Gosline & Brock, 1960; Martin & Drewry, 1979; Smith & Smith *in* Smith & Heemstra, 1986; Thomson *in* Quéro *et al.*, 1990; Kuitert, 1993; Allen & Robertson, 1994; Thomson, 1997).

### *Valamugil engeli* (Bleeker)

*Mugil engeli* Bleeker, 1858, p. 277, Jakarta (Batavia), Java, Indonesia.

*Mugil engeli* Bleeker, 1858: Fowler (1928, 1931, 1934, 1949).

*Moolgarda engeli* (Bleeker, 1858): Senou *in* Nakabo (1993), Randall (1996a), Englund *et al.* (2000a), Hoover (2003).

*Chelon engeli* (Bleeker, 1858): Yamamoto & Tagawa (2000).

*Valamugil engeli* (Bleeker, 1858): Randall & Kanayama (1972), Randall (1980a), Tinker (1982), Yoshino & Senou *in* Masuda *et al.* (1984), Randall (1987a), Myers (1989), Thomson (1997), Harrison & Senou (1999).

TAXONOMY: Senou *in* Nakabo (1993) placed this species in *Moolgarda* Whitley. Thomson (1997) noted that no type of *Moolgarda* exists, that extant specimens identified as *Moolgarda* by Whitley are *Liza alata* (Steindachner, 1892) and that the description of the type species of *Moolgarda* is a *Valamugil* species. Thomson (1997) concluded that *Moolgarda* is a junior synonym of *Valamugil*. Harrison & Senou (1999) also used *Valamugil* as the valid genus for this species and the next.

COMMON NAMES: Kanda (AFS; FAO), Kanda mullet, Australian mullet (Yamamoto & Tagawa, 2000), Summer mullet (Yamamoto & Tagawa, 2000).

HAWAIIAN RECORDS: This species was introduced in 1955 from the Marquesas to O‘ahu, where it became established in shallow, saline ponds. It has now spread throughout the main islands, found in estuaries (Randall & Kanayama, 1972; Randall, 1987a; Englund *et al.*, 2000a; Yamamoto & Tagawa, 2000).

GENERAL RANGE: Indo-Pacific from East Africa and the Red Sea to southern Japan, Micronesia, and the Marquesas; introduced in the Hawaiian Islands. Benthopelagic in estuaries, shallow lagoons, and over reef flats (Yoshino & Senou *in* Masuda *et al.*, 1984; Myers, 1989; Thomson, 1997).

### [*Valamugil seheli* (Forsskål)]

*Mugil crenilabis* var. *seheli* Forsskål, 1775, p. 73, Luhaiya, Yemen, Red Sea.

*Valamugil seheli* (Forsskål, 1775): Thompson (1997), Harrison & Senou (1999).

TAXONOMY: Thompson (1997).

COMMON NAMES: Bluespot mullet (FAO).

HAWAIIAN RECORDS: Harrison & Senou (1999) included the Hawaiian Islands within the range of this species but there are no other records of its occurrence within the region.

GENERAL RANGE: Indo-Pacific from East Africa and the Red Sea to Indonesia, southern Japan, northern Australia, New Caledonia, Micronesia, and French Polynesia. Engybenthic in shallow, coastal waters, often in lagoons and estuaries (Thompson, 1997; Harrison & Senou, 1999).

**Atheriniformes**  
**Atherinoidei**

**Atherinidae — Silversides**

***Atherinomorus insularum*** (Jordan & Evermann)

*Atherina insularum* Jordan & Evermann, 1903a, p. 170, Honolulu, O'ahu, Hawaiian Islands.

*Atherina insularum* Jordan & Evermann, 1903a: Jordan & Evermann (1903a, 1905), Jenkins (1903), Snyder (1904).

*Hepsetia insularum* (Jordan & Evermann, 1903a): Fowler (1928, 1931, 1934).

*Thoracatherina insularum* (Jordan & Evermann, 1903a): Fowler (1949).

*Pranesus insularum* (Jordan & Evermann, 1903a): Gosline & Brock (1960), Hobson (1974), Tinker (1982), Okamoto & Kanenaka (1984), Uchida & Uchiyama (1986).

*Atherinomorus lacunosus* non (Forster in Bloch & Schneider, 1801) [a valid species not found in the Hawaiian Islands]: Myers (1989), Randall *et al.* (1993a).

*Atherinomorus insularum* (Jordan & Evermann, 1903a): Yoshino in Masuda *et al.* (1984), White *et al.* (1984), Randall (1996a).

TAXONOMY: White *et al.* (1984), Whitehead & Ivantsoff (1983) synonymized *Pranesus* with *Atherinomorus* but did not mention *A. insularum* (Jordan & Evermann, 1903). Randall *et al.* (1993a) correctly noted the change in generic placement in their text but erroneously listed *Atherinomorus lacunosus* (Forster in Bloch & Schneider, 1801) as the Hawaiian species in their table. Myers (1989) included an illustration of *Atherinomorus insularum whitei* (Schultz, 1953) from Saipan without including the subspecies in the caption, listed this subspecies as a junior synonym of *A. lacunosus* in his text, and included the Hawaiian Islands within the range of *A. lacunosus* without comment. This conclusion needs to be justified. In the absence of studies demonstrating otherwise, the Hawaiian Islands populations of *Atherinomorus* are here considered to be an endemic species, *A. insularum*. Records from elsewhere are probably misidentifications (as mentioned by Yoshino in Masuda *et al.*, 1984).

COMMON NAMES: 'Iao (Randall, 1996a), 'T'iao, 'Iomo, Hawaiian silverside (FAO; Randall, 1996a), Tōgoro (DLNR).

HAWAIIAN RECORDS: Hawai'i Island to Kure at 0–2 m (Jordan & Evermann, 1903a, 1905; Uchida & Uchiyama, 1986; Okamoto & Kanenaka, 1984; Randall *et al.*, 1993b).

GENERAL RANGE: Probably a Hawaiian endemic. Epipelagic along rocky shorelines at ca. 0–2 m (Gosline & Brock, 1960). No recent review of taxonomy or biology.

**Notocheiridae**

***Iso hawaiiensis*** Gosline

*Iso hawaiiensis* Gosline, 1952, p. 47, Figs. 1a–b, ca. 1/2 mi west of Makapu'u Point, O'ahu, Hawaiian Islands.

*Iso hawaiiensis* Gosline, 1952: Gosline (1952), Gosline & Brock (1960), Tinker (1982), Myers (1989), Saeed *et al.* (1993).

TAXONOMY: Saeed *et al.* (1993).

COMMON NAMES: Hawaiian surf sardine (FAO), Keeled silverside (Myers, 1999).

HAWAIIAN RECORDS: O'ahu at 0–1 m (Gosline, 1952).

GENERAL RANGE: Currently considered to be a central Pacific endemic known from the Marshall Islands, the Hawaiian Islands, and Rapa, but J.E. Randall (pers. comm., Dec. 2002) considers the specimens from the Marshalls and Rapa to be other species and *I. hawaiiensis* to be a Hawaiian Islands endemic. Epipelagic at 0–2 m in surf along rocky shores (Saeed *et al.*, 1993).

**Beloniformes**  
**Adrianichthyoidei**

**Adrianichthyidae — Ricefishes, Medakas, Adrianichthyids**

[*Oryzias latipes* (Temminck & Schlegel)]

*Poecilia latipes* Temminck & Schlegel, 1846, p. 244, Pl. 103 (fig. 5), Japan.

*Oryzias latipes* (Temminck & Schlegel, 1846): Brock (1960), Maciolek (1984), Uyeno & Arai in Masuda *et al.* (1984), Uwa & Parenti (1988), Devick (1991), Fuller *et al.* (1999).

TAXONOMY: Uwa & Parenti (1988).

COMMON NAMES: Japanese medaka (AFS).

HAWAIIAN RECORDS: This species was introduced in 1922 from Asia to freshwater habitats on O‘ahu but failed to establish populations (Brock, 1960; Maciolek, 1984; Devick, 1991; Fuller *et al.*, 1999).

GENERAL RANGE: Eastern Asia from Kazakhstan to Japan, Taiwan, Korea, and southern China. Surface-dwelling in shallow, still fresh and brackish waters (Uyeno & Arai in Masuda *et al.*, 1984; Uwa & Parenti, 1988; Fuller *et al.*, 1999).

## Belonoidei

### Belonidae — Needlefishes<sup>42</sup>

#### *Ablennes hians* (Valenciennes)

*Belone hians* Valenciennes in Cuvier & Valenciennes, 1846, p. 432, Pl. 548, Bahia, Brazil.

*Athlennes hians* (Valenciennes, 1846): Jenkins (1903), Snyder (1904), Jordan & Evermann (1905).

*Ablennes hians* (Valenciennes, 1846): Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Parin (1967), Collette & Parin (1970), Tinker (1982), Harrison *et al.* (1983), Myers (1989), Hoover (1993, 2003), Allen & Robertson (1994).

TAXONOMY: Parin (1967), Collette & Parin (1970).

COMMON NAMES: ‘Aha‘aha (Gosline & Brock, 1960), Flat needlefish (AFS; FAO), Gaping needlefish (Hoover, 1993, 2003), Stickfish, Barred Needlefish.

HAWAIIAN RECORDS: Maui to Pearl and Hermes Reef at 0–2 m (Jenkins, 1903; Jordan & Evermann, 1905; Fowler, 1949; Harrison *et al.*, 1983).

GENERAL RANGE: Circumtropical and subtropical in the Red Sea, Atlantic Ocean, Indian Ocean, and across the entire Pacific Ocean, with poleward range extensions in western boundary currents. Epipelagic in oceanic and neritic waters (Parin, 1967; Myers, 1989; Allen & Robertson, 1994).

#### *Platybelone argalus platyura* (Bennett)

*Belone platyura* Bennett, 1832, p. 168, Mauritius, Indian Ocean.

*Belone carinata* Valenciennes in Cuvier & Valenciennes, 1846: Cuvier & Valenciennes (1846).

*Belone platyura* Bennett, 1832: Streets (1877), Steindachner (1900), Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Tinker (1982).

*Belone platyura* non Rüppell, 1837 [a valid Red Sea subspecies of *P. argalus*]: Steindachner (1900).

*Belone platyurus* Bennett, 1832: Jenkins (1903).

*Platybelone argalus* (LeSeuer, 1821) [other subspecies]: Parin (1967), Collette & Parin in Whitehead *et al.* (1984), Hoover (2003), Allen & Robertson (1994).

*Platybelone argalus platyura* (Bennett, 1832): Parin (1967), Collette & Parin (1970), Randall *et al.* (1985a), Myers (1989), Randall *et al.* (1990a), Hoover (1993), Randall *et al.* (1993b), Randall (1996a), Randall *et al.* (1997a).

TAXONOMY: Parin (1967), Collette & Parin (1970).

COMMON NAMES: ‘Aha (Hoover, 1993, 2003; Randall, 1996a), Keeltail needlefish (AFS; FAO; Randall, 1996a; Hoover, 2003), Flat-tailed needlefish (Hoover, 1993, 2003), Stickfish, Flat-tailed longtom (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to Midway at 0–2 m (Streets, 1877a; Jordan & Evermann, 1905; Randall *et al.*, 1985b, 1993b; Hoover, 1993).

GENERAL RANGE: Circumtropical and subtropical in the Atlantic, Indian, and Pacific oceans. Seven subspecies are recognized (Collette & Parin, 1970). *Platybelone argalus platyura* occurs in the Indo-Pacific from east Africa and the southernmost portion of the Arabian Sea to Indonesia, southern Japan, the Ogasawara Islands, Guam, Australia, the Hawaiian Islands, and Easter Island. Epipelagic, juveniles occur offshore and adults are found in nearshore waters. Common in small groups over reef flats and in lagoons and bays (Parin, 1967; Collette & Parin, 1970; Collette & Parin in Whitehead *et al.*, 1984; Myers, 1989; Randall *et al.*, 1990a, 1997b; Allen & Robertson, 1992).

***Tylosurus acus melanotus*** (Bleeker)

*Belone melanotus* Bleeker, 1850, p. 94, Jakarta (Batavia), Java, Indonesia.

*Thalassosteus appendiculatus* (Klunzinger, 1871): Jordan *et al.* (1927) [authorship of species incorrectly attributed to Günther].

*Strongylura appendiculata* (Klunzinger, 1871): Fowler (1928), Tinker (1982 text).

*Tylosurus acus* (Lacépède, 1803) [other subspecies]: Parin (1967), Collette & Parin (1970), Collette & Parin *in* Whitehead *et al.* (1984), Allen & Robertson (1994).

*Tylosurus acus melanotus* (Bleeker, 1850): Collette & Parin (1970), Randall (1980a), Tinker (1982 appendices), Randall *et al.* (1993b, 1997a), Collette & Banford (2001).

TAXONOMY: Parin (1967), Collette & Parin (1970). Eschmeyer (1998) stated in his entry for *Sphyaena acus* Lacépède, 1810, that names based upon *S. acus*, should not be used and that “it should be regarded as a synonym of *Tylosurus imperialis* (Rafinesque, 1810).” In his entry for *Esox imperialis* Rafinesque, 1810, Eschmeyer (1998) stated: “*Sphyaena acus* was placed on the Official Index and *Esox imperialis* on the Official List. See also *Sphyaena acus* Lacépède 1803 [note: because of changes, synonyms of *T. imperialis* may not be synonyms of *Tylosurus imperialis imperialis*]. Apparently wrongly treated as valid as *Tylosurus acus imperialis* .. ; name *acus* should not be used.” The International Commission of Zoological Nomenclature officially suppressed *Sphyaena acus* Lacépède for purposes of the law of priority in ICZN Opinion 900 (1970, *Bull. Zool. Nomen.* **26**(5/6): 213–216), making the name permanently unavailable for taxonomic purposes in Zoology. Personal communications with W. Eschmeyer (Nov. 2000) and B. Collette (Nov. 2000) determined that recent authors have continued to use *T. acus* despite knowledge of the ruling of the Commission because of as-yet-unresolved questions about the taxonomic status of the various populations now recognized as *T. acus* and inadequacies in the original descriptions of the available names for those populations, including both *Esox imperialis* and *Sphyaena acus*. These are not questions that can be clarified in this checklist and therefore the tradition of using *Tylosurus acus* is continued here even though the suppression of that name by the Commission is recognized.

COMMON NAMES: Agujon (AFS), Agujon needlefish (FAO), Stickfish.

HAWAIIAN RECORDS: O‘ahu to Midway at 0–1 m (Jordan *et al.*, 1927; Fowler, 1928; Randall, 1981a; Randall *et al.*, 1993b).

GENERAL RANGE: Circumtropical and subtropical in the Mediterranean Sea, Atlantic, Indian, and Pacific oceans. Four subspecies are recognized [*T. pacificus* (Steindachner) was considered a fifth subspecies but was recently elevated to the rank of a full species (Collette & Banford, 2001)]. *Tylosurus acus melanotus* occurs in the Indo-Pacific from South Africa and the Red Sea to Indonesia, Australia, southern Japan, the Ogasawara Islands, the Hawaiian Islands, the Society Islands, the eastern tropical Pacific offshore islands, and Panama. Epipelagic in nearshore waters although juveniles may associate with floating material at sea (Parin, 1967; Collette & Parin, 1970; Collette & Parin *in* Whitehead *et al.*, 1984; Allen & Robertson, 1994; Randall *et al.*, 1997b; Collette & Banford, 2001).

***Tylosurus crocodilus crocodilus*** (Peron & Lesueur)

*Belona crocodila* Péron & Lesueur *in* Lesueur, 1821b, p. 129, Mauritius, Indian Ocean.

*Belone annulata* Valenciennes *in* Cuvier & Valenciennes, 1846: Steindachner (1900).

*Tylosurus giganteus* (Temminck & Schlegel, 1846): Jenkins (1903), Jordan & Evermann (1905).

*Strongylura crocodila* (Péron & Lesueur, 1821): Fowler (1928, 1931, 1934, 1949).

*Strongylura indica* (Lesueur, 1821) [status uncertain according to Eschmeyer, 1998]: Fowler (1928, 1931, 1934, 1949, in part).

*Strongylura gigantea* (Temminck & Schlegel, 1846): Gosline & Brock (1960), Struhsaker (1973a), Tinker (1982), Okamoto & Kanenaka (1984).

*Tylosurus crocodilus* (Péron & Lesueur, 1821) [other subspecies]: Parin (1967), Collette & Parin (1970), Allen & Robertson (1994), Hoover (2003).

*Tylosurus crocodilus crocodilus* (Péron & Lesueur, 1821): Parin (1967), Myers (1989), Randall *et al.* (1990a), Hoover (1993), Randall *et al.* (1993b, 1997a), Randall (1996a).

TAXONOMY: Parin (1967), Collette & Parin (1970).

COMMON NAMES: ‘Aha (Hoover, 1993, 2003; Randall, 1996a), ‘Aha‘aha (Gosline & Brock, 1960), Auau (Gosline & Brock, 1960), Houndfish (AFS; Randall, 1996a; Hoover, 2003), Hound needlefish (FAO),

Crocodile needlefish (Hoover, 1993, 2003), Stickfish, Crocodile longtom (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Hawai'i Island to Midway at 0–3 m (Steindachner, 1900; Jordan & Evermann, 1905; Okamoto & Kanenaka, 1984; Hoover, 1993).

GENERAL RANGE: Circumtropical and subtropical in the Atlantic, Indian, and Pacific oceans. Two subspecies are recognized in the Pacific. *Tylosurus crocodilus crocodilus* occurs in the Gulf of Mexico, Red Sea, Atlantic, Indian, and Pacific oceans; in the Indo-Pacific from South Africa and the Red Sea to Indonesia, Australia, southern Japan, the Ogasawara Islands, the Hawaiian Islands, and the Society Islands. *Tylosurus crocodilus fodiator* Jordan and Gilbert is an eastern Pacific endemic. Epipelagic in lagoons and over seaward reefs although juveniles may associate with floating material at sea (Parin, 1967; Collette & Parin, 1970; Myers, 1989; Randall *et al.*, 1990a, 1997b; Allen & Robertson, 1994).

### *Xenentodon cancila* (Hamilton)

*Esox cancila* Hamilton, 1822, p. 213, Pl. 27 (fig. 70), ponds and smaller rivers of Gangetic provinces of India. *Strongylura krefftii* non (Günther, 1866) [*S. krefftii* is a valid species not introduced to the Hawaiian Islands]; Robins *et al.* (1991b) [misidentification].

*Xenentodon cancila* (Hamilton, 1822): Roberts (1989), Kottelat (1989), Devick (1991), Fuller *et al.* (1999), Yamamoto & Tagawa (2000).

TAXONOMY: Roberts (1989), Kottelat (1989).

COMMON NAMES: Silver needlefish, Stickfish (Yamamoto & Tagawa, 2000), Asian needlefish (Fuller *et al.*, 1999), Freshwater garfish (Fuller *et al.*, 1999).

HAWAIIAN RECORDS: This fresh- and brackish-water species was introduced to Wahiawa Reservoir (Lake Wilson) on O'ahu in 1988, probably by an aquarium hobbyist. By 1989, *X. cancila* had become so abundant that it was considered a threat to sport fishes in the reservoir. Its population has since decreased (Devick, 1991; Fuller *et al.*, 1999; Yamamoto & Tagawa, 2000).

GENERAL RANGE: Southeast Asia from India throughout Indochina and the Malay Peninsula. Introduced to the Hawaiian Islands. Epipelagic in shallow, still freshwaters at 0–2 m (Roberts, 1989; Kottelat, 1989; Fuller *et al.*, 1999).

## Scomberesocidae — Sauries

### *Cololabis adocetus* Böhlke

*Cololabis adocetus* Böhlke, 1951, p. 83, 160 mi southwest of San Juan, Peru, at 17°00'S, 76°50'W.

*Elassichthys adocetus* (Böhlke, 1951): Hubbs & Wisner (1980).

*Cololabis adocetus* Böhlke, 1951: Gosline & Brock (1960), Tinker (1982), Collette *et al.* (1984).

TAXONOMY: Collette *et al.* (1984a).

HAWAIIAN RECORDS: Hawai'i Island to Kaua'i at 0–1 m (Gosline & Brock, 1960; Hubbs & Wisner, 1980).

GENERAL RANGE: Eastern Pacific endemic from off Baja California to northern Chile, west to the Hawaiian Islands, but rare or absent from the eastern equatorial Pacific and nearshore waters of North and Central America. Epipelagic in oceanic waters (Hubbs & Wisner, 1980).

### *Cololabis saira* (Brevoort)

*Scomberesox saira* Brevoort, 1856, p. 281, Pl. 7 (fig. 1), Simoda, Japan [spelled *Scomberesox saira* in text, *Scomberesox saira* on plate].

*Cololabis saira* (Brevoort, 1856) [*a lapsus* in spelling]: Borets & Sokolovsky (1978).

*Cololabis saira* (Brevoort, 1856): Fowler (1949), Gosline & Brock (1960), Novikov *et al.* (1981), Hubbs & Wisner (1980), Tinker (1982), Harrison *et al.* (1983).

TAXONOMY: Hubbs & Wisner (1980).

COMMON NAMES: Pacific saury (AFS).

HAWAIIAN RECORDS: Unspecified locations in the Northwestern Hawaiian Islands to Milwaukee Seamount and northward at 0–1 m. Perhaps only seasonally present in the region, in winter at the extreme northern part of the archipelago (Gosline & Brock, 1960; Novikov *et al.*, 1981; Hubbs & Wisner, 1980; Harrison *et al.*, 1983; B. Mundy, unpubl. data).

GENERAL RANGE: North Pacific endemic from Taiwan to Baja California north to Asia, North America, and the Aleutians, between 60°N and 20°N in the eastern and western Pacific, and 55°N and 25° or 30°N in the central Pacific. Epipelagic in oceanic and coastal waters (Hubbs & Wisner, 1980).

### Exocoetidae — Flyingfishes

#### [*Cheilopogon arcticeps* (Günther)]

*Exocoetus arcticeps* Günther, 1866, p. 289, “China”.

*Cypselurus arcticeps* (Günther, 1866): Fowler (1934), Parin (1960a, 1960b).

*Cheilopogon arcticeps* (Günther, 1866): Parin (1961a, 1961b, 1996, 1999), Kovalevskaya (1980), Paxton *et al.* (1989).

TAXONOMY: Parin (1961a, b, 1996, 1999), Kovalevskaya (1980).

COMMON NAMES: Bearhead flyingfish (FAO).

HAWAIIAN RECORDS: A record from unspecified locations in the Hawaiian Archipelago (Parin, 1960b, in his table 26 but not in his text) is probably a printing error. Parin (1961b, 1996, 1999) did not include central Pacific localities within the range of *C. arcticeps*.

GENERAL RANGE: Eastern Indian and west-central Pacific oceans from southern Japan, the China seas, the Philippines, Indonesia, Vietnam, Thailand, New Guinea, Australia, and the Solomon Islands. Epipelagic in neritic waters (Parin, 1960b,b; Parin, 1961a; Paxton *et al.*, 1989; Parin, 1996, 1999).

#### *Cheilopogon atrisignis* (Jenkins)

*Cypselurus atrisignis* Jenkins, 1903, p. 436, Pl. 3, Honolulu, O’ahu, Hawaiian Islands.

*Cypselurus atrisignis* Jenkins, 1903 [a *lapsus* in the spelling of the genus]: Jenkins (1903), Jordan & Evermann (1905).

*Cypselurus atrisignis* Jenkins, 1903: Fowler (1928, 1934), Gosline & Brock (1960), Parin (1960a, 1960b), Tinker (1982), Harrison *et al.* (1983), Yoshino *in* Masuda *et al.* (1984).

*Cypselurus gregoryi* Pietschmann, 1928: Pietschmann (1928, 1930), Fowler (1934).

*Maculocoeus atrisignis* (Jenkins, 1903): Fowler (1949).

*Cheilopogon atrisignis* (Jenkins, 1903): Parin (1961a, 1961b, 1996, 1999).

TAXONOMY: Parin (1961a, b, 1996, 1999).

COMMON NAMES: Gilder flyingfish (FAO).

HAWAIIAN RECORDS: O’ahu to Pearl and Hermes Reef at 0–1 m (Jenkins, 1903; Jordan & Evermann, 1905; Fowler, 1934a; Harrison *et al.*, 1983).

GENERAL RANGE: Indo-transPacific from Madagascar and Somalia to Indonesia, Japan, the Philippines, New Guinea, Micronesia, the Hawaiian Islands, and Central America. The Central American populations are recognized as a distinct subspecies, *C. atrisignis galapagensis* Fowler, 1944. Epipelagic, probably oceanic (Parin, 1960b,b, 1996, 1999; Yoshino *in* Masuda *et al.*, 1984).

COMMENTS: The “*Cypselurus*” sp. collected off O’ahu at 0–110 m by Struhsaker (1973a) was not identified to species.

#### *Cheilopogon dorsomacula* (Fowler)

*Cypselurus furcatus dorsomacula* Fowler, 1944, p. 358, Fig. 116, southwest of Colima, Mexico, at 18°00’N, 105°47’W.

*Cheilopogon katoptron* non (Bleeker, 1865) [a valid species restricted to coastal waters of the western Pacific]: Parin (1961a, 1961b) in part?

*Cheilopogon dorsomaculata* (Fowler, 1944) [a *lapsus* in spelling]: Watson (1999).

*Cheilopogon dorsomacula* (Fowler, 1944): Parin (1996, 1999).

TAXONOMY: Parin (1996, 1999).

COMMON NAMES: Backspot flyingfish (FAO).

HAWAIIAN RECORDS: None, but Parin’s (1996, 1999) descriptions and map of this species’ general range shows it as occurring in the Hawaiian Islands. Earlier records of *C. katoptron* from Hawai’i refer to this species.

GENERAL RANGE: Trans-Pacific endemic; exact range unknown but from southern Japan and east of the Philippines and the Coral Sea to the Hawaiian Islands, French Polynesia, and the eastern Pacific. “In the tropical part of the Pacific Ocean this species occurs everywhere .. but apparently it is absent in

the inland seas of south-eastern Asia” (Parin, 1996). Epipelagic (Watson, 1999; Parin, 1999).

***Cheilopogon furcatus* (Mitchill)**

*Exocoetus furcatus* Mitchill, 1815, p. 449, Pl. 5 (fig. 2), New York, U.S.A.

*Cypsilurus altipennis* non (Valenciennes, 1847) [*Cheilopogon pinnatibarbus altipennis* is a valid subspecies that does not occur in the Hawaiian Islands]: Fowler (1949).

*Cypsilurus furcatus* (Mitchill, 1815): Fowler (1949).

*Cypselurus furcatus* (Mitchill, 1815): Parin (1960a, 1960b), Yoshino in Masuda *et al.* (1984).

*Cheilopogon furcatus* (Mitchill, 1815): Tinker (1944), Parin (1961b), Heemstra & Parin in Smith & Heemstra (1986), Kovalevskaya & Shiganova (1988), Paxton *et al.* (1989), Collette & Parin in Quéro *et al.* (1990), Parin (1996, 1999), Parin & Belyanina (1998).

TAXONOMY: Parin & Belyanina (1998), Parin (1999).

COMMON NAMES: Spotfin flyingfish (AFS; FAO).

HAWAIIAN RECORDS: O‘ahu to the vicinity of Kure at 0–1 m (Fowler, 1949; Tinker, 1944; Parin & Belyanina, 1998).

GENERAL RANGE: Circumglobal in the tropical through warm-temperate tropical Atlantic, Indian, and Pacific oceans except for interior southeast Asian seas. In the Pacific from Japan and Australia to Samoa, the Hawaiian Islands, French Polynesia, and offshore islands of the eastern tropical Pacific. Epipelagic in oceanic and neritic waters (Parin, 1960b,b; Yoshino in Masuda *et al.*, 1984; Heemstra & Parin in Smith & Heemstra, 1986; Paxton *et al.*, 1989; Collette & Parin in Quéro *et al.*, 1990; Parin, 1996, 1999; Parin & Belyanina, 1998).

[*Cheilopogon katoptron* (Bleeker)]

*Exocoetus katoptron* Bleeker, 1865, p. 115, Sibogha, W. Sumatra, Indonesia.

*Cypselurus katoptron* (Bleeker, 1865): Parin (1960a, 1960b).

*Cheilopogon katoptron* (Bleeker, 1865): Parin (1961a, 1961b, 1996, 1999).

TAXONOMY: Parin (1996, 1999).

COMMON NAMES: Indonesian flyingfish (FAO).

HAWAIIAN RECORDS: Parin (1960b) listed *C. katoptron* from Hawaiian Islands in his text but not his tables. He did not include the Hawaiian Islands in the range of this species in subsequent papers (Parin, 1960a, 1961b, 1999). Hawaiian records of this species probably refer to *C. dorsomacula* (see Parin, 1996).

GENERAL RANGE: Tropical and subtropical eastern Indian and west-central Pacific oceans from the Philippines, Vietnam, Indonesia, and Thailand to northwestern Australia. Records from other areas refer to various other species. Epipelagic in neritic waters (Parin, 1996, 1999).

***Cheilopogon spilonopterus* (Bleeker)**

*Exocoetus spilonopterus* Bleeker, 1865, p. 113, Padang, Sumatra, Indonesia.

*Exocoetus bahiensis* non Ranzani, 1842 [a junior synonym of *Cypselurus cyanopterus* (Valenciennes, 1847), a valid species not found in the Hawaiian Islands]: Steindachner (1900).

*Cypsilurus bahiensis* non (Ranzani, 1842): Jenkins (1903), Jordan & Evermann (1905).

*Cypselurus bahiensis* non (Ranzani, 1842): Fowler (1928, 1931, 1934).

*Cypsilurus cyanopterus* non (Valenciennes in Cuvier & Valenciennes, 1847) [a valid species not found in the Hawaiian Islands]: Fowler (1949, in part).

*Cypsilurus spilonopterus* (Bleeker, 1865): Jordan & Dickerson (1908).

*Cypselurus spilonopterus* (Bleeker, 1865): Gosline & Brock (1960), Parin (1960a, 1960b), Tinker (1982), Harrison *et al.* (1983), Yoshino in Masuda *et al.* (1984), Myers (1989).

*Cheilopogon spilonopterus* (Bleeker, 1865): Parin (1961b, 1996, 1999).

TAXONOMY: Parin (1961b, 1996, 1999).

COMMON NAMES: Stained flyingfish (FAO).

HAWAIIAN RECORDS: Hawai‘i Island to Lisianski at 0–1 m (Steindachner, 1900; Jordan & Evermann, 1905; Fowler, 1928; Harrison *et al.*, 1983).

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to the Ryukyus, Indonesia, the Philippines, Micronesia, the Hawaiian Islands, the Society Islands, and the Revillagigedos, Malpelo, and

Galapagos Islands in the eastern Pacific. Epipelagic in neritic waters (Parin, 1960b,b; Yoshino *in* Masuda *et al.*, 1984; Myers, 1989; Parin, 1996, 1999).

[*Cheilopogon spilopterus* (Valenciennes)]

*Exocoetus spilopterus* Valenciennes *in* Cuvier & Valenciennes, 1847, p. 113, Strong Island (Oualan Island), Caroline Islands.

*Cypselurus spilopterus* (Valenciennes, 1847): Fowler (1928, in part, 1934), Gosline & Brock (1960), Parin (1960a, 1960b), Tinker (1982), Harrison *et al.* (1983), Myers (1989).

*Maculocoetus spilopterus* (Valenciennes, 1847): Fowler (1949).

*Cheilopogon spilopterus* (Valenciennes, 1847): Parin (1961b, 1996, 1999), Paxton *et al.* (1989).

TAXONOMY: Parin (1961b, 1996, 1999).

COMMON NAMES: Manyspotted flyingfish (FAO).

HAWAIIAN RECORDS: Recorded from O'ahu by Fowler (1928) and from unspecified locations in the Northwestern Hawaiian Islands by Harrison *et al.* (1983). However, Parin (1996) stated that the "easternmost findings are registered near the Phoenix Islands and the Samoan Islands" and later showed this species as absent from the central North Pacific in a distribution map for the species (Parin, 1999). It thus seems that *C. spilopterus* does not occur in the Hawaiian Islands.

GENERAL RANGE: Indo-Pacific from India to Indonesia, the Philippines, Australia, western Micronesia, Samoa, and the Phoenix Islands. Epipelagic in neritic waters (Parin, 1960b,b, 1999; Myers, 1989; Paxton *et al.*, 1989).

*Cheilopogon suttoni* (Whitley & Colefax)

*Maculocoetus suttoni* Whitley & Colefax, 1938, p. 288, Pl. 14 (fig. 1), Nauru, Gilbert Islands.

*Cypselurus spilopterus* non (Valenciennes, 1847) [a valid species not found in the Hawaiian Islands?]: Fowler (1928, in part) — see Parin (1960a) for discussion.

*Cypselurus vitiazi* Parin, 1958: Parin (1958).

*Cypselurus suttoni* (Whitley & Colefax, 1938): Parin (1960a, 1960b, 1999), Yoshino *in* Masuda *et al.* (1984), Randall *et al.* (1990a).

*Cheilopogon suttoni* (Whitley & Colefax, 1938): Parin (1961a, 1961b, 1996).

TAXONOMY: Parin (1961a, b, 1996, 1999).

COMMON NAMES: Sutton's flyingfish (FAO; Randall *et al.*, 1997a).

HAWAIIAN RECORDS: O'ahu to southwest of Laysan at 0–1 m (Fowler, 1928; Parin, 1958, 1960b, 1961a).

GENERAL RANGE: Indo-Pacific from the Gulf of Aden to the Ryukyus, Australia, the Hawaiian Islands, and the Tuamotus. Parin (1996) stated that the eastward limit of this species' range is 140°E but later corrected this to 140°W (Parin, 1999). Epipelagic in oceanic waters (Parin, 1958, 1960a, 1960b, 1961a, 1999; Yoshino *in* Masuda *et al.*, 1984; Randall *et al.*, 1990a).

*Cheilopogon unicolor* (Valenciennes)

*Exocoetus unicolor* Valenciennes *in* Cuvier & Valenciennes, 1847, p. 97, Vanikoro Island.

*Cypselurus simus* non (Valenciennes *in* Cuvier & Valenciennes, 1847) [a valid species also found in the Hawaiian Islands]: Fowler (1931, in part).

*Cypselurus antoncichi* Woods & Schultz *in* Schultz *et al.*, 1953: Parin (1960a, 1960b, 1996).

*Cypselurus unicolor* (Valenciennes, 1847): Parin (1960a, 1960b), Yoshino *in* Masuda *et al.* (1984), Myers (1989).

*Cheilopogon unicolor* (Valenciennes, 1847): Parin (1961a, 1961b), Kovalevskaya (1980), Heemstra & Parin *in* Smith & Heemstra (1986), Parin (1996, 1999), Parin & Belyanina (1998).

TAXONOMY: Parin (1961a, b, 1996, 1999), Parin & Belyanina (1998). The three syntypes of *C. unicolor* (Valenciennes) are specimens of the species recognized by Parin (1996) as *Hirundichthys oxycephalus* (Bleeker), *Cheilopogon antoncichi* (Woods & Schultz), and *C. furcatus* (Mitchill). Collette *et al.* (1992) considered *C. antoncichi* and *C. unicolor* to be distinct valid species, but Parin & Belyanina (1998) recognized *C. antoncichi* as a junior synonym of *C. unicolor*. This problem needs more investigation and clarification in a formal publication.

COMMON NAMES: Limpidwing flyingfish (FAO).

HAWAIIAN RECORDS: Hawai'i Island to Kure Atoll at 0–1 m (Parin, 1960b,b, 1961a, 1996; Kovalevskaya, 1980).

GENERAL RANGE: Pacific endemic from southern Japan, Taiwan, the Philippines, New Guinea, and



Australia to Micronesia, the Hawaiian Islands, the Society Islands, and the Marquesas. Records of *C. unicolor* (Valenciennes) from the Indian Ocean probably refer to *C. furcatus* (Mitchill). Epipelagic in neritic waters (Parin, 1960b,b, 1961a, b, 1996; Yoshino in Masuda *et al.*, 1984; Myers, 1989; Kovalevskaya, 1980; Heemstra & Parin in Smith & Heemstra, 1986).

***Cypselurus angusticeps*** Nichols & Breder

*Cypselurus angusticeps* Nichols & Breder, 1935, p. 2, Fig. 2, Negonego Island, Tuamotu Archipelago.  
*Cypselurus angusticeps* Nichols & Breder, 1935: Parin (1961a, 1961b, 1996).

TAXONOMY: Parin (1961a, b, 1996, 1999).

COMMON NAMES: Narrowhead flyingfish (FAO).

HAWAIIAN RECORDS: Parin (1996) stated that the range of this species includes the “central part of the Pacific Ocean eastwards up to Hawai‘i (USNM 92582)”. Parin (1999) clearly included the Hawaiian Islands within the range of *C. angusticeps*.

GENERAL RANGE: Indo-Pacific from East Africa to southern Japan, Vanuatu, Palau, the Tuamotu Archipelago, and the Hawaiian Islands with an isolated population at the Revilligigedos Islands in the eastern Pacific. Epipelagic in neritic waters (Parin, 1961b, 1996, 1999).

***Cypselurus poecilopterus*** (Valenciennes)

*Exocoetus poecilopterus* Valenciennes in Cuvier & Valenciennes, 1847, p. 112, Pl. 561 [not 527], New Britain Island, Bismarck Archipelago.

*Maculocoetus poecilopterus* (Valenciennes, 1847): Fowler (1949).

*Cypselurus poecilopterus* (Valenciennes, 1847): Fowler & Ball (1925), Fowler (1928, 1934), Parin (1960a, 1960b, 1961b, 1996, 1999), Yoshino in Masuda *et al.* (1984), Randall *et al.* (1985a), Heemstra & Parin in Smith & Heemstra (1986), Myers (1989), Paxton *et al.* (1989).

TAXONOMY: Parin (1960b, 1961b, 1996, 1999).

COMMON NAMES: Yellow-wing flyingfish (FAO).

HAWAIIAN RECORDS: Johnston Atoll at 0–1 m but not the Hawaiian Islands (Fowler & Ball, 1925; Fowler, 1928; Randall *et al.*, 1985b)? There is a possibility that these records are based on misidentified *C. simus* (Valenciennes) (see Parin, 1999).

GENERAL RANGE: Indo-Pacific from East Africa to Indonesia, southern Japan, Micronesia, Australia, Johnston Atoll, Fiji, and Samoa. Also reported from the Society Islands but these records may be based upon *C. simus* (see Parin, 1996, 1999). Epipelagic in neritic waters (Parin, 1960b,b, 1996; Yoshino in Masuda *et al.*, 1984; Heemstra & Parin in Smith & Heemstra, 1986; Myers, 1989; Paxton *et al.*, 1989).

***Cypselurus simus*** (Valenciennes)

*Exocoetus simus* Valenciennes in Cuvier & Valenciennes, 1847, p. 105, Hawaiian Islands.

*Exocoetus simus* Valenciennes, 1847: Cuvier & Valenciennes (1847).

*Exocoetus neglectus* non Bleeker, 1865 [a junior synonym of *Cypselurus oligolepis* (Bleeker, 1865), a species not found in the Hawaiian Islands]; Steindachner (1900).

*Cypsilurus simus* (Valenciennes, 1847): Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Fowler (1949).

*Cypselurus simus* (Valenciennes, 1847): Fowler (1928, 1931), Gosline & Brock (1960), Parin (1960a, 1960b, 1961a, 1961b, 1996, 1999), Tinker (1982), Harrison *et al.* (1983), Randall *et al.* (1985a).

TAXONOMY: Parin (1960b, 1961b, 1996, 1999). See comments under General range.

COMMON NAMES: Malolo, Ficklespotted flyingfish (FAO).

HAWAIIAN RECORDS: Johnston Atoll and Maui to the Northwestern Hawaiian Islands at 0–1 m (Cuvier & Valenciennes, 1847; Jordan & Evermann, 1905; Fowler, 1928; Harrison *et al.*, 1983; Randall *et al.*, 1985b; Parin, 1999).

GENERAL RANGE: Central Pacific endemic recorded from the Hawaiian Islands and Johnston Atoll, Tonga, Samoa, the Cook Islands, French Polynesia, and Easter Island (Parin, 1996); but perhaps a Hawaiian endemic (Parin, 1999). Parin (1960a, b) gave the range of *C. simus* as Pacific from southern Japan, China, and the Philippines to Vanuatu, the Hawaiian Islands, and the Society Islands. He later questioned the identifications of specimens outside of the Hawaiian Islands, stating “Apparently, *C.*

*simus* is endemic to waters surrounding the Hawaiian Islands” (Parin, 1961a). More recently he gave the range as “central Pacific” but commented that “it is possible that the ‘southern’ population of *C. simus* belongs to another undescribed species” (Parin, 1996, restated in 1999). The range of *C. simus* needs verification. Epipelagic in neritic waters (Parin, 1996, 1999).

#### *Exocoetus monocirrhus* Richardson

*Exocoetus monocirrhus* Richardson, 1846, p. 265, “Sea of China” [spelling of genus was a *lapsus*].  
*Exocoetus obtusirostris* non Günther, 1866 [a valid Atlantic and South Pacific species — see Parin 1961a]: Borets & Sokolovsky (1978)?  
*Exocoetus monocirrhus* Richardson, 1846: Parin (1960a, 1961b, 1999), Kovalevskaya (1980), Harrison *et al.* (1983), Yoshino *in* Masuda *et al.* (1984), Heemstra & Parin *in* Smith & Heemstra (1986), Paxton *et al.* (1989), Robertson & Allen (2002).

TAXONOMY: Parin (1960b, 1961b, 1999).

COMMON NAMES: Barbel flyingfish (FAO), Two-wing flyingfish.

HAWAIIAN RECORDS: Hawai‘i Island to Kure Atoll at 0–1 m (Kovalevskaya, 1980; Harrison *et al.*, 1983).

GENERAL RANGE: Tropical Indo-transPacific from South Africa to Japan, Australia, the Hawaiian Islands, and Baja California to Peru in the eastern Pacific, but absent from the Pacific south of ca. 15°S. Epipelagic in offshore waters (Parin, 1960b, 1961b, 1999; Kovalevskaya, 1980; Yoshino *in* Masuda *et al.*, 1984; Heemstra & Parin *in* Smith & Heemstra, 1986; Paxton *et al.*, 1989; Robertson & Allen, 2002).

#### *Exocoetus volitans* Linnaeus

*Exocoetus volitans* Linnaeus, 1758, p. 316, “Habitat in alto Pelago, Europaeo & Americano”.  
*Exocoetus volitans* Linnaeus, 1758: Fowler (1900), Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Parin (1960a, 1961b, 1999), Kovalevskaya (1980), Tinker (1982), Harrison *et al.* (1983), Collette & Parin *in* Whitehead *et al.* (1984), Yoshino *in* Masuda *et al.* (1984), Randall *et al.* (1985a), Heemstra & Parin *in* Smith & Heemstra (1986), Myers (1989), Allen & Robertson (1994).

TAXONOMY: Parin (1960b, 1961b, 1999).

COMMON NAMES: Malolo, Tropical two-wing flyingfish (AFS; FAO), Flyingfish.

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to Kure Atoll at 0–1 m (Fowler, 1900; Jordan & Evermann, 1905; Gosline & Brock, 1960; Kovalevskaya, 1980; Harrison *et al.*, 1983; Randall *et al.*, 1985b).

GENERAL RANGE: Circumglobal in the tropical through temperate Mediterranean Sea, Atlantic, Indian, and Pacific oceans. Epipelagic in offshore waters (Parin, 1960b, 1999; Collette & Parin *in* Whitehead *et al.*, 1984; Yoshino *in* Masuda *et al.*, 1984; Heemstra & Parin *in* Smith & Heemstra, 1986; Myers, 1989).

#### [*Fodiator acutus rostratus* (Günther)]

*Exocoetus rostratus* Günther, 1866, p. 280, “Hawaiian Islands” [a mistaken collection locality].  
*Exocoetus rostratus* Günther, 1866: Günther (1866).  
*Parexocoetus rostratus* (Günther, 1866): Jordan & Evermann (1905).  
*Parexocoetus brachypterus* non (Richardson, 1846) [a valid species found in the Hawaiian Islands]: Fowler (1928, in part).  
*Fodiator rostratus* (Günther, 1866): Gosline & Brock (1960), Tinker (1982).  
*Fodiator acutus rostratus* (Günther, 1866): Fowler (1949), Parin (1960a, 1961b), Collette & Parin *in* Quérou *et al.* (1990), Allen & Robertson (1994).

TAXONOMY: Parin (1961b).

COMMON NAMES: Sharpchin flyingfish (AFS).

HAWAIIAN RECORDS: This species has only reported from the Hawaiian Islands in its first description (Günther, 1866), which probably had false locality data (Gosline & Brock, 1960). Günther had several eastern tropical Pacific specimens from “the Haslar collection” that had collection localities mislabeled as “the Sandwich Islands” (e.g., *Arius dasycephalus*, *Chaetodon humeralis*, *Hypsoblennius brevipinnis*).

GENERAL RANGE: Eastern tropical Atlantic (*F. acutus acutus* Valenciennes, 1847) and eastern tropical

Pacific from California to Peru (*F. acutus rostratus*); records from other areas are doubtful. Epipelagic in neritic waters (Parin, 1960b, 1961b; Collette & Parin *in* Quéro *et al.*, 1990; Allen & Robertson, 1994).

***Hirundichthys albimaculatus*** (Fowler)

*Cypselurus albimaculatus* Fowler, 1934b, p. 327, Fig. 81, Ladrone Island, Guam, Mariana Islands.

*Prognichthys albimaculatus* (Fowler, 1934): Parin (1960a, 1960b).

*Danichthys albimaculatus* (Fowler, 1934b): Yoshino *in* Masuda *et al.* (1984).

*Hirundichthys albimaculatus* (Fowler, 1934b): Parin (1961b, 1996, 1999), Kovalevskaya (1980), Parin & Belyanina (2002).

TAXONOMY: Parin & Belyanina (2002).

COMMON NAMES: Whitespot flyingfish (FAO).

HAWAIIAN RECORDS: Probably throughout the area, with records from Johnston Atoll and Hawai'i Island to west of the Hancock Seamounts, although there are few records from within the 200-nmi EEZ (Kovalevskaya, 1980; Parin & Belyanina, 2002).

GENERAL RANGE: Tropical Pacific endemic found between 40°N–20°S, from southern Japan, the Bonin Islands, Philippines and New Guinea eastward to ca. 112°W at 10°N and 90°W at 10°S. Epipelagic in oceanic waters (Parin, 1960b,b, 1999; Yoshino *in* Masuda *et al.*, 1984; Kovalevskaya, 1980; Parin, 1996; Parin & Belyanina, 2002).

***Hirundichthys gilberti*** (Snyder)

*Exonastes gilberti* Snyder, 1904, p. 522, Pl. 7 (fig. 13), 28°30'N, 140°W, northeast of the Hawaiian Islands.

*Exonastes gilberti* Snyder, 1904: Snyder (1904), Jordan & Evermann (1905).

*Cypselurus oxycephalus* non (Bleeker, 1852) [a valid *Hirundichthys* species whose occurrence in Hawaiian waters needs verification]: Fowler (1928, in part).

*Cypselurus rondeletii* non (Valenciennes, 1847) [a valid *Hirundichthys* species not found in the Hawaiian Islands]: Fowler (1928).

*Prognichthys gilberti* (Snyder, 1904): Gosline & Brock (1960), Parin (1960a, 1960b), Tinker (1982), Harrison *et al.* (1983).

*Danichthys gilberti* (Snyder, 1904): Fowler (1949).

*Danichthys rondeletii* non (Valenciennes, 1847): Fowler (1949), Masuda *et al.* (1984).

*Hirundichthys rondeletii* non (Valenciennes, 1847): Parin (1961b), Kovalevskaya (1980).

*Hirundichthys gilberti* (Snyder, 1904): Parin & Belyanina (2002).

TAXONOMY: Parin & Belyanina (2002).

HAWAIIAN RECORDS: O'ahu to the Hancock Seamounts, usually in the northern part of the region and perhaps with seasonal latitudinal migration, at 0–1 m (Snyder, 1904; Jordan & Evermann, 1905; Fowler, 1928; Gosline & Brock, 1960; Harrison *et al.*, 1983; Kovalevskaya, 1980).

GENERAL RANGE: North Pacific Kuroshio Current, Kuroshio Extension, transition zone, and California Current endemic. Epipelagic in oceanic waters (Parin & Belyanina, 2002; references to *H. rondeletii* in earlier literature may refer to this species or to *H. albimaculatus*).

[***Hirundichthys oxycephalus*** (Bleeker)]

*Exocoetus oxycephalus* Bleeker, 1852c, p. 771, Makasar (Ujung Padang), Sulawesi, and Jakarta (Batavia), Java, Indonesia.

*Cypselurus oxycephalus* (Bleeker, 1852c): Fowler & Ball (1925), Fowler (1928, 1931).

*Danichthys oxycephalus* (Bleeker, 1852c): Fowler (1949).

*Hirundichthys oxycephalus* (Bleeker, 1852c): Parin (1960a, 1960b, 1961a, 1961b, 1996, 1999), Yoshino *in* Masuda *et al.* (1984), Paxton *et al.* (1989).

TAXONOMY: Parin (1961b, 1999). See comment for taxonomy of *Cheilopogon unicolor*.

COMMON NAMES: Bony flyingfish (FAO).

HAWAIIAN RECORDS: A record from Laysan at 0–1 m (Fowler & Ball, 1925) is apparently a misidentification (see range given in Parin, 1999).

GENERAL RANGE: Indo-West Pacific from the Arabian Sea to Indonesia, southern Japan, the Philippines, southeastern Australia, and the Solomon Islands (Parin, 1996, 1999). The range of *H. oxycephalus*

was incorrectly given in early references as tropical Indo-Pacific extending eastward to Samoa, the Hawaiian Islands, and central America (Parin, 1960b,b, 1961). Epipelagic in neritic waters (Yoshino in Masuda *et al.*, 1984; Paxton *et al.*, 1989; Parin, 1996, 1999).

***Hirundichthys speculiger* (Valenciennes)**

*Exocoetus speculiger* Valenciennes in Cuvier & Valenciennes, 1847, p. 94, Mauritius.

*Exocoetus speculiger* Valenciennes, 1847: Streets (1877)?

*Cypselurus rubescens* (Rafinesque, 1818): Fowler & Ball (1925), Fowler (1928, 1931, 1934).

*Cypselurus speculiger* (Valenciennes, 1847): Gosline & Brock (1960), Tinker (1982), Harrison *et al.* (1983), Myers (1989).

*Hirundichthys speculiger* (Valenciennes, 1847): Fowler (1949), Parin (1960a, 1960b, 1961a, 1961b, 1996, 1999), Kovalevskaya (1980), Collette & Parin in Whitehead *et al.* (1984), Yoshino in Masuda *et al.* (1984), Paxton *et al.* (1989), Collette & Parin in Quéro *et al.* (1990).

TAXONOMY: Parin (1961b, 1996, 1999).

COMMON NAMES: Mirrorwing flyingfish (FAO).

HAWAIIAN RECORDS: Hawai'i Island to Lisianski at 0–1 m (Fowler & Ball, 1925; Fowler, 1928; Harrison *et al.*, 1983; Kovalevskaya, 1980).

GENERAL RANGE: Circumglobal in the tropical through warm-temperate Atlantic, Indian, and Pacific oceans except perhaps in the interior southern Asian seas. Epipelagic in oceanic waters (Parin, 1960b,b, 1961a, b, 1999; Collette & Parin in Whitehead *et al.*, 1984; Yoshino in Masuda *et al.*, 1984; Myers, 1989; Paxton *et al.*, 1989; Collette & Parin in Quéro *et al.*, 1990; Parin, 1996).

***Oxyporhamphus micropterus micropterus* (Valenciennes)**

*Exocoetus micropterus* Valenciennes in Cuvier & Valenciennes, 1847, p. 127, Pl. 563 [not 529], King George Sound, Western Australia.

*Evolantia microptera* (Valenciennes, 1847): Jenkins (1903), Jordan & Evermann (1905), Fowler (1928).

*Hemiramphus argenteus* Bennett, 1840: Fowler (1928).

*Oxyporhamphus argenteus* (Bennett, 1840): Fowler (1934, 1949).

*Oxyporhamphus micropterus micropterus* (Valenciennes, 1847): Gosline & Brock (1960), Parin (1960a), Parin *et al.* (1980), Tinker (1982), Harrison *et al.* (1983), Boehlert & Mundy (1992), Allen & Robertson (1994), Dasilao *et al.* (1997).

TAXONOMY: Parin *et al.* (1980). Familial placement follows Dasilao *et al.* (1997). *Hemiramphus argenteus* Bennett, 1840, is a name of uncertain status (Parin *et al.*, 1980; Eschmeyer, 1998) that Fowler (1928 and elsewhere) applied to the species now known as *O. micropterus* (Valenciennes, 1847). No type specimens of *H. argenteus* were preserved and it is not possible to determine if Bennett's specimens were actually *O. micropterus*.

COMMON NAMES: Malolo (Gosline & Brock, 1960), Smallwing flyingfish (AFS), Oceanic flying halfbeak (FAO).

HAWAIIAN RECORDS: O'ahu to the Hancock Seamounts at 0–1 m (Jenkins, 1903; Jordan & Evermann, 1905; Fowler, 1928; Parin *et al.*, 1980; Harrison *et al.*, 1983; Boehlert & Mundy, 1992).

GENERAL RANGE: Circumglobal in the tropical and subtropical Atlantic, Indian, and Pacific oceans. Two subspecies recognized. *Oxyporhamphus micropterus micropterus* is Indo-Pacific from East Africa and the Red Sea to Japan, Australia, Micronesia, the Hawaiian Islands, the Society Islands, Baja California, and Peru. Epipelagic and oceanic at 0–1 m (Parin, 1960b; Parin *et al.*, 1980; Allen & Robertson, 1994).

***Parexocoetus brachypterus* (Richardson)**

*Exocaelus brachypterus* Richardson, 1846, p. 265, Tahiti [based on a specimen of *Exocoetus monocirrhus* Richardson, 1846, and perhaps not an available name (Eschmeyer, 1998); spelling of genus was a *lapsus*].

*Exocoetus brachypterus* Richardson, 1846: Streets (1877), Steindachner (1900).

*Parexocoetus mesogaster* non Bloch, 1795 [probably a junior synonym of *Parexocoetus mento* (Valenciennes, 1847), a valid species not found in the Hawaiian Islands]: Fowler (1900).

*Exocoetus brachyopterus* Richardson, 1846 [a *lapsus* in spelling]: Steindachner (1900).

*Ptenonotus melanogenion* Pietschmann, 1928: Pietschmann (1928, 1930).

*Parexocoetus melanogenion* (Pietschmann, 1928): Fowler (1934).

*Parexocoetus brachypterus* (Richardson, 1846): Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1934, 1949), Gosline & Brock (1960), Tinker (1982).

*Parexocoetus brachypterus brachypterus* (Richardson, 1846): Parin (1960a, 1960b, 1961b, 1996, 1999), Yoshino in Masuda *et al.* (1984), Heemstra & Parin in Smith & Heemstra (1986), Myers (1989), Collette & Parin in Quéro *et al.* (1990).

TAXONOMY: Parin (1960b, 1961b, 1996, 1999). Until recently, two subspecies were recognized within this species, with Indo-Pacific populations as *P. brachypterus brachypterus* and Atlantic populations as *P. brachypterus hillianus* (Gosse). *Parexocoetus hillianus* (Gosse) is now recognized as a distinct species (Parin, 2003).

COMMON NAMES: Malolo (Gosline & Brock, 1960), Puhiki'i (Gosline & Brock, 1960), Sailfin flyingfish (AFS; FAO).

HAWAIIAN RECORDS: Hawai'i Island to Laysan at 0–1 m (Streets, 1877a; Jordan & Evermann, 1905). The *Parexocoetus* sp. recorded from Johnston by Boehlert *et al.* (1992) was this species.

GENERAL RANGE: Indo-Pacific, from South Africa to Japan, Australia, Micronesia, the Hawaiian Islands, the Society Islands, and the Marquesas, with a distinct eastern tropical Pacific population in the Gulf of Panama. Epipelagic in nearshore waters (Parin, 1960b,b, 1996, 1999; Yoshino in Masuda *et al.*, 1984; Heemstra & Parin in Smith & Heemstra, 1986; Myers, 1989; Collette & Parin in Quéro *et al.*, 1990).

### *Prognichthys sealei* Abe

*Prognichthys sealei* Abe, 1955, p. 185, Figs. 1–3, 30 mi east of Miyako Island, south Ryukyu Islands, Japan.

*Prognichthys sealei* Abe, 1955: Parin (1960a, 1960b, 1961b, 1999), Yoshino in Masuda *et al.* (1984), Heemstra & Parin in Smith & Heemstra (1986), Myers & Donaldson (1996), Robertson & Allen (2002).

TAXONOMY: Parin (1961b, 1999), Heemstra & Parin in Smith & Heemstra (1986).

COMMON NAMES: Sailor flyingfish (FAO), Shortnose flyingfish.

HAWAIIAN RECORDS: The *Prognichthys* larvae recorded from Hawai'i Island to O'ahu (Kovalevskaya, 1980) were probably *P. sealei*, as this is the only species in the genus otherwise recorded from Hawaiian waters (Parin, 1960a).

GENERAL RANGE: Indo-Pacific from South Africa to Indonesia, southern Japan, the Mariana Islands, the Coral Sea, Samoa, the Hawaiian Islands, and offshore islands of the eastern tropical Pacific. Epipelagic in oceanic waters (Parin, 1960b,b, 1961b, 1999; Yoshino in Masuda *et al.*, 1984; Heemstra & Parin in Smith & Heemstra, 1986; Myers & Donaldson, 1996; Robertson & Allen, 2002).

## Hemiramphidae — Halfbeaks

### *Euleptorhamphus viridis* (van Hasselt)

*Hemiramphus viridis* van Hasselt, 1823, p. 131, Vishakhapatnam (Vizagapatam), India, and Java, Indonesia.

*Euleptorhamphus longirostris* (Cuvier, 1829): Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Fowler (1928).

*Euleptorhamphus viridis* (van Hasselt, 1823): Fowler (1934, 1949), Gosline & Brock (1960), Struhsaker (1973a), Parin *et al.* (1980), Tinker (1982), Harrison *et al.* (1983).

TAXONOMY: Parin *et al.* (1980).

COMMON NAMES: 'Ihe'ihe (Gosline & Brock, 1960), Ribbon halfbeak (AFS), Longfinned halfbeak (FAO).

HAWAIIAN RECORDS: Hawai'i Island to Laysan and perhaps to the Hancock Seamounts at 0–1 m (Jenkins, 1903; Jordan & Evermann, 1905; Fowler, 1934a; Parin *et al.*, 1980; Harrison *et al.*, 1983).

GENERAL RANGE: Indo-transPacific from South Africa and the Red Sea to Japan, Australia, Micronesia, the Hawaiian Islands, Ellis Island, California and Peru. Epipelagic and oceanic at least 0–1 m (Parin *et al.*, 1980).

### *Hemiramphus depauperatus* Lay & Bennett

*Hemiramphus depauperatus* Lay & Bennett, 1839, p. 66, O'ahu, Hawaiian Islands.

*Hemiramphus brasiliensis* non (Linnaeus, 1758) [a valid Atlantic species]: Jenkins (1903), Fowler (1928, 1931, 1949, in part).

*Hemiramphus depauperatus* Lay & Bennett, 1839: Lay & Bennett (1839), Fowler (1900), Snyder (1904), Jordan & Evermann (1905), Gosline & Brock (1960), Parin *et al.* (1980), Tinker (1983), Randall (1996a).

TAXONOMY: Parin *et al.* (1980).

COMMON NAMES: 'Ihe'ihe, Iheihe (Randall, 1996a), Me'eme'e (Gosline & Brock, 1960), Polynesian half-beak (Randall, 1996a).

HAWAIIAN RECORDS: Hawai'i Island to Lisianski at 0–1 m (Lay & Bennett, 1839; Jordan & Evermann, 1905; Fowler, 1928; Parin *et al.*, 1980).

GENERAL RANGE: Central Pacific endemic known from the Hawaiian, Line, Society, and Marquesas Islands. Epipelagic in neritic waters at 0–1 m (Parin *et al.*, 1980).

***Hyporhamphus acutus pacificus* (Steindachner)**

*Hemirhamphus pacificus* Steindachner, 1900a, p. 177, Laysan Island, Hawaiian Islands.

*Hyporhamphus* species: Fowler (1900).

*Hemirhamphus pacificus* Steindachner, 1900a: Steindachner (1900a).

*Hyporhamphus pacificus* (Steindachner, 1900a): Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1934), Gosline & Brock (1960), Tinker (1982).

*Hyporhamphus acutus* (Günther, 1872): Tinker (1982), Randall (1996a).

*Hyporhamphus acutus pacificus* (Steindachner, 1900a): Collette (1974), Parin *et al.* (1980), Harrison *et al.* (1983), Randall *et al.* (1985a), Myers (1989), Randall *et al.* (1993b).

TAXONOMY: Parin *et al.* (1980).

COMMON NAMES: 'Ihe'ihe, Iheihe (Randall, 1996a), Acute halfbeak (Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at 0–1 m (Steindachner, 1900a; Jordan & Evermann, 1905; Collette, 1974; Randall *et al.*, 1985b, 1993b).

GENERAL RANGE: Central Pacific endemic; subspecies *H. acutus acutus* (Günther) from the Marshalls to the Gilberts, Tonga, the Line, Marquesas, and Easter Islands; subspecies *H. a. pacificus* is a Johnston Atoll and Hawaiian Island endemic. Epipelagic at 0–1 m in deep lagoons but not over shallow reefs (Collette, 1974; Parin *et al.*, 1980; Myers, 1989).

**Cyprinodontiformes  
Aplocheiloidei**

**Aplocheilidae — Rivulines**

[*Aplocheilus lineatus* (Valenciennes)]

*Panchax lineatum* Valenciennes in Cuvier & Valenciennes, 1846, p. 381, Pl. 546, Bombay, India.

*Aplocheilus lineatus* (Valenciennes, 1846): Parenti (1981), Maciolek (1984), Scheel (1990), Fuller *et al.* (1999).

TAXONOMY: Parenti (1981), Scheel (1990).

COMMON NAMES: Striped panchax (AFS).

HAWAIIAN RECORDS: Introduced to freshwaters of O'ahu after 1960 but failed to become established (Maciolek, 1984; Fuller *et al.*, 1999).

GENERAL RANGE: Southern India. Fresh- and brackish-water in shallow rice fields, ponds, canals, and estuaries at 0–1 m (Scheel, 1990; Fuller *et al.*, 1999).

[*Nothobranchius guentheri* (Pfeffer)]

*Fundulus guentheri* Pfeffer, 1893, p. 167, Zanzibar.

*Nothobranchius guentheri* (Pfeffer, 1893): Parenti (1981), Maciolek (1984), Scheel (1990), Fuller *et al.* (1999).

TAXONOMY: Parenti (1981), Scheel (1990).

COMMON NAMES: Redtail notho (AFS).

HAWAIIAN RECORDS: Introduced to freshwaters of O'ahu in 1967 but failed to become established (Maciolek, 1984; Fuller *et al.*, 1999). The identity of the *Nothobranchius* introduced to Hawai'i is questionable because the name *N. guentheri* has been applied to many aquarium fishes that were not this species (Scheel, 1990).

GENERAL RANGE: Eastern Africa, from Tanzania and Zanzibar. Shallow freshwaters including temporary, perennial pools (Scheel, 1990).

## Cyprinodontoidei

## Fundulidae — Topminnows, Killifish

[*Fundulus grandis* Baird & Girard]

*Fundulus grandis* Baird & Girard, 1853, p. 389, near Indianola, Texas, U.S.A.

*Fundulus grandis* Baird & Girard, 1853: Brock (1960), Burgess & Shute in Lee *et al.* (1980), Maciolek (1984), Randall (1987a), Fuller *et al.* (1999).

TAXONOMY: Burgess & Shute in Lee *et al.* (1980).

COMMON NAMES: Gulf killifish (AFS).

HAWAIIAN RECORDS: Introduced from Texas to freshwaters of all of the islands in 1905 but failed to become established (Brock, 1960; Maciolek, 1984; Randall, 1987a; Fuller *et al.*, 1999).

GENERAL RANGE: North America from northeastern Florida to southwestern Texas. Epipelagic in shallow fresh- and brackish-water areas of estuaries and tidal marshes (Burgess & Shute in Lee *et al.*, 1980; Fuller *et al.*, 1999).

Poeciliidae — Livebearers, Poeciliids<sup>43</sup>

*Gambusia affinis* (Baird & Girard)

*Heterandria affinis* Baird & Girard, 1853, p. 390, Rio Medina and Rio Salado, Texas, U.S.A.

*Gambusia affinis* (Baird & Girard, 1853): Fowler (1941, 1949), Brock (1960), Lee & Burgess in Lee *et al.* (1980), Maciolek (1984), Wooten *et al.* (1988), Rauchenberger (1989a, 1989b), Courtenay & Meffe (1989), Devick (1991), Fuller *et al.* (1999), Englund *et al.* (2000a, 2000b), Yamamoto & Tagawa (2000), Englund & Eldredge (2001).

TAXONOMY: Lee & Burgess in Lee *et al.* (1980), Wooten *et al.* (1988), Rauchenberger (1989a, b). Two species of mosquitofish that until recently were not distinguished, *G. affinis* and *G. holbrooki* Girard, 1859, have been repeatedly introduced worldwide under the name *G. affinis*, creating uncertainty about the identification of the species present in many areas of importation (Courtenay & Meffe, 1989). The mosquitofish originally introduced to the Hawaiian Islands were *G. affinis*, however, because their source, Texas, is well within the range of only that species (Fuller *et al.*, 1999). Even so, the possibility remains that *G. holbrooki* was also introduced during later importations of these frequently transported species.

COMMON NAMES: Western mosquitofish (AFS).

HAWAIIAN RECORDS: Introduced from Texas in 1905 and established on Hawai'i, Maui, Moloka'i, O'ahu, and Kaua'i in all low-current, freshwater habitats and in brackish-water lagoons and channels (Fowler, 1941; Maciolek, 1984; Devick, 1991; Fuller *et al.*, 1999; Englund *et al.*, 2000a, b; Yamamoto & Tagawa, 2000; Englund & Eldredge, 2001).

GENERAL RANGE: *Gambusia affinis* is indigenous to eastern North America from Alabama to eastern Mexico. *Gambusia holbrooki* is indigenous to eastern North America from New Jersey to Alabama (Wooten *et al.*, 1988). Both have been extensively introduced worldwide. Epipelagic near the surface of shallow fresh- and brackish-waters (Lee & Burgess in Lee *et al.*, 1980; Fuller *et al.*, 1999).

*Limia vittata* (Guichenot)

*Poecilia vittata* Guichenot, 1853, p. 146, Pl. 5 (fig. 1), Cuba.

*Poecilia vittata* Guichenot, 1853: Rosen & Bailey (1963), Maciolek (1984), Randall (1987a), Rauchenberger (1989a), Courtenay & Meffe (1989), Devick (1991).

*Limia* cf. *vittata* (Guichenot, 1853): Englund *et al.* (2000a, 2000b).

*Limia vittata* (Guichenot, 1853): Brock (1960), Fuller *et al.* (1999), Yamamoto & Tagawa (2000).

TAXONOMY: Rosen & Bailey (1963), Rauchenberger (1989a). Rodriguez (1997) for the generic status of *Limia*.

COMMON NAMES: Cuban limia (AFS), Cuban molly (Yamamoto & Tagawa, 2000), Cuban topminnow (Yamamoto & Tagawa, 2000), Tabai (Yamamoto & Tagawa, 2000).

HAWAIIAN RECORDS: Introduced before 1950 and now established in fresh- and brackish-water coastal ponds, streams, and canals of O'ahu. Populations of this species are not now as abundant as they

once were but the species remains a dominant organism in coastal low-salinity habitats of Honolulu (Brock, 1960; Maciolek, 1984; Randall, 1987a; Devick, 1991; Fuller *et al.*, 1999; Englund *et al.*, 2000a, b; Yamamoto & Tagawa, 2000).

GENERAL RANGE: Indigenous to Cuba, introduced in the Hawaiian Islands. Epipelagic at the surface in shallow freshwaters (Rosen & Bailey, 1963; Courtenay & Meffe, 1989; Fuller *et al.*, 1999).

### *Poecilia* hybrid

*Poecilia mexicana* Steindachner, 1863, p. 178, Orizaba, southern Mexico.

*Poecilia salvatoris* Regan, 1907, p. 65, pl. 14, San Salvador, El Salvador.

*Poecilia sphenops* Valenciennes in Cuvier & Valenciennes, 1846, p. 130, Veracruz, Mexico.

*Poecilia sphenops* Valenciennes, 1846 [a valid species that was likely not introduced to the Hawaiian Islands in a pure form, if at all]; Rosen & Bailey (1963), Hensley & Courtenay in Lee *et al.* (1980), Rauchenberger (1989a), Courtenay & Meffe (1989).

*Poecilia sphenops* non Valenciennes, 1846: Maciolek (1984), Fuller *et al.* (1999) [Hawaiian Islands specimens only].

*Poecilia mexicana* Steindachner, 1863: Schultz & Miller (1971), Menzel & Darnell (1973), Maciolek (1984), Randall (1987a), Rauchenberger (1989a), Courtenay & Meffe (1989), Devick (1991), Fuller *et al.* (1999), Englund *et al.* (2000a, 2000b).

*Poecilia salvatoris* Regan, 1907: Miller (1994).

*Poecilia* sp. hybrid complex (*salvatoris/mexicana* group): Yamamoto & Tagawa (2000).

TAXONOMY: Rauchenberger (1989a), Miller (1994), and Yamamoto & Tagawa (2000). The shortfin mollies introduced in the Hawaiian Islands are hybrids whose parental species will never be known with certainty, but which are in the *Poecilia sphenops* complex [called the *Poecilia salvatoris/mexicana* species complex by Yamamoto & Tagawa (2000)]. Maciolek (1984) recorded *P. sphenops* from the Hawaiian Islands but Randall (1987a), Courtenay & Meffe (1989), and Fuller *et al.* (1999) questioned this identification, variously suggesting that these were likely to be misidentified *P. mexicana* or other species. Devick (1991) and Englund *et al.* (2000a, b) did not include *P. sphenops* in recent studies of introduced freshwater fishes of the Hawaiian Islands. Yamamoto & Tagawa (2000) identified the "*Poecilia sphenops*" previously recorded from the state as hybrids in the *Poecilia salvatoris/mexicana* complex, usually referred to as the *Poecilia sphenops* complex. Englund *et al.* (2000a, b) stated that the morphological characters of shortfin mollies in the Hawaiian Islands are not congruent with any described species but that they are distinctive and apparently do not interbreed with other poeciliids here.

Rosen & Bailey (1963) included *P. mexicana* as a junior synonym of *P. sphenops*, noting that the forms are morphologically distinct but interfertile, and also listed *P. salvatoris* as a synonym of *P. sphenops*. *Poecilia mexicana* was recognized as a valid species after further study (Schultz & Miller, 1971; Menzel & Darnell, 1973) and this has been recognized in reviews of the family (i.e., Rauchenberger, 1989a). *Poecilia salvatoris* was not considered a valid species distinct from *P. sphenops* until it was resurrected in an aquarium magazine article that has remained largely unmentioned in ichthyological literature (Miller, 1994).

COMMON NAMES: Shortfin molly (AFS), Mexican molly, Liberty/Mexican molly (Yamamoto & Tagawa, 2000), Tabai (Yamamoto & Tagawa, 2000).

HAWAIIAN RECORDS: Introduced after 1960 (perhaps prior to 1950) to freshwater streams on O'ahu, where it has become established (Maciolek, 1984; Randall, 1987a; Devick, 1991; Fuller *et al.*, 1999). It is now one of the most common fishes in lower stream reaches of O'ahu (Englund *et al.*, 2000a, b). Yamamoto & Tagawa (2000, p. 65) stated "Along with the mosquitofish, this molly is ubiquitous in modified Hawaiian streams. In shallow, channelized streams, it is often the only fish found in abundance."

GENERAL RANGE: *Poecilia mexicana* is indigenous to Central America and Caribbean Islands from north-eastern Mexico to Columbia and the southernmost West Indies. *Poecilia sphenops* is indigenous to the Atlantic slopes of Mexico and Guatemala. *Poecilia salvatoris* is indigenous to the Atlantic slope of Guatemala and Honduras, the Pacific slope of eastern Guatemala, and the Rio Lempa basin including adjacent streams and some interior lakes of El Salvador. Mollies of the *P. sphenops* species complex are widely introduced elsewhere. All are epipelagic near the surface of shallow fresh- and brackish-waters (Menzel & Darnell, 1973; Hensley & Courtenay in Lee *et al.*, 1980; Courtenay & Meffe, 1989; Miller, 1994; Fuller *et al.*, 1999).



***Poecilia latipinna*** (Lesueur)

*Mollienesia latipinna* Lesueur, 1821a, p. 3, Pl. 3, near New Orleans, Louisiana, U.S.A.

*Poecilia latipinna* (Lesueur, 1821a): Fowler (1941, 1949), Brock (1960), Burgess *in Lee et al.* (1980), Maciolek (1984), Randall (1987a), Rauchenberger (1989a), Courtenay & Meffe (1989), Devick (1991), Yamamoto & Tagawa (2000).

TAXONOMY: Burgess *in Lee et al.* (1980), Rauchenberger (1989a).

COMMON NAMES: Sailfin molly (AFS), Tabai (Yamamoto & Tagawa, 2000).

HAWAIIAN RECORDS: Introduced to all of the main Hawaiian Islands from stocks first originating from Texas in 1905. In the 1980s and 1990s it was reported as established in brackish habitats and lower stream reaches of Hawai'i, Maui, Moloka'i, O'ahu, and Kaua'i. *Poecilia latipinna* was apparently displaced by other species in the late 20th century and is now abundant only at a few localities on O'ahu and perhaps Moloka'i (Fowler, 1941; Maciolek, 1984; Randall, 1987a; Devick, 1991; Yamamoto & Tagawa, 2000).

GENERAL RANGE: Eastern North and Central America from North Carolina to Yucatan. Widely introduced elsewhere. Epipelagic near the surface of shallow fresh-, brackish-, and salt-waters (Burgess *in Lee et al.*, 1980; Courtenay & Meffe, 1989).

***Poecilia reticulata*** Peters

*Poecilia reticulata* Peters, 1859, p. 412, Guayre River, Caracas, Venezuela.

*Lebistes reticulatus* (Peters, 1860): Fowler (1934), Brock (1960).

*Poecilia reticulata* Peters, 1860: Maciolek (1984), Hensley & Courtenay *in Lee et al.* (1980), Rauchenberger (1989a), Courtenay & Meffe (1989), Devick (1991), Fuller *et al.* (1999), Englund *et al.* (2000a, 2000b), Yamamoto & Tagawa (2000).

TAXONOMY: Rauchenberger (1989a).

COMMON NAMES: Guppy (AFS), Rainbow fish (Yamamoto & Tagawa, 2000), Millions fish (Yamamoto & Tagawa, 2000).

HAWAIIAN RECORDS: Introduced in 1920–1922 to O'ahu and since established in a wide range of freshwater habitats on Hawai'i, Maui, Moloka'i, O'ahu, and Kaua'i (Fowler, 1934a; Maciolek, 1984; Devick, 1991; Fuller *et al.*, 1999; Englund *et al.*, 2000a, b; Yamamoto & Tagawa, 2000).

GENERAL RANGE: Indigenous to northeastern South America from Guyana to Venezuela and Caribbean Islands from Trinidad to the Virgin Islands. Widely introduced throughout the world. Epipelagic near the surface in shallow freshwaters (Hensley & Courtenay *in Lee et al.*, 1980; Courtenay & Meffe, 1989; Fuller *et al.*, 1999).

**[*Poecilia* sp.]**

*Poecilia* sp.: Devick (1991).

TAXONOMY: An unidentified species (see below).

COMMON NAMES: Top minnow, Tabai.

HAWAIIAN RECORDS: Devick (1991) mentioned that an additional, unidentified *Poecilia* species was introduced from unknown aquarium sources to streams on O'ahu. There are no other records of this *Poecilia* species in the Hawaiian Islands, making it doubtful that the record is valid (see, for example: Fuller *et al.*, 1999; Englund *et al.*, 2000a, b; Yamamoto & Tagawa, 2000). It is likely that Devick's (1991) reference was only to a morphological variant of the shortfin molly hybrid.

GENERAL RANGE: Unknown.

***Xiphophorus hellerii*** Heckel

*Xiphophorus hellerii* Heckel, 1848, p. 291, Pl. 8 (figs. 1–3), Orizaba, Mexico.

*Xiphophorus helleri* Heckel, 1848: Brock (1960), Hensley & Courtenay *in Lee et al.* (1980), Maciolek (1984), Rauchenberger (1989a), Courtenay & Meffe (1989), Devick (1991), Fuller *et al.* (1999), Englund (2000b), Yamamoto & Tagawa (2000).

TAXONOMY: Rauchenberger (1989a).

COMMON NAMES: Green swordtail (AFS).

HAWAIIAN RECORDS: Introduced in 1922 to freshwater streams on Hawai'i, Maui, Moloka'i, O'ahu, and Kaua'i. Established in streams and high-elevation reservoirs of O'ahu and Kaua'i (Brock, 1960; Maciolek, 1984; Devick, 1991; Fuller *et al.*, 1999; Englund, 2000b; Yamamoto & Tagawa, 2000).

GENERAL RANGE: Indigenous to Atlantic slopes of Central America from Veracruz, Mexico, to northern Honduras. Widely introduced elsewhere. Epipelagic at the surface of shallow freshwaters (Hensley & Courtenay *in Lee et al.*, 1980; Courtenay & Meffe, 1989; Fuller *et al.*, 1999).

***Xiphophorus maculatus*** (Günther)

*Platypoecilus maculatus* Günther, 1866, p. 350, Mexico.

*Xiphophorus maculatus* (Günther, 1866): Brock (1960), Maciolek (1984), Hensley & Courtenay *in Lee et al.* (1980), Rauchenberger (1989a), Courtenay & Meffe (1989), Devick (1991), Fuller *et al.* (1999), Yamamoto & Tagawa (2000).

TAXONOMY: Rauchenberger (1989a).

COMMON NAMES: Southern platyfish (AFS), Platy, Moonfish (all from Yamamoto & Tagawa, 2000).

HAWAIIAN RECORDS: Introduced in 1922 to freshwater reservoirs on Hawai'i Island, Maui, and O'ahu. Established in low-elevation freshwater habitats of all types on Maui and O'ahu (Brock, 1960, Maciolek, 1984; Devick, 1991; Fuller *et al.*, 1999; Yamamoto & Tagawa, 2000).

GENERAL RANGE: Indigenous to Atlantic slopes of Central America from Veracruz, Mexico, to Belize. Widely introduced elsewhere. Epipelagic at the surface of shallow freshwaters (Hensley & Courtenay *in Lee et al.*, 1980; Courtenay & Meffe, 1989; Fuller *et al.*, 1999).

***Xiphophorus variatus*** (Meek)

*Platypoecilus variatus* Meek, 1904, p. 146, Pl. 10, Valles, San Luis Potosi, Mexico.

*Xiphophorus variatus* (Meek, 1904): Hensley & Courtenay *in Lee et al.* (1980), Maciolek (1984), Rauchenberger (1989a), Courtenay & Meffe (1989), Fuller *et al.* (1999).

TAXONOMY: Rauchenberger (1989a).

COMMON NAMES: Variable platyfish (AFS).

HAWAIIAN RECORDS: Introduced after 1960 and possibly established in ponds on O'ahu (Maciolek, 1984) although this species was no longer listed from the state by Devick (1991) or Yamamoto & Tagawa (2000). (See also Fuller *et al.*, 1999).

GENERAL RANGE: Indigenous to Atlantic slopes of northern Mexico. Introduced elsewhere. Epipelagic at the surface of shallow freshwaters (Hensley & Courtenay *in Lee et al.*, 1980; Courtenay & Meffe, 1989; Fuller *et al.*, 1999).

## Stephanoberyciformes

### Melamphaidae — Bigscale fishes, Ridgeheads<sup>44</sup>

***Melamphaes danae*** Ebeling

*Melamphaes danae* Ebeling, 1962, p. 102, Fig. 37, Sulawesi Sea at 4°03'N, 123°26'E.

*Melamphaes* sp. C (poss. *danae*): Loeb (1979)?

*Melamphaes danae* Ebeling, 1962: Ebeling (1962), Amesbury (1975), Clarke & Wagner (1976), Ebeling *in* Smith & Heemstra (1986).

TAXONOMY: Ebeling (1962), Ebeling *in* Smith & Heemstra (1986).

HAWAIIAN RECORDS: Johnston Atoll and O'ahu at 75–1275 m at night, 650–1275 m during day (Amesbury, 1975; Clarke & Wagner, 1976; W. Watson, pers. comm.).

GENERAL RANGE: Indo-Pacific from East Africa to the Philippines, New Guinea, the Hawaiian Islands, and the southeastern Pacific north of Easter Island. Mesopelagic at 75–1275 m, often at 125–150 m (Ebeling, 1962; Clarke & Wagner, 1976).

***Melamphaes indicus*** Ebeling

*Melamphaes indicus* Ebeling, 1962, p. 85, Fig. 32, Sulawesi Sea at 1°42'N, 124°29'E.

*Melamphaes* sp. A (prob. *indicus*): Loeb (1979)?

*Melamphaes indicus* Ebeling, 1962: Ebeling (1962), Clarke & Wagner (1976).

TAXONOMY: Ebeling (1962).

HAWAIIAN RECORDS: O'ahu to west of French Frigate at 125–150 m at night, 640–900 m during day (Ebeling, 1962; Clarke & Wagner, 1976).

GENERAL RANGE: Indo-Pacific from Madagascar to Indonesia, Vanuatu, and the Hawaiian Islands. Mesopelagic at 125–900 m (Ebeling, 1962; Clarke & Wagner, 1976).

***Melamphaes janae*** Ebeling

*Melamphaes janae* Ebeling, 1962, p. 81, Fig. 30, eastern tropical Pacific off Columbia at 4°04'N, 78°43'W.

*Melamphaes janae* Ebeling, 1962: Ebeling (1962), Clarke & Wagner (1976)?

TAXONOMY: Ebeling (1962).

HAWAIIAN RECORDS: O'ahu at 190–250 m at night, 650–900 m during day (Clarke & Wagner, 1976, who recorded this species as a questionable identification).

GENERAL RANGE: Indo-transPacific and primarily tropical from East Africa to Indonesia, the Hawaiian Islands, and eastward to the Gulf of Panama and Peru. Mesopelagic at 150–900 m (Ebeling, 1962; Clarke & Wagner, 1976).

[***Melamphaes laeviceps*** Ebeling]

*Melamphaes laeviceps* Ebeling, 1962, p. 63, Fig. 25, eastern tropical Pacific north of the Galapagos Islands at 1°01.5'N, 91°45.7'W.

*Melamphaes laeviceps* Ebeling, 1962: Ebeling (1962), Borets & Sokolovsky (1978)?

TAXONOMY: Ebeling (1962).

HAWAIIAN RECORDS: Borets & Sokolovsky (1978) recorded this species from an unspecified locality in the Hawaiian Ridge but Ebeling (1962) stated that this is an equatorial species. Its occurrence in the region needs to be verified.

GENERAL RANGE: Eastern tropical Pacific endemic from the Gulf of Panama westward to 7–11°N, 160°W. Mesopelagic at >400–500 m (Ebeling, 1962).

***Melamphaes longivelis*** Parr

*Melamphaes microps longivelis* Parr, 1933, p. 16, Fig. 6, off Acklins Island, Bahamas, at 22°31'N, 74°26'W.

*Melamphaes longivelis* Parr, 1933: Ebeling (1962), Ebeling & Weed (1973), Clarke & Wagner (1976)?, Fujii in Masuda *et al.* (1984), Paxton *et al.* (1989).

TAXONOMY: Ebeling (1962) stated that this is a species complex with unresolved taxonomy.

HAWAIIAN RECORDS: O'ahu at 625–640 m (Clarke & Wagner, 1976, who recorded this species as questionable identification).

GENERAL RANGE: Tropical through the warm temperate Atlantic and Pacific oceans; in the Indo-Pacific from western Indonesia, the Ogasawara Islands, off New Guinea, Australia, the Hawaiian Islands, and the southeastern Pacific at 30°S, 90°W. Meso- and bathypelagic at 150–1500 m (Ebeling, 1962; Ebeling & Weed, 1973; Clarke & Wagner, 1976; Fujii in Masuda *et al.*, 1984; Paxton *et al.*, 1989).

***Melamphaes lugubris*** Gilbert

*Melamphaes lugubris* Gilbert, 1891, p. 59, California coast south of Point Conception at 32°40'30"N, 117°31'30"W.

*Melamphaes lugubris* Gilbert, 1891: Ebeling (1962), Novikov *et al.* (1981), Fujii in Masuda *et al.* (1984), Boehlert & Mundy (1992)?

TAXONOMY: Ebeling (1962).

HAWAIIAN RECORDS: The Hancock Seamounts from tentatively identified larvae collected at 50–200 m (Boehlert & Mundy, 1992). The occurrence of this species in the region needs verification from adult specimens.

GENERAL RANGE: Subarctic and transition zone North Pacific endemic from the Kuril Islands and Aleutians to Baja California in the California Current. In the central North Pacific, the southern limit of occurrence has been recorded with certainty only to 35°N. Mesopelagic at 50–1200 m (Ebeling, 1962; Fujii in Masuda *et al.*, 1984).

***Melamphaes polylepis* Ebeling**

*Melamphaes polylepis* Ebeling, 1962, p. 43, Fig. 20, off Sri Lanka, Indian Ocean, at 5°21'N, 80°38'E.

*Melamphaes* sp. B (poss. *polylepis*): Loeb (1979)?

*Melamphaes polylepis* Ebeling, 1962: Ebeling (1962), Ebeling & Weed (1973), Clarke & Wagner (1976), Fujii in Masuda *et al.* (1984).

TAXONOMY: Ebeling (1962).

HAWAIIAN RECORDS: O'ahu to the Hancock Seamounts at 640–1150 m (Ebeling, 1962; Clarke & Wagner, 1976).

GENERAL RANGE: Circumtropical and subtropical in the Gulf of Mexico, Atlantic, Indian, and Pacific oceans. Known only from a few isolated localities in the Pacific. Meso- and bathypelagic at 200–2250 m (Ebeling, 1962; Ebeling & Weed, 1973; Clarke & Wagner, 1976; Fujii in Masuda *et al.*, 1984).

***Melamphaes simus* Ebeling**

*Melamphaes simus* Ebeling, 1962, p. 94, Fig. 34, south of the Canary Islands, eastern North Atlantic, 27°19'N, 16°41'W.

*Melamphaes simus* Ebeling, 1962: Ebeling (1962), Ebeling & Weed (1973), Clarke & Wagner (1976), Loeb (1979), Boehlert & Mundy (1992).

TAXONOMY: Ebeling (1962).

HAWAIIAN RECORDS: O'ahu to the Hancock Seamounts at 300–800 m (Ebeling, 1962; Clarke & Wagner, 1976; Boehlert & Mundy, 1992).

GENERAL RANGE: Circumglobal in the tropical through temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans except the eastern tropical Pacific. In the Pacific from southern Japan to Vanuatu, the Hawaiian Islands, and the eastern Pacific at 23°N, 120°W. Mesopelagic at 150–800 m (Ebeling, 1962; Ebeling & Weed, 1973; Clarke & Wagner, 1976).

**[*Melamphaes suborbitalis* (Gill)]**

*Plectromus suborbitalis* Gill, 1883b, p. 258, east of New Jersey, western North Atlantic, at 38°52'40"N, 69°24'40"W.

*Melamphaes* cf. *suborbitalis* (Gill, 1883b): Ebeling (1962).

*Melamphaes* sp. D (poss. *suborbitalis*): Loeb (1979)?

*Melamphaes suborbitalis* (Gill, 1883b): Ebeling (1962), Ebeling & Weed (1973), Borets & Sokolovsky (1978)?, Fujii in Masuda *et al.* (1984), Paxton *et al.* (1989).

TAXONOMY: Ebeling (1962) noted that his Pacific specimens “differed strikingly by several characters” from this Atlantic species. The taxonomy of this Pacific form is unresolved. Kotlyar (1999) described a similar species, *M. parini* from the Sea of Okhotsk but otherwise included Ebeling's Pacific populations within *M. suborbitalis* and providing a discussion of interpopulation variability within the species.

HAWAIIAN RECORDS: Borets & Sokolovsky (1978) recorded *M. suborbitalis* from an unspecified locality in the Hawaiian Archipelago, but this record needs verification.

GENERAL RANGE: Subtropical and temperate North Atlantic, Pacific near the Ogasawara Islands, and in the Tasman Sea. Specimens similar to *M. suborbitalis* have been collected at 28–29°N, 126–127°W. Meso- and bathypelagic at 500–2000 m (Ebeling, 1962; Ebeling & Weed, 1973; Fujii in Masuda *et al.*, 1984; Paxton *et al.*, 1989).

***Poromitra crassiceps* (Günther)**

*Scopelus crassiceps* Günther, 1878, p. 185, several localities — the mid-Atlantic, off Pernambuco, Brazil, and the Antarctic Ocean.

*Melamphaes unicornis* Gilbert, 1905: Gilbert (1905), Fowler (1928, 1949), Gosline & Brock (1960), Borets & Sokolovsky (1978), Tinker (1982).

*Melamphaes crassiceps* (Günther, 1878): Fowler (1934).

*Poromitra crassiceps* (Günther, 1878): Ebeling & Weed (1973), Ebeling (1975), Clarke & Wagner (1976), Borets & Sokolovsky (1978), Novikov *et al.* (1981), Fujii in Masuda *et al.* (1984).

TAXONOMY: Ebeling & Weed (1973). *Poromitra crassiceps* (Günther, 1878) may be a species complex (Ebeling, 1975). If its populations are divisible into species, available names are *P. cristiceps*

(Gilbert, 1890), described from off Washington state, for the subarctic Pacific population and *P. unicornis* (Gilbert, 1905), described from off Kaua‘i, for the central Pacific population (Fujii *in* Masuda *et al.*, 1984).

HAWAIIAN RECORDS: O‘ahu to Koko Seamount at 150–825 m at night, 750–1612 m (Gilbert, 1905; Clarke & Wagner, 1976; Novikov *et al.*, 1981).

GENERAL RANGE: Circumglobal in the tropical through cold-temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans. Mesopelagic at 150–2600 m (Ebeling & Weed, 1973; Clarke & Wagner, 1976; Fujii *in* Masuda *et al.*, 1984).

### *Poromitra megalops* (Lütken)

*Melamphaes megalops* Lütken, 1878, p. 176, Pl. 5 (figs. 1–3), south of the Azores, eastern tropical Atlantic.

*Poromitra* sp. (poss. *megalops*): Loeb (1979)?

*Poromitra megalops* (Lütken, 1878): Ebeling & Weed (1973), Clarke & Wagner (1976), Fujii *in* Masuda *et al.* (1984), Ebeling *in* Smith & Heemstra (1986).

TAXONOMY: Ebeling & Weed (1973), Ebeling *in* Smith & Heemstra (1986).

HAWAIIAN RECORDS: O‘ahu at 250–850 m at night, 625–1,000 m during day (Clarke & Wagner, 1976).

GENERAL RANGE: Circumtropical and subtropical in the Atlantic, Indian, and Pacific oceans. Mesopelagic at 150–1000 m (Ebeling & Weed, 1973; Clarke & Wagner, 1976; Fujii *in* Masuda *et al.*, 1984).

### *Poromitra oscitans* Ebeling

*Poromitra oscitans* Ebeling, 1975, p. 308, Fig. 1, Banda Sea, Indonesia, at 5°28'S, 130°39'E.

*Poromitra oscitans* Ebeling, 1975: Ebeling (1975), Clarke & Wagner (1976), Tinker (1982), Fujii *in* Masuda *et al.* (1984), Belyanina (1987).

TAXONOMY: Ebeling (1975), Belyanina (1987).

HAWAIIAN RECORDS: O‘ahu at 750–1350 m (Ebeling, 1975; Clarke & Wagner, 1976).

GENERAL RANGE: Indo-transPacific from east Africa to Indonesia, the Ogasawara Islands, the Philippines, the Hawaiian Islands, New Zealand (but only one collection south of 10°S), Baja California, and Peru. Meso- and bathypelagic at 750–5320 m fishing depths (Ebeling, 1975; Clarke & Wagner, 1976; Fujii *in* Masuda *et al.*, 1984).

### [*Scopeloberyx malayanus malayanus* Weber]

*Scopeloberyx malayanus* Weber, 1913, p. 187, Indonesia from the Manipa Strait at 3°20'S, 127°22.9'E, and Banda Sea at 3°32.5'S, 124°15.5'E.

*Scopeloberyx malayanus malayanus* Weber, 1913: Kotlyar (2004b).

TAXONOMY: Kotlyar (2004b).

HAWAIIAN RECORDS: None, but the general range of the species, and in particular specimens from the northwest, southwest, and southeast of the Hawaiian Islands strongly suggest that the species occurs in region (Kotlyar, 2004). Some of the records of *S. robustus* (Günther), below, may refer to *S. malayanus*.

GENERAL RANGE: Indo-Pacific from south of Madagascar and the Chagos Archipelago through Indonesia to the Ogasawara Islands, French Polynesia, and the central Pacific to ca. 118°W. Meso- and bathypelagic at 150 m to 3500 m fishing depths (Kotlyar, 2004b).

### *Scopeloberyx opisthopterus* (Parr)

*Melamphaes opisthopterus* Parr, 1933, p. 18, Fig. 7, off Cat Island, Bahamas, at 24°29'N, 75°53'W.

*Scopeloberyx opisthopterus* (Parr, 1933): Ebeling & Weed (1973), Amesbury (1975), Clarke & Wagner (1976), Fujii *in* Masuda *et al.* (1984), Boehlert & Mundy (1992), Kotlyar (2005).

TAXONOMY: Ebeling & Weed (1973), Kotlyar (2005).

HAWAIIAN RECORDS: O‘ahu to the Hancock Seamounts at 550–1450 m (Amesbury, 1975; Clarke & Wagner, 1976; Boehlert & Mundy, 1992; Kotlyar, 2005). The *Scopeloberyx* sp. of Loeb (1979) were not identified to species.

GENERAL RANGE: Circumglobal in the tropical to temperate Atlantic, Indian, and Pacific oceans between ca. 35°N–35°S with more boreal records in northern extensions of the boundary currents. Meso- and bathypelagic at 500–1450 m (Ebeling & Weed, 1973; Clarke & Wagner, 1976; Fujii *in* Masuda *et al.*, 1984; Kotlyar, 2005).

***Scopeloberyx robustus*** (Günther)

*Melamphaes robustus* Günther, 1887, p. 29, mid-Atlantic Ocean southwest of Sierra Leone.

*Scopeloberyx robustus* (Günther, 1887): Ebeling & Weed (1973), Amesbury (1975), Clarke & Wagner (1976), Fujii in Masuda *et al.* (1984), Smith *et al.* (1992), Boehlert & Mundy (1992), Kotlyar (2004a, 2004b).

TAXONOMY: Ebeling & Weed (1973). Kotlyar (2004a, b) revised this species complex and its relatives, recognizing seven species (one with two subspecies) in the complex. Although he did not examine specimens from the Hawaiian Islands, he recorded two species that likely occur in the archipelago: *Scopeloberyx robustus* (Günther, 1887) *sensu stricto*, which is circumtropical and subtropical except for the eastern Pacific, and *S. malayanus malayanus* (Weber, 1913), an Indo-Pacific species. Kotlyar (2004a) also described a North Pacific species, *S. rossicus* Kotlyar 2004, that could be expected at the northwesternmost part of the Hawaiian region, and recognized an eastern Pacific endemic species, *S. maxillaris* (Garman, 1899), that might occur at the southeasternmost Hawaiian Islands as waifs. Kotlyar (2004b) described another eastern Pacific endemic species, *S. pequinoi* Kotlyar 2004, that thus far has a more restricted range than *S. maxillaris*. It is uncertain if *S. pequinoi* might be found in the Hawaiian Islands as waifs.

HAWAIIAN RECORDS: O'ahu to the Hancock Seamounts at 340–1200 m (Amesbury, 1975; Clarke & Wagner, 1976; Boehlert & Mundy, 1992).

GENERAL RANGE: Circumglobal in the tropical through cold-temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans. Meso- and bathypelagic at 340–4200 m (Ebeling & Weed, 1973; Clarke & Wagner, 1976; Fujii in Masuda *et al.*, 1984; Smith *et al.*, 1992).

***Scopelogadus mizolepis*** (Günther)

*Scopelus mizolepis* Günther, 1878, p. 185, south of Aru Island off New Guinea, at 5°41'S, 134°04'30"E.

*Melamphaes mizolepis* (Günther, 1878): Fowler (1928, 1949).

*Scopelogadus* sp.: Struhsaker (1973a), Boehlert *et al.* (1992).

*Scopelogadus mizolepis* (Günther, 1878): Ebeling & Weed (1963), Amesbury (1975), Clarke & Wagner (1976), Loeb (1979), Childress *et al.* (1990).

TAXONOMY: *Scopelogadus mizolepis* (Günther, 1878) is divided into two subspecies: *Scopelogadus m. mizolepis* (Günther, 1878) occurs at the Hancock Seamounts while *S. m. bispinosus* (Gilbert, 1915) occurs in the eastern tropical and equatorial Pacific. Specimens from the main Hawaiian Islands are intermediate in morphology between the two subspecies (Ebeling & Weed, 1963).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to O'ahu at 100–>1000 m at night, 600–>1000 m during day (Ebeling & Weed, 1963; Struhsaker, 1973a; Amesbury, 1975; Clarke & Wagner, 1976; Boehlert *et al.*, 1992).

GENERAL RANGE: Circumglobal between 40°N–22°S in the tropical through warm-temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans. Meso- and bathypelagic at 100–>1550 m (Ebeling & Weed, 1963).

**[*Sio nordenskjoldii* (Lönnerberg)]**

*Melamphaes (Plectromus) nordenskjoldii* Lönnerberg, 1905, p. 765, northeast of the Falkland Islands, 48°54'S, 51°40'W.

*Sio nordenskjoldii* (Lönnerberg, 1905): Moss (1962), Ebeling & Weed (1973), Kotlyar (2002a).

TAXONOMY: Kotlyar (2002a).

HAWAIIAN RECORDS: The inclusion *Sio nordenskjoldii* in this checklist was prompted by a record of a single specimen in the central North Pacific at 41°19'N, 177°44'E (Moss, 1962; Ebeling & Weed, 1973). Kotlyar (2002a) recently determined that this record was false, based on a misreading of the collection locality, which was actually at 41°19'S.

GENERAL RANGE: Circumtemperate Southern Hemisphere species known from 24°46'S–50°S. Meso- and bathypelagic at >150 m (Moss, 1962; Ebeling & Weed, 1973).

**Stephanoberycidae — Pricklefishes*****Malacosarcus macrostoma*** (Günther)

*Scopelus macrostoma* Günther, 1878, p. 186, mid-Pacific southeast of the Line Islands at 0°33'N, 154°34'W.  
*Malacosarcus macrostoma* (Günther, 1878): Fowler (1928), Ebeling & Weed (1973), Merrett & Marshall (1981), Merrett (1992), Boehlert & Mundy (1992)?

TAXONOMY: Ebeling & Weed (1973). The identification of the Hawaiian Islands specimens attributed to *M. macrostoma* is tentative. The specimens are larvae that match *M. macrostoma* most closely among currently known stephanoberycid taxa, but that have some characters suggesting that they might be an undescribed species (Boehlert & Mundy, 1992). Although their identification to genus and species needs verification, there is no doubt about their familial identification.

HAWAIIAN RECORDS: Two larvae from the Hancock Seamounts and off Hawai'i Island have been tentatively identified as this species (Boehlert & Mundy, 1992).

GENERAL RANGE: KNOWN only from the eastern North Atlantic and the tropical Pacific southeast of the Line Islands, north of Tahiti, the Hawaiian Ridge, and in the southeast Pacific far from land. Bathy- or benthopelagic at 2985 to ca. 4578 m (Ebeling & Weed, 1973; Merrett & Marshall, 1981; Merrett, 1992; Boehlert & Mundy, 1992).

**Cetomimoidae****Rondeletiidae — Redmouth whalefishes*****Rondeletia loricata*** Abe & Hotta

*Rondeletia loricata* Abe & Hotta, 1963, p. 43, Pls. 11 (figs. 1–7), 12 (8–9), off Kesen-numa, Japan.  
*Rondeletia loricata* Abe & Hotta, 1963: Paxton (1973), Clarke & Wagner (1976), Paxton & Bray in Smith & Heemstra (1986), Paxton & Blake in Quéro *et al.* (1990), Childress *et al.* (1990), Kotlyar (1996).

TAXONOMY: Paxton (1973), Kotlyar (1996).

HAWAIIAN RECORDS: O'ahu at 100–1150 m, 0–1900 m fishing depths (Clarke & Wagner, 1976; Childress *et al.*, 1990).

GENERAL RANGE: Circumtropical through cold-temperate between 46°N–47°S in the Atlantic, Indian, and Pacific oceans. Meso- and bathypelagic at 100–2350 m, usually below 1000 m during day (Paxton, 1973; Clarke & Wagner, 1976; Paxton & Bray in Smith & Heemstra, 1986; Paxton & Blake in Quéro *et al.*, 1990; Kotlyar, 1996).

**Barbourisiidae — Red whalefishes*****Barbourisia rufa*** Parr

*Barbourisia rufa* Parr, 1945, p. 128, Pl. 1, Gulf of Mexico at 27°01'N, 94°22'W.  
*Barbourisia rufa* Parr, 1945: Clarke & Wagner (1976), Hughes & Iwai (1978), Amaoka in Masuda *et al.* (1984), Paxton & Bray in Smith & Heemstra (1986), Paxton & Blake in Quéro *et al.* (1990), Kotlyar (1995).

TAXONOMY: Paxton & Bray in Smith & Heemstra (1986), Kotlyar (1995).

COMMON NAMES: Redvelvet whalefish (FAO), Red whalefish.

HAWAIIAN RECORDS: O'ahu at 750–800 m, 0–1200 m fishing depths (Clarke & Wagner, 1976).

GENERAL RANGE: Circumtropical through cold-temperate between 56°N–35°S in the Atlantic, Indian, and Pacific oceans, except the eastern tropical and eastern South Pacific. Meso-, bathy-, and benthopelagic at 120–2000 m (Clarke & Wagner, 1976; Hughes & Iwai, 1978; Amaoka in Masuda *et al.*, 1984; Paxton & Bray in Smith & Heemstra, 1986; Paxton & Blake in Quéro *et al.*, 1990; Kotlyar, 1995).

**Cetomimidae — Flabby whalefishes*****Cetomimus* sp.**

Identity unknown.

TAXONOMY: One, or more than one, *Cetomimus* species occurs in the Hawaiian Islands, but no records

have been published (J. Paxton, pers. comm., 1988).

HAWAIIAN RECORDS: Unknown, but probably off O'ahu, where most of the sampling of midwater fishes in the Hawaiian Islands was done.

GENERAL RANGE: Unknown.

***Cetostoma regani*** Zugmayer

*Cetostoma regani* Zugmayer, 1914, p. 4, eastern North Atlantic at 30°45'30"N, 25°47'W.

*Cetostoma regani* Zugmayer, 1914: Paxton (1989).

TAXONOMY: Paxton (1989).

HAWAIIAN RECORDS: O'ahu at 0–1500 m fishing depths. Collections on both sides of the North Pacific Ocean as well as at the main Hawaiian Islands indicate that *C. regani* occurs throughout the region (Paxton, 1989).

GENERAL RANGE: Circumtropical through cold-temperate between 50°N–40°S in the Gulf of Mexico, Atlantic, Indian, and Pacific oceans except perhaps the eastern tropical Pacific. Meso- and bathypelagic at 500–1600 m (Paxton, 1989).

***Ditropichthys storeri*** (Goode & Bean)

*Cetomimus storeri* Goode & Bean, 1895, p. 453, Pl. 17 (fig. 3), east of New Jersey in the western North Atlantic at 39°03'15"N, 70°50'45"W.

*Ditropichthys storeri* (Goode & Bean, 1895): Paxton (1989).

TAXONOMY: Paxton (1989).

HAWAIIAN RECORDS: O'ahu to the Hancock Seamounts at 0–1200 m fishing depths (Paxton, 1989).

GENERAL RANGE: Circumtropical through cold-temperate between 48°N–43°S in the Gulf of Mexico, Atlantic, Indian, and Pacific oceans except perhaps the eastern tropical Pacific. Meso- and bathypelagic at 600–>1550 m, 0–5000 m fishing depths (Paxton, 1989).

***Gyrinomimus* sp.**

Identity unknown.

TAXONOMY: One, or more than one, *Gyrinomimus* species occurs in the Hawaiian Islands, but no records have been published (J. Paxton, pers. comm., 1988).

HAWAIIAN RECORDS: Unknown, but probably off O'ahu, where most of the sampling of midwater fishes in the Hawaiian Islands was done.

GENERAL RANGE: Unknown.

**Mirapinnidae — Mirapinnids, Ribbonbearers**

***Eutaeniophorus festivus*** (Bertelsen & Marshall)

*Taeniophorus festivus* Bertelsen & Marshall, 1956, p. 6, Figs. 3–4, 8, 9 (B–C), Indian Ocean at 4°02'S, 95°44.5'E. Eutaeniophoridae: Miller *et al.* (1979) — probably this species.

*Eutaeniophorus festivus* (Bertelsen & Marshall, 1956): Bertelsen & Marshall (1984), Bertelsen *in* Smith & Heemstra (1986), Bertelsen *in* Quéro *et al.* (1990), Boehlert & Mundy (1992, 1996).

TAXONOMY: Bertelsen & Marshall (1984), Bertelsen *in* Smith & Heemstra (1986).

HAWAIIAN RECORDS: O'ahu to the Hancock Seamounts, known from larvae collected at 0–200 m (Miller *et al.*, 1979; Boehlert & Mundy, 1992; Boehlert & Mundy, 1996).

GENERAL RANGE: Circumtropical through warm-temperate between 35°N–20°S in the Atlantic, Indian, and Pacific oceans but distribution poorly known. Epi- and mesopelagic at 0–200 m (Bertelsen *in* Smith & Heemstra, 1986; Bertelsen *in* Quéro *et al.*, 1990).

***Parataeniophorus brevis*** Bertelsen & Marshall

*Parataeniophorus brevis* Bertelsen & Marshall, 1956, p. 10, Fig. 7, Indian Ocean at 24°33'S, 38°26'E.

*Parataeniophorus* sp.: Boehlert *et al.* (1992).

*Parataeniophorus brevis* Bertelsen & Marshall, 1956: Bertelsen & Marshall (1984), Bertelsen *in* Smith & Heemstra (1986), Paxton *et al.* (1989), Shiganova (1989), Herrera & Lavenberg (1995), Boehlert & Mundy (1996).



TAXONOMY: Bertelsen & Marshall (1984), Bertelsen *in* Smith & Heemstra (1986).

HAWAIIAN RECORDS: O'ahu at 1–200 m (Herrera & Lavenberg, 1995; Boehlert & Mundy, 1996). Larvae not identified to species were collected at Johnston Atoll at 1–50 m (Boehlert *et al.*, 1992).

GENERAL RANGE: Eastern Indian Ocean and Pacific from near Australia, the Hawaiian Islands and California. Epi-, meso-, and bathypelagic at 0–1400 m (Bertelsen *in* Smith & Heemstra, 1986; Shiganova, 1989; Paxton *et al.*, 1989; Bertelsen *in* Quéro *et al.*, 1990; Herrera & Lavenberg, 1995).

## Beryciformes Trachichthyoidei

### Anoplogasteridae — Fangtooths<sup>45</sup>

#### *Anoplogaster cornuta* (Valenciennes)

*Hoplostethus cornutus* Valenciennes *in* Cuvier & Valenciennes, 1833, p. 470, south Atlantic at 26°S, 50°W.

*Caulolepis longidens* Gill, 1883: Gilbert (1905), Jordan & Evermann (1905), Fowler (1928), Gosline & Brock (1960).

*Anoplogaster cornuta* (Valenciennes, 1833): Struhsaker (1973a), Clarke & Wagner (1976), Borets & Sokolovsky (1978), Loeb (1979), Novikov *et al.* (1981), Tinker (1982), Kotlyar (1986a), Boehlert & Mundy (1992).

TAXONOMY: Kotlyar (1986a).

COMMON NAMES: Common fangtooth (AFS).

HAWAIIAN RECORDS: Hawai'i Island to the Hancock Seamounts at 135–980 m at night, 650–2915 m during day (Gilbert, 1905; Struhsaker, 1973a; Clarke & Wagner, 1976; Boehlert & Mundy, 1992).

GENERAL RANGE: Circumglobal between 63°N–45°S in the Gulf of Mexico, Atlantic, Indian, and Pacific oceans. Meso- and bathypelagic at 75–4992 m, usually at 135–2000 m (Clarke & Wagner, 1976; Kotlyar, 1986a).

### Diretmidae — Spinyfins

#### *Diretmichthys parini* (Post & Quéro)

*Diretmoides parini* Post & Quéro, 1981, p. 49, Figs. 9b, 10a-h, 11, Atlantic Ocean at 23°47'N, 20°59'W.

*Diretmus argenteus* non Johnson, 1864 [a valid species that may also occur in the Hawaiian Islands]: Post (1976, *in part*).

*Diretmoides parini* Post & Quéro, 1981: Post & Quéro (1981), Shimizu *in* Masuda *et al.* (1984), Post *in* Whitehead *et al.* (1984), Kotlyar (1987), Paxton *et al.* (1989).

*Diretmichthys parini* (Post & Quéro, 1981): Kotlyar (1990, 2002b).

TAXONOMY: Kotlyar (1990).

HAWAIIAN RECORDS: Unspecified locality and depths in the “Hawaiian Islands region” (Kotlyar, 1990).

GENERAL RANGE: There are almost no records of this family from the central North Pacific Ocean, although diretmids are widespread. *Diretmichthys parini* is circumglobal between 60°N–40°S in the tropical through cold-temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans. In the Pacific, recorded from Japan and southern Australia to the Hawaiian Islands, the central equatorial region, and off Peru. Meso- and bathypelagic at 200–2100 m, larvae and juveniles at 0–200 m (Post, 1976; Post & Quéro, 1981; Shimizu *in* Masuda *et al.*, 1984; Post *in* Whitehead *et al.*, 1984; Kotlyar, 1987, 2002; Paxton *et al.*, 1989; Kotlyar, 2002b).

#### [*Diretmoides pauciradiatus* (Woods)]

*Diretmus pauciradiatus* Woods *in* Woods & Sonoda, 1973, p. 296, Fig. 15, southern Caribbean Sea at 11°52'N, 69°27'W.

*Diretmoides pauciradiatus* (Woods, 1973): Post *in* Whitehead *et al.* (1984), Kotlyar (1987).

TAXONOMY: Kotlyar (1987).

HAWAIIAN RECORDS: A larva collected near O'ahu was tentatively identified as this species (B. Mundy, unpubl. data).

GENERAL RANGE: Circumglobal between 32°N–30°S in the tropical through subtropical Gulf of Mexico, Atlantic, Indian, and Pacific oceans. In the Pacific, previously recorded only from the Ryukyus to

the Banda Sea and in the central equatorial region. Meso- and bathypelagic at 170–1880 m, larva and juveniles at 50–600 m (Post *in* Whitehead *et al.*, 1984; Kotlyar, 1987).

[*Dirtemus argenteus* Johnson]

*Dirtemus argenteus* Johnson, 1864, p. 403, Pl. 36 (fig. 2 [not 1]), off Madeira, eastern North Atlantic.

*Dirtemus argenteus* Johnson, 1864: Humphreys *et al.* (1984), Post *in* Whitehead *et al.* (1984), Kotlyar (1987), Paxton *et al.* (1989).

TAXONOMY: Kotlyar (1987).

HAWAIIAN RECORDS: Koko Seamount at unspecified depths (Humphreys *et al.*, 1984).

GENERAL RANGE: Circumglobal between 60°N–40°S in the tropical through cold-temperate Atlantic, Indian and Pacific oceans. In the Pacific, recorded only from Australia, between 10°N–20°S from the Philippines to Peru, and perhaps the Emperor Seamounts. Meso- and bathypelagic at 280–2000 m, larva and juveniles at 0–250 m (Humphreys *et al.*, 1984; Post *in* Whitehead *et al.*, 1984; Kotlyar, 1987; Paxton *et al.*, 1989).

### Trachichthyidae — Roughies, Slimeheads

*Aulotrachichthys heptalepis* (Gon)

*Paratrachichthys heptalepis* Gon, 1984, p. 294, Fig. 1, ca. 100 mi south of Ni‘ihau, Hawaiian Islands, at 20°16'N, 160°02'W.

*Paratrachichthys* sp.: Clarke (1972), Struhsaker (1973a, in part), Randall (1976a), Tinker (1982, in part), Humphreys *et al.* (1984) in part?, Uchida & Uchiyama (1986, in part), Chave & Mundy (1994) in part?

*Paratrachichthys heptalepis* Gon, 1984, 1987).

*Aulotrachichthys heptalepis* (Gon, 1984): Paxton *et al.* (1989), Eschmeyer (1990).

TAXONOMY: Gon (1984, 1987).

HAWAIIAN RECORDS: Maui to Maro Reef at 50–255 m (Clarke, 1972; Struhsaker, 1973a; Uchida & Uchiyama, 1986; Gon, 1984).

GENERAL RANGE: Hawaiian Islands endemic. Engybenthic at 50–255 m (Gon, 1984).

*Aulotrachichthys prosthemi* (Jordan & Fowler)

*Paratrachichthys prosthemi* Jordan & Fowler, 1902b, p. 9, Fig. 1, Suruga Bay, Japan.

*Paratrachichthys* sp.: Struhsaker (1973a, in part), Tinker (1982) in part?, Humphreys *et al.* (1984) in part?, Chave & Mundy (1994) in part?

*Paratrachichthys prosthemi* Jordan & Fowler, 1902b: Gon (1987), Chave & Mundy (1994).

TAXONOMY: Gon (1987). Paxton *et al.* (1989) and Eschmeyer (1990) for generic allocation.

HAWAIIAN RECORDS: Moloka‘i to O‘ahu at 90–198 m, perhaps to Milwauke Seamount (Struhsaker, 1973a; Humphreys *et al.*, 1984; Gon, 1987; Chave & Mundy, 1994).

GENERAL RANGE: North Pacific endemic from Japan and the Hawaiian Islands. Engybenthic in or near crevices and caves at 90–198 m (Gon, 1987; Chave & Mundy, 1994).

*Gephyroberyx japonicus* (Döderlein)

*Trachichthys japonicus* Döderlein *in* Steindachner & Döderlein, 1883, p. 49, Tokyo, Japan.

*Gephyroberyx japonicus* (Döderlein, 1883): Kotlyar (1980), Yamakawa *in* Okamura *et al.* (1982), Humphreys *et al.* (1984).

TAXONOMY: Kotlyar (1980b). Maul *in* Quéro *et al.* (1990) considered *G. japonicus* (Döderlein, 1883) to be a junior synonym of *G. darwinii* (Johnson, 1866).

COMMON NAMES: Big roughy.

HAWAIIAN RECORDS: The Hancock Koko seamounts at unspecified depths (Humphreys *et al.*, 1984).

GENERAL RANGE: North Pacific endemic from Japan, the Kyushu-Palau Ridge, and the Emperor Seamounts. Engybenthic at 320–660 m (Yamakawa *in* Okamura *et al.*, 1982; Humphreys *et al.*, 1984).

***Hoplostethus crassispinus* Kotlyar**

*Hoplostethus crassispinus* Kotlyar, 1980a, p. 1055, Fig. 1, Emperor Seamounts, central North Pacific.

*Hoplostethus* sp.: Novikov *et al.* (1981)?

*Hoplostethus mediterraneus* non Cuvier in Cuvier & Valenciennes, 1829 [a valid species that probably does not occur in Hawai'i]: Humphreys *et al.* (1984)?

*Hoplostethus crassispinus* Kotlyar, 1980a: Yamakawa *in* Masuda *et al.* (1984), Yamakawa *in* Okamura (1985), Borets (1986), Kotlyar (1986b).

TAXONOMY: Kotlyar (1986b). *Hoplostethus mediterraneus* Cuvier, 1829, was recorded from O'ahu by Clarke (1972) and the Hancock Seamounts by Humphreys *et al.* (1984). Other references to *H. mediterraneus* from Hawai'i (Randall, 1976a; Tinker, 1982; Gon, 1987) appear to be based on these records. Records of *H. mediterraneus* from Hawaiian waters refer to *H. crassispinus* Kotlyar, 1980a, and *H. fedorovi* Kotlyar, 1986 (see Kotlyar's, 1986b, discussion of *H. mediterraneus intermedius* (Hector, 1875)).

HAWAIIAN RECORDS: Bank 11 to Koko Seamount at 160–450 m (Novikov *et al.*, 1981?; Humphreys *et al.*, 1984?; Borets, 1986).

GENERAL RANGE: Western Pacific and transition zone endemic known from the Okinawa Trough, Kyushu-Palau Ridge, Emperor Seamounts, and northern Hawaiian Ridge; perhaps in the South China Sea. Engyebenthic at 160–600 m (Borets, 1986; Kotlyar, 1986b; Yamakawa *in* Okamura *et al.*, 1985; Yamakawa *in* Masuda *et al.*, 1984).

***Hoplostethus fedorovi* Kotlyar**

*Hoplostethus fedorovi* Kotlyar, 1986b, p. 125, Fig. 12, southwest of the Hancock Seamounts, central North Pacific, at 25°0.7'N, 175°41'E.

*Hoplostethus mediterraneus* non Cuvier in Cuvier & Valenciennes, 1829 [a valid species that probably does not occur in the Hawaiian Islands]: Clarke (1972)?, Randall (1976a)?, Tinker (1982)?, Gon (1987)?

*Hoplostethus fedorovi*: Kotlyar (1986b).

TAXONOMY: Kotlyar (1986b).

HAWAIIAN RECORDS: The record of *H. mediterraneus* from O'ahu at 185 m (Clarke, 1972) may be of this species (see *H. crassispinus*).

GENERAL RANGE: Known with certainty only from the holotype collected from 25°0.7'N, 175°41'E, southwest of the Hancock Seamounts and west of Lisianski, at 500–520 m; perhaps a central North Pacific endemic, probably engyebenthic (Kotlyar, 1986b).

**Berycoidei****Berycidae — Alfonsins*****Beryx decadactylus* Cuvier**

*Beryx decadactylus* Cuvier *in* Cuvier & Valenciennes, 1829a, p. 222, no type locality given.

*Beryx decadactylus* Cuvier *in* Cuvier & Valenciennes, 1829a: Fowler (1928), Gosline & Brock (1960), Iwai (1976), Novikov *et al.* (1981), Tinker (1982), Busakhin (1982), Humphreys *et al.* (1984), Uchida & Uchiyama (1986), Borets (1986), Heemstra *in* Smith & Heemstra (1986), Chave & Mundy (1992).

TAXONOMY: Busakhin (1982), Heemstra *in* Smith & Heemstra (1986).

COMMON NAMES: Red bream (AFS), Alfonsino (FAO).

HAWAIIAN RECORDS: Cross Seamount and Hawai'i Island to the Hancock and Koko seamounts at 200–805 m (Fowler, 1928; Novikov *et al.*, 1981; Busakhin, 1982; Uchida & Uchiyama, 1986; Borets, 1986; Chave & Mundy, 1994).

GENERAL RANGE: Circumglobal from 70°N–45°S in the subtropical through sub boreal Gulf of Mexico, Mediterranean Sea, Atlantic, Indian, and Pacific oceans, but absent from the eastern Pacific and most equatorial areas. Benthopelagic at 7–1000 m, usually at >200 m (Busakhin, 1982).

***Beryx splendens* Lowe**

*Beryx splendens* Lowe, 1834, p. 142, off Madeira, western North Atlantic.

*Beryx splendens* Lowe, 1834: Borets & Sokolovsky (1978), Novikov *et al.* (1981), Busakhin (1982), Humphreys *et al.* (1984), Uchida & Uchiyama (1986), Borets (1986), Heemstra *in* Smith & Heemstra (1986).

TAXONOMY: Busakhin (1982), Heemstra *in* Smith & Heemstra (1986).

HAWAIIAN RECORDS: Cross Seamount and Necker Island to Bank 10, the Hancock and Koko seamounts at 10–880 m, usually >163 m (Borets & Sokolovsky, 1978; Novikov *et al.*, 1981; Uchida & Uchiyama, 1986; Borets, 1986; K. Kawamoto, pers. comm., July 2002).

GENERAL RANGE: Circumglobal from 65°N–45°S in the tropical through cold-temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans, except the eastern North Pacific and perhaps most equatorial areas. Benthopelagic at 10–1240 m, usually at >150 m (Busakhin, 1982; Borets, 1986).

## Holocentroidei

### Holocentridae — Squirrelfishes<sup>46</sup>

#### *Myripristis amaena* (Castelnau)

*Neomyripristis amaenus* Castelnau, 1873, p. 99, Knob Island, Torres Strait, Queensland, Australia [a questionable type locality because the specimen was purchased rather than directly collected, and because the species is otherwise unknown from this region (Randall & Greenfield, 1996)].

*Myripristis symmetricus* Jordan & Evermann, 1903: Jordan & Evermann (1903a, 1905).

*Myripristis argyromus* Jordan & Evermann, 1903: Jordan & Evermann (1903a, 1905), Fowler (1928, 1931, 1949), Gosline & Brock (1960).

*Myripristis prasinus* non Cuvier *in* Cuvier & Valenciennes, 1829 [*lapsus* for *M. pralinia*, a valid species not found in the Hawaiian Islands]: Fowler (1928, 1931, in part).

*Myripristis pralinus* non Cuvier *in* Cuvier & Valenciennes, 1829: Fowler (1934, in part, 1949).

*Myripristis amaena* (Castelnau, 1873): Greenfield (1968, 1974), Tinker (1982), Okamoto & Kanenaka (1984), Shimizu *in* Masuda *et al.* (1984), Randall (1985a, 1996a), Randall *et al.* (1985a), Uchida & Uchiyama (1986), Myers (1989), Godwin & Kosaki (1989), Paxton *et al.* (1989), Paxton *et al.* (1993b), Hoover (1993, 2003), Randall & Greenfield (1996), Kotlyar (1998), Randall *et al.* (1997a).

TAXONOMY: Greenfield (1974), Randall & Greenfield (1996).

COMMON NAMES: ‘Ū‘ū (Hoover, 1993, 2003; Randall, 1996a), Brick soldierfish (FAO; Hoover, 1993, 2003; Randall, 1996a), Menpachi (Gosline & Brock, 1960).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to Kure Atoll at 5–25 m (Jordan & Evermann, 1903a, 1905; Gosline & Brock, 1960; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Godwin & Kosaki, 1989; Hoover, 1993; Randall & Greenfield, 1996).

GENERAL RANGE: Pacific endemic from the Ryukyus, the Ogasawara Islands, Belau, New Guinea and the Caroline Islands to the Hawaiian Islands, the Line Islands, the Tuamotus, and Pitcairn Group. Benthopelagic in or near crevices and caves at 5–52 m (Greenfield, 1968, 1974; Shimizu *in* Masuda *et al.*, 1984; Uchida & Uchiyama, 1986; Myers, 1989; Paxton *et al.*, 1989; Randall & Greenfield, 1996; Kotlyar, 1998; Randall *et al.*, 1997b).

#### *Myripristis berndti* Jordan & Evermann

*Myripristis berndti* Jordan & Evermann, 1903a, p. 170, Honolulu, O‘ahu, Hawaiian Islands.

*Myripristis murdjan* non (Forsskål, 1775) [a valid species also found in the Hawaiian Islands]: Günther (1874b), Steindachner (1900), Fowler (1900, 1928, 1931, 1949, in part), Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Hobson (1974, in part), Okamoto & Kanenaka (1984), Uchida & Uchiyama (1986).

*Myripristis berndti* Jordan & Evermann, 1903a: Jordan & Evermann (1903a, 1905), Snyder (1904), Fowler (1949), Gosline & Brock (1960), Randall & Guézé (1981), Tinker (1982), Randall (1985a, 1996a), Randall *et al.* (1985a), Uchida & Uchiyama (1986), Winterbottom *et al.* (1989), Myers (1989), Randall *et al.* (1993b), Hoover (1993, 2003), Chave & Mundy (1994), Allen & Robertson (1994), Randall & Greenfield (1996), Kotlyar (1998), Randall *et al.* (1997a), Robertson & Allen (2002).

TAXONOMY: Randall & Guézé (1981), Randall & Greenfield (1996).

COMMON NAMES: ‘Ū‘ū (Hoover, 1993, 2003; Randall, 1996a), Blotcheye soldierfish (FAO), Bigscale soldierfish (Hoover, 1993, 2003; Randall, 1996a), Menpachi (Gosline & Brock, 1960).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to Kure Atoll at 6–159 m (Günther, 1874; Jordan & Evermann, 1903a, 1905; Gosline & Brock, 1960; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Chave & Mundy, 1994).

GENERAL RANGE: Indo-transPacific from South Africa, the Seychelles, and the Chagos Archipelago to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, Pitcairn Island, the offshore islands of the eastern tropical Pacific, southern Baja California, and Costa Rica to Ecuador. Engybenthic in crevices and caves at 1–159 m (Randall & Guézé, 1981; Winterbottom *et al.*, 1989; Myers, 1989; Chave & Mundy, 1994; Allen & Robertson, 1994; Randall & Greenfield, 1996; Kotlyar, 1998; Randall *et al.*, 1997b; Robertson & Allen, 2002).

***Myripristis chryseres* Jordan & Evermann**

*Myripristis chryseres* Jordan & Evermann, 1903a, p. 171, Hilo, Hawai'i Island, Hawaiian Islands.

*Myripristis clarionensis* non Gilbert, 1897 [a valid eastern Pacific endemic species]: Fowler (1949, in part).

*Myripristis chryseres* Jordan & Evermann, 1903a: Jordan & Evermann (1903a, 1905), Fowler (1928), Gosline & Brock (1960), Greenfield (1968), Clarke (1972), Struhsaker (1973a), Greenfield (1974), Randall & Guézé (1981), Tinker (1982), Randall (1985a, 1996a), Randall *et al.* (1985a), Uchida & Uchiyama (1986), Myers (1989), Paxton *et al.* (1989), Randall *et al.* (1993b), Chave & Mundy (1994), Hoover (1994, 2003), Randall & Greenfield (1996), Kotlyar (1998), Randall *et al.* (1997a).

TAXONOMY: Greenfield (1974), Randall & Greenfield (1996).

COMMON NAMES: Pa'u'u (Gosline & Brock, 1960), 'Ū'ū (Hoover, 1993, 2003; Randall, 1996a), Yellowfin soldierfish (FAO; Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at >20–235 m (Jordan & Evermann, 1903a, 1905; Clarke, 1972; Randall *et al.*, 1985b; Uchida & Uchiyama, 1986; Randall *et al.*, 1993b; Chave & Mundy, 1994; Hoover, 1994).

GENERAL RANGE: Indo-Pacific from South Africa, Reunion and Sri Lanka to Japan, the Ogasawara Islands, Australia, Micronesia, Samoa, and the Hawaiian Islands. Engybenthic in or near crevices and caves at 12–240 m (Greenfield, 1968, 1974; Randall & Guézé, 1981; Myers, 1989; Paxton *et al.*, 1989; Chave & Mundy, 1994; Randall & Greenfield, 1996; Kotlyar, 1998; Randall *et al.*, 1997b).

***Myripristis kuntee* Valenciennes**

*Myripristis kuntee* Valenciennes in Cuvier & Valenciennes, 1831, p. 487, Mauritius, Indian Ocean.

*Myripristis multiradiatus* Günther, 1874: Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Fowler (1928), Gosline & Brock (1960).

*Myripristis kuntee* Valenciennes in Cuvier & Valenciennes, 1831: Greenfield (1968, 1974), Hobson (1974), Tinker (1982), Shimizu in Masuda *et al.* (1984), Randall (1985a, 1996a), Randall *et al.* (1985a), Uchida & Uchiyama (1986), Winterbottom *et al.* (1989), Myers (1989), Paxton *et al.* (1989), Randall *et al.* (1990a, 1993b), Hoover (1993, 2003), Randall & Greenfield (1996), Kotlyar (1998), Randall *et al.* (1997a).

TAXONOMY: Greenfield (1974), Randall & Greenfield (1996).

COMMON NAMES: 'Ū'ū (Hoover, 1993, 2003; Randall, 1996a), Shoulderbar soldierfish (FAO; Randall, 1985), Pearly soldierfish (Hoover, 1993, 2003), Epaulette soldierfish (Randall, 1996a; Hoover, 2003), Menpachi (DLNR).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at 15–40 m (Jenkins, 1903; Jordan & Evermann, 1905; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Hoover, 1993).

GENERAL RANGE: Indo-Pacific from South Africa, the Seychelles, and the Maldives to Indonesia, Japan, the Ogasawara Islands, the Philippines, Australia, New Guinea, Micronesia, the Hawaiian Islands, and the Marquesas Islands. Engybenthic in or near crevices and caves at 8–40 m (Greenfield, 1968, 1974; Shimizu in Masuda *et al.*, 1984; Uchida & Uchiyama, 1986; Winterbottom *et al.*, 1989; Myers, 1989; Paxton *et al.*, 1989; Randall *et al.*, 1990a, 1997b; Randall & Greenfield, 1996; Kotlyar, 1998).

[***Myripristis leiognathus* Valenciennes**]

*Myripristis leiognathus* Valenciennes, 1846, pl. 4 (fig. 1), Galapagos Islands.

*Myripristis sealei* Jenkins, 1903: Jenkins (1903), Jordan & Evermann (1905), Fowler (1928), Tinker (1982).

*Myripristis occidentalis* Gill, 1863: Gosline & Brock (1960)?

*Myripristis leiognathos* Valenciennes, 1846 [*lapsus* for *leiognathus*]: Greenfield (1965), Humann (1993), Kotlyar (1998).

*Myripristis leiognathus* Valenciennes, 1846: Allen & Robertson (1994).

COMMON NAMES: Panamic soldierfish.

TAXONOMY AND HAWAIIAN RECORDS: The collection locality of Honolulu, O'ahu, given for the type material of *Myripristis sealei* Jenkins was likely erroneous (Gosline & Brock, 1960, text and appendix). The type is conspecific with *M. leiognathus*, which is an eastern tropical Pacific Ocean endemic (Greenfield, 1965; Humann, 1993; Allen & Robertson, 1994; Kotlyar, 1998). There are no valid records of *M. leiognathus* from the Hawaiian Islands.

***Myripristis murdjan*** (Forsskål)

*Sciaena murdjan* Forsskål, 1775, p. 48, Jidda, Saudi Arabia, Red Sea.

*Myripristis murdjan* (Forsskål, 1775): Randall & Greenfield (1996), Randall *et al.* (1997a), Myers (1999), Randall & Stender (2002).

TAXONOMY: Randall & Greenfield (1996).

COMMON NAMES: Pinecone soldierfish (FAO), Blotcheye soldierfish (Randall *et al.*, 1997a; Myers, 1999).

HAWAIIAN RECORDS: Midway to Kure Atoll at 10–20 m (Randall & Stender, 2002). All previous records of *M. murdjan* from the Hawaiian Islands were misidentifications of *M. berndti* Jordan & Evermann, 1903 (see Randall & Greenfield, 1996).

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to Indonesia, the Ryukyus, Australia, Micronesia, the northernmost Hawaiian Islands, and Samoa. Records from the central and southern Hawaiian Islands, the Gilbert Islands, and French Polynesia are misidentifications of other species. Engy-benthic in or near crevices and caves at 1–50 m (Randall & Greenfield, 1996; Randall & Stender, 2002).

***Myripristis vittata*** Valenciennes

*Myripristis vittatus* Valenciennes in Cuvier & Valenciennes, 1831, p. 492, Mauritius, Indian Ocean.

*Myripristis vittatus* Valenciennes, 1831: Greenfield (1974).

*Myripristis vittata* Valenciennes, 1831: Shimizu *in* Masuda *et al.* (1984), Winterbottom *et al.* (1989), Myers (1989), Randall *et al.* (1990a), Severns & Fiene-Severns (1993), Randall *et al.* (1993a), Randall & Greenfield (1996), Randall (1996a), Kotlyar (1998), Randall *et al.* (1997a).

TAXONOMY: Randall *et al.* (1993a), Randall & Greenfield (1996).

COMMON NAMES: 'Ū'ū (Randall, 1996a), White-tipped soldierfish (FAO; Randall, 1996a), Menpachi (DLNR).

HAWAIIAN RECORDS: Molokini Islet off Maui at 55–70 m (Severns & Fiene-Severns, 1993; Randall *et al.*, 1993a).

GENERAL RANGE: Indo-Pacific from east Africa and the Seychelles to Indonesia, Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, and the Marquesas. Engy-benthic in or near crevices and caves at 3–80 m (Greenfield, 1974; Shimizu *in* Masuda *et al.*, 1984; Winterbottom *et al.*, 1989; Myers, 1989; Randall *et al.*, 1990a, 1993a, 1997b; Randall & Greenfield, 1996; Kotlyar, 1998).

***Neoniphon aurolineatus*** (Liénard)

*Holocentrum auro-lineatum* Liénard, 1839, p. 32, Mauritius, Indian Ocean.

*Holocentrum argenteum* non Valenciennes in Cuvier & Valenciennes, 1831 [a valid *Neoniphon* species not found in the Hawaiian Islands]: Steindachner (1900).

*Flammeo scythrops* Jordan & Evermann, 1903: Jordan & Evermann (1903a, 1905), Tinker (1982), Shimizu & Yamakawa (1979).

*Holocentrus scythrops* (Jordan & Evermann, 1903): Fowler (1928, 1949), Gosline & Brock (1960).

*Neoniphon aurolineatus* (Liénard, 1839): Randall & Heemstra (1985), Randall (1985a, 1996a), Randall *et al.* (1985a), Uchida & Uchiyama (1986), Myers (1989), Randall *et al.* (1990a), Chave & Mundy (1994), Hoover (1994, 2003), Kotlyar (1998), Randall *et al.* (1997a).

TAXONOMY: Randall & Heemstra (1985).

COMMON NAMES: 'Ala'ihī (Hoover, 1993, 2003; Randall, 1996a), Goldline squirrelfish (Hoover, 1993, 2003; Randall, 1996a), Yellowstriped squirrelfish (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Laysan at 30–188 m (Steindachner, 1900; Jordan & Evermann, 1903a, 1905; Randall, 1985a; Randall *et al.*, 1985b; Uchida & Uchiyama, 1986; Chave & Mundy, 1994; Hoover, 1994).

GENERAL RANGE: Indo-Pacific from Mauritius, Réunion, and the Comoro Islands to Indonesia, Japan, the

Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, and the Marquesas. Engybenthic in or near crevices or caves at 30–188 m (Shimizu & Yamakawa, 1979; Randall & Heemstra, 1985; Myers, 1989; Chave & Mundy, 1994; Kotlyar, 1998; Randall *et al.*, 1997b).

***Neoniphon sammara*** (Forsskål)

*Sciaena sammara* Forsskål, 1775, p. 48, Jidda, Saudi Arabia, Red Sea.

*Flammeo sammara* (Forsskål, 1775): Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Shimizu & Yamakawa (1979), Tinker (1982), Okamoto & Kanenaka (1984).

*Holocentrus sammara* (Forsskål, 1775): Fowler (1928, 1931, 1949), Gosline & Brock (1960), Hobson (1974).

*Neoniphon sammara* (Forsskål, 1775): Randall & Heemstra (1985), Randall (1985a, 1996a), Randall *et al.* (1985a, 1993b, 1997a), Uchida & Uchiyama (1986), Winterbottom *et al.* (1989), Myers (1989), Hoover (1993), Kotlyar (1998).

TAXONOMY: Randall & Heemstra (1985).

COMMON NAMES: ‘Ala’ihi (Hoover, 1993, 2003; Randall, 1996), Sammara squirrelfish (FAO), Spottfin squirrelfish (Hoover, 1993, 2003; Randall, 1996a), Bloodspot squirrelfish.

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to Kure Atoll at 4–77 m (Jenkins, 1903; Jordan & Evermann, 1905; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986).

GENERAL RANGE: Indo-Pacific from South Africa, the Red Sea and the Chagos Archipelago to Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, the Society Islands, and Ducie Island. Engybenthic in or near caves and crevices in coral reefs at 0–77 m (Hobson, 1974; Shimizu & Yamakawa, 1979; Randall & Heemstra, 1985; Uchida & Uchiyama, 1986; Winterbottom *et al.*, 1989; Myers, 1989; Kotlyar, 1998; Randall *et al.*, 1997b).

***Ostichthys archiepiscopus*** (Valenciennes)

*Myripristis archiepiscopus* Valenciennes, 1862, p. 1169, Réunion, Indian Ocean.

*Myripristis pillwaxii* Steindachner, 1893: Steindachner (1893).

*Ostichthys pillwaxii* (Steindachner, 1893): Jordan & Evermann (1905).

*Ostichthys japonicus* non (Cuvier in Cuvier & Valenciennes, 1829) [a valid western Pacific species not found in the Hawaiian Islands]: Fowler (1928, in part), Gosline & Brock (1960, in part).

*Ostichthys pilwaxii* (Steindachner, 1893) [*lapsus* for *pillwaxii*]: Clarke (1972), Struhsaker (1973a).

*Pristilepis archiepiscopus* (Valenciennes, 1862): Uchida & Uchiyama (1986).

*Ostichthys archiepiscopus* (Valenciennes, 1862): Randall (1980a), Randall *et al.* (1982), Tinker (1982 appendix), Randall & Wrobel (1988), Kotlyar (1998), Randall *et al.* (1997a).

TAXONOMY: Randall *et al.* (1982).

COMMON NAMES: Straighthead soldierfish (FAO).

HAWAIIAN RECORDS: O‘ahu to Maro Reef at 90–119 m (Steindachner, 1893; Jordan & Evermann, 1905; Clarke, 1972; Struhsaker, 1973a; Uchida & Uchiyama, 1986).

GENERAL RANGE: Indo-Pacific, perhaps anti-equatorial; known from disjunct localities including Réunion, the Ryukyu and Ogasawara Islands, the Hawaiian Islands, and the Society Islands. Engybenthic at 90–400 m (Clarke, 1972; Uchida & Uchiyama, 1986; Randall *et al.*, 1982, 1997; Randall & Wrobel, 1988; Kotlyar, 1998).

***Ostichthys sandix*** Randall, Shimizu, & Yamakawa

*Ostichthys sandix* Randall, Shimizu & Yamakawa, 1982, p. 16, Fig. 10, off Campbell Industrial Park, southwestern O‘ahu, Hawaiian Islands.

*Ostichthys japonicus* non (Cuvier in Cuvier & Valenciennes, 1829) [a valid western Pacific species not found in the Hawaiian Islands]: Fowler (1928, in part).

*Ostichthys* sp.: Clarke (1972), Randall (1976a, 1980a).

*Ostichthys sandix* Randall, Shimizu & Yamakawa, 1982: Randall *et al.* (1982), Randall & Wrobel (1988), Kotlyar (1998).

TAXONOMY: Randall *et al.* (1982).

HAWAIIAN RECORDS: O‘ahu at 84–220 m (Fowler, 1928; Clarke, 1972; Randall *et al.*, 1982).

GENERAL RANGE: Central Pacific endemic known from the Hawaiian and Society islands. Engybenthic at 84–400 m (Clarke, 1972; Randall *et al.*, 1982; Randall & Wrobel, 1988; Kotlyar, 1998).

***Plectrypops lima*** (Valenciennes)

*Myripristis lima* Valenciennes in Cuvier & Valenciennes, 1831, p. 493, Mauritius, Indian Ocean.

*Myripristis lima* Valenciennes, 1831: Günther (1873–1910b), Steindachner (1900).

*Holotrachys lima* (Valenciennes, 1831): Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1931, 1949), Gosline & Brock (1960), Hobson (1974), Tinker (1982).

*Plectrypops lima* (Valenciennes, 1831): Shimizu in Masuda *et al.* (1984), Randall *et al.* (1985a), Randall & Heemstra in Smith & Heemstra (1986), Winterbottom *et al.* (1989), Myers (1989), Randall *et al.* (1990a, 1993b), Hoover (1994 — text only, photograph is *Sargocentron iota* Randall, 2003), Allen & Robertson (1994), Randall (1996a), Kotlyar (1998), Randall *et al.* (1997a).

TAXONOMY: Randall & Heemstra in Smith & Heemstra (1986).

COMMON NAMES: ‘Ū‘ū (Hoover, 1993, 2003; Randall, 1996a), Cardinal soldierfish, Shy soldierfish, Roughscale soldierfish (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to Midway at 9 m (Günther, 1873–1910; Jordan & Evermann, 1905; Randall *et al.*, 1985b, 1993b; Hoover, 1994).

GENERAL RANGE: Indo-Pacific from east Africa, Madagascar and the Chagos Archipelago to Japan, the Ogasawara Islands, Australia, Lord Howe Island, the Marianas, the Hawaiian Islands, Easter Island, and the offshore islands of the eastern tropical Pacific. Engybenthic in or near crevices and caves at 8–43 m (Shimizu in Masuda *et al.*, 1984; Winterbottom *et al.*, 1989; Myers, 1989; Randall *et al.*, 1990a, 1997b; Allen & Robertson, 1994; Kotlyar, 1998).

***Pristilepis oligolepis*** (Whitley)

*Holotrachys oligolepis* Whitley, 1941, p. 28, Pl. 1 (fig. 19), between Cape Naturalist and Geraldton, Western Australia.

*Ostichthys japonicus* non (Cuvier in Cuvier & Valenciennes, 1829) [a valid western Pacific species not found in the Hawaiian Islands]: Gosline & Brock (1960, in part).

*Ostichthys oligolepis* (Whitley, 1941): Tinker (1982).

*Pristilepis oligolepis* (Whitley, 1941): Randall *et al.* (1982, 1985a, 1993b, 1997a), Shimizu in Masuda *et al.* (1984), Paxton *et al.* (1989), Chave & Mundy (1994), Kotlyar (1998).

TAXONOMY: Randall *et al.* (1982).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to Midway at 9–348 m (below 100 m in the main islands, occurring shallower at further north toward Midway) (Gosline & Brock, 1960; Randall *et al.*, 1985b, 1993b).

GENERAL RANGE: Indo-Pacific, probably antitropical; known from disjunct localities at Réunion, Australia, southern Japan, the Ogasawara Islands, the Hawaiian Islands, and Easter Island. Engybenthic in or near crevices and caves at 9–348 m (Randall *et al.*, 1982, 1997; Shimizu in Masuda *et al.*, 1984; Paxton *et al.*, 1989; Chave & Mundy, 1994; Kotlyar, 1998).

**[*Sargocentron caudimaculatum* (Rüppell)]**

*Holocentrus caudimaculatus* Rüppell, 1838, p. 97, 103, Jeddah, Red Sea.

*Adioryx caudimaculatus* (Rüppell, 1838): Shimizu & Yamakawa (1979), Tinker (1982).

*Sargocentron caudimaculatum* (Rüppell, 1838): Randall & Heemstra (1985), Winterbottom (1989), Myers (1989), Kotlyar (1998), Randall *et al.* (1997a), Randall (1998a).

TAXONOMY: Randall (1998a).

COMMON NAMES: Silverspot squirrelfish (FAO), Tailspot squirrelfish (Randall *et al.*, 1997a; Myers, 1999).

HAWAIIAN RECORDS: Although Tinker (1982) included Hawai‘i in the range of this species, *S. caudimaculatum* has not otherwise been recorded from Hawai‘i. This is considered a false record.

GENERAL RANGE: Indo-Pacific from South Africa, the Red Sea, and the Chagos Archipelago to Indonesia, southern Japan, the Ogasawara Islands, Minami Tori Shima, Australia, the Marshall and Line Islands, and French Polynesia. Engybenthic in or near crevices and caves at 2–>40 m (Shimizu & Yamakawa, 1979; Randall & Heemstra, 1985; Winterbottom *et al.*, 1989; Myers, 1989; Kotlyar, 1998; Randall *et al.*, 1997b; Randall, 1998a).

***Sargocentron diadema*** (Lacépède)

*Holocentrus diadema* Lacépède, 1802, p. 335, no type locality given.



*Holocentrus diadema* Lacépède, 1802: Günther (1873–1910), Steindachner (1900).

*Holocentrus diadema* Lacépède, 1802: Fowler (1900), Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1931, 1949), Gosline & Brock (1960), Hobson (1974).

*Adioryx diadema* (Lacépède, 1802): Shimizu & Yamakawa (1979), Tinker (1982).

*Sargocentron diadema* (Lacépède, 1802): Randall & Heemstra (1985), Randall (1985a, 1996a), Uchida & Uchiyama (1986), Myers (1989), Winterbottom *et al.* (1989), Randall *et al.* (1990a), Kuitert (1993), Hoover (1993, 2003), Randall *et al.* (1993b), Kotlyar (1998), Randall *et al.* (1997a), Randall (1998a).

**TAXONOMY:** Randall (1998a). Eschmeyer (1998) stated that Lacépède's publication of an illustration of this species in 1801, usually cited as the original description, used only a vernacular name and that the 1802 publication is actually the original description. Randall (1998a) suggested that the type locality of the species was likely Mauritius.

**COMMON NAMES:** 'Ala'ihī-kalaloa, 'Ala'ihī (Hoover, 1993, 2003; Randall, 1996a), Crown squirrelfish (Hoover, 1993, 2003; Randall, 1996a).

**HAWAIIAN RECORDS:** Hawai'i Island to Midway at 3–77 m (Günther, 1873–1910; Jordan & Evermann, 1905; Hobson, 1974; Uchida & Uchiyama, 1986; Randall *et al.*, 1993b).

**GENERAL RANGE:** Indo-Pacific from South Africa, the Red Sea, and the Chagos Archipelago to Indonesia, southern Japan, the Ogasawara Islands, Australia, the Hawaiian Islands, French Polynesia and the Pitcairn Group. Engybnthetic in or near crevices and caves of coral reefs at 1–77 m, often in lagoons or bays at < 20 m (Shimizu & Yamakawa, 1979; Randall & Heemstra, 1985; Uchida & Uchiyama, 1986; Winterbottom *et al.*, 1989; Myers, 1989; Randall *et al.*, 1990a, 1997b; Kuitert, 1993; Kotlyar, 1998; Randall, 1998a).

### ***Sargocentron ensifer* (Jordan & Evermann)**

*Holocentrus ensifer* Jordan & Evermann, 1903a, p. 176, Honolulu, O'ahu, Hawaiian Islands.

*Holocentrus ensifer* Jordan & Evermann, 1903a: Jordan & Evermann (1903a, 1905), Gosline & Brock (1960).

*Holocentrus furcatus* non Günther, 1859 [a junior synonym of *H. ascensionis* (Osbeck, 1765), a valid Atlantic species]: Fowler (1928, 1931, 1934).

*Adioryx furcatus* non (Günther, 1859): Shimizu & Yamakawa (1979).

*Adioryx ensifer* (Jordan & Evermann, 1903a): Tinker (1982), Okamoto & Kanenaka (1984).

*Sargocentron fureatum* non (Günther, 1859) [a *lapsus* in spelling for *S. furcatum*]: Uchida & Uchiyama (1986).

*Sargocentron ensiferum* (Jordan & Evermann, 1903a): Randall & Heemstra (1985), Hoover (1993, 2003), Severns & Fiene-Severns (1993), Randall *et al.* (1993b), Randall (1996a), Kotlyar (1998), Randall (1998a).

**TAXONOMY:** Randall (1998a). Eschmeyer (1998) erred in stating that *Holocentrus ensifer* Jordan & Evermann, 1903, is a synonym of *Holocentrus furcatus* Günther, 1859, but this was not repeated in the catalog's website [<http://www.calacademy.org/research/ichthyology/catalog/>]. The use of *ensifer* instead of *ensiferum* for the species name also follows that website.

**COMMON NAMES:** 'Ala'ihī (Hoover, 1993, 2003; Randall, 1996a), Yellowstripe squirrelfish (Hoover, 1993, 2003; Randall, 1996a).

**HAWAIIAN RECORDS:** Hawai'i Island to Midway at 18–64 m (Jordan & Evermann, 1903a, 1905; Okamoto & Kanenaka, 1984; Uchida & Uchiyama, 1986; Hoover, 1993; Severns & Fiene-Severns, 1993; Randall, 1998a).

**GENERAL RANGE:** Pacific endemic, perhaps anti-equatorial, from Japan, the Ryukyus, the South China Sea, and New Caledonia to the Hawaiian and Pitcairn islands. Engybnthetic in or near crevices and caves at 18–64 m, usually at >40 m (Shimizu & Yamakawa 1979, Randall & Heemstra 1985, Uchida & Uchiyama 1986; Kotlyar, 1998; Randall, 1998a).

### ***Sargocentron iota* Randall**

*Sargocentron iota* Randall, 1998a, p. 36, Pl. 3 (fig. B); Fig. 13, off Kahe Point, west coast of O'ahu, Hawaiian Islands.

*Plectrypops lima* non (Valenciennes in Cuvier & Valenciennes, 1831) [a valid species also found in the Hawaiian Islands]: Hoover (1994, photograph only).

*Sargocentron iota* Randall, 1998a: Randall (1998a).

**TAXONOMY:** Randall (1998a).

**COMMON NAMES:** Dwarf squirrelfish (Myers, 1999).

**HAWAIIAN RECORDS:** Hawai'i Island to O'ahu at 9–11 m (Hoover, 1994 - photograph only; Randall, 1998a).

GENERAL RANGE: Eastern Indian Ocean and Pacific from Christmas Island (Indian Ocean) and Indonesia to Palau, New Guinea, the Hawaiian Islands, New Caledonia and Fiji. Engybenitic in or near complex coral habitats at 1–34 m (Randall, 1998a).

***Sargocentron microstoma* (Günther)**

*Holocentrum microstoma* Günther, 1859, p. 34, Ambon Island, Moluccas Islands, Indonesia.

*Holocentrum microstoma* Günther, 1859: Günther (1873–1910) except Hawaiian specimens.

*Holocentrus microstomus* Günther, 1859: Gosline & Brock (1960).

*Adioryx microstomus* (Günther, 1859): Shimizu & Yamakawa (1979).

*Sargocentron microstomum* (Günther, 1859): Randall & Heemstra (1985).

*Sargocentron microstoma* (Günther, 1859): Shimizu *in* Masuda *et al.* (1984), Randall (1985a, 1998a), Randall *et al.* (1985a, 1990a, 1997a), Winterbottom *et al.* (1989), Myers (1989), Paxton *et al.* (1989), Chave & Mundy (1994), Kotlyar (1998).

TAXONOMY: Randall (1998a).

COMMON NAMES: Smallmouth squirrelfish (Randall *et al.*, 1997a), Fine-lined squirrelfish (Myers, 1999).

HAWAIIAN RECORDS: Johnston Atoll at 165–183 m (Günther, 1873–1910; Randall *et al.*, 1985b; Chave & Mundy, 1994). Randall & Heemstra (1985) and Randall (1998a) stated that Hawaiian records of *S. microstoma* are all based upon misidentifications, primarily of the endemic species *S. xantherythrum* (Jordan & Evermann, 1903). Gosline & Brock (1960) included *S. microstoma* but stated, “We have not seen the species in Hawaii”. *Sargocentron microstoma* occurs at Johnston Atoll but probably not in Hawai‘i. In this regard, Kotlyar’s (1998) text is correct but his fig. 3 is erroneous.

GENERAL RANGE: Indo-Pacific, primarily at oceanic islands, from the Comoro Islands, the Maldives and Chagos Archipelago to Indonesia, the Ryukyu and Ogasawara Islands, northern Australia, New Guinea, Micronesia, Johnston Atoll (but not the Hawaiian Islands), Austral Islands, and the Tuamotus. Engybenitic in or near crevices and holes at 1–183 m, but usually at 1–35 m (Shimizu & Yamakawa, 1979; Shimizu *in* Masuda *et al.*, 1984; Winterbottom *et al.*, 1989; Myers, 1989; Paxton *et al.*, 1989; Randall *et al.*, 1990a, 1997b; Chave & Mundy, 1994; Kotlyar, 1998; Randall, 1998a).

***Sargocentron punctatissimum* (Cuvier)**

*Holocentrum punctatissimum* Cuvier *in* Cuvier & Valenciennes, 1829a, p. 215, Strong Island [Kosrae], Caroline Islands.

*Holocentrus diploxiphus* Günther, 1872: Fowler (1900), Jenkins (1903), Snyder (1904).

*Holocentrus gracilispinis* Fowler, 1904: Fowler (1904).

*Holocentrus punctatissimus* Cuvier, 1829: Jordan & Evermann (1905).

*Holocentrus lacteoguttatus* Cuvier *in* Cuvier & Valenciennes, 1829: Fowler (1928, 1931, 1949), Gosline & Brock (1960).

*Holocentrus lacteoguttatum* Cuvier, 1829: Hobson (1974).

*Adioryx lacteoguttatus* (Cuvier, 1829): Shimizu & Yamakawa (1979), Tinker (1982), Okamoto & Kanenaka (1984).

*Sargocentron punctatissimum* (Cuvier, 1829): Randall & Heemstra (1985), Randall (1985a, 1996a, 1998a), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Myers (1989), Winterbottom *et al.* (1989), Paxton *et al.* (1989), Hoover (1993, 2003), Kotlyar (1998).

TAXONOMY: Randall (1998a).

COMMON NAMES: ‘Ala‘ihi (Hoover, 1993, 203; Randall, 1996a), Peppered squirrelfish (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to Kure Atoll at 1–21 m, usually at 1–3 m, with one anomalous collection at 101–183 m (Fowler, 1900; Jordan & Evermann, 1905; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall, 1985a, 1998a; Randall *et al.*, 1985b, 1993b). Randall (1998a) mentioned that the Hawaiian record from 101–183 m was based upon a submersible observation and collection of juveniles newly recruited from the water column.

GENERAL RANGE: Indo-Pacific from South Africa, the Red Sea, and the Chagos Archipelago to the Ryukyu and Ogasawara Islands, northern Australia, Micronesia, the Hawaiian Islands, and Easter Island. Engybenitic in or near crevices and caves at 0–183 m, but usually <21 m and most often in very shallow water of 1–3 m (Shimizu & Yamakawa, 1979; Randall & Heemstra, 1985; Winterbottom *et al.*, 1989; Paxton *et al.*, 1989; Randall *et al.*, 1990a, 1997b; Kotlyar, 1998; Randall, 1998a).

***Sargocentron spiniferum*** (Forsskål)

*Sciaena spinifera* Forsskål, 1775, p. 49, Jidda [Jeddah], Saudi Arabia, Red Sea.

*Holocentrus leo* Cuvier, 1829: Smith & Swain (1882), Jenkins (1903).

*Holocentrus spinifer* (Forsskål, 1775): Jordan & Evermann (1905), Fowler (1928, 1931, 1949), Gosline & Brock (1960).

*Holocentrus spinifera* (Forsskål, 1775): Hobson (1974).

*Adioryx spinifer* (Forsskål, 1775): Shimizu & Yamakawa (1979), Tinker (1982), Okamoto & Kanenaka (1984).

*Sargocentron spiniferum* (Forsskål, 1775): Randall & Heemstra (1985), Randall (1985a, 1996a, 1998a), Randall *et al.* (1985a, 1993b, 1997a), Uchida & Uchiyama (1986), Myers (1989), Winterbottom *et al.* (1989), Hoover (1993, 2003), Chave & Mundy (1994), Kotlyar (1998).

TAXONOMY: Randall (1998a).

COMMON NAMES: ‘Ala‘ihi (Hoover, 1993, 2003; Randall, 1996a), Sabre squirrelfish (FAO), Saber squirrelfish (Randall, 1996a; Hoover, 2003), Longjaw squirrelfish (Hoover, 1993, 2003).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to Kure Atoll at 6–122 m (Smith & Swain, 1882; Jenkins, 1903; Jordan & Evermann, 1905; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Hoover, 1993; Chave & Mundy, 1994; Kotlyar, 1998).

GENERAL RANGE: Indo-Pacific from east Africa, the Red Sea, and Chagos Archipelago to the Ryukyu and Ogasawara Islands, northern Australia, Solomon Islands, Micronesia, the Hawaiian Islands, and the Pitcairn Group. Engybenthic in or near crevices and caves, usually of coral reefs, at 1–122 m (Shimizu & Yamakawa, 1979; Randall & Heemstra, 1985; Winterbottom *et al.*, 1989; Myers, 1989; Chave & Mundy, 1994; Kotlyar, 1998; Randall *et al.*, 1997b; Randall, 1998a).

***Sargocentron spinosissimum*** (Temminck & Schlegel)

*Holocentrum spinosissimum* Temminck & Schlegel, 1843, p. 22, Pl. 8 A, Nagasaki, Japan.

*Adioryx spinosissimus* (Temminck & Schlegel, 1843): Shimizu & Yamakawa (1979).

*Sargocentron spinosissimum* (Temminck & Schlegel, 1843): Randall & Heemstra (1985), Randall *et al.* (1997a), Kotlyar (1998), Randall (1998a).

TAXONOMY: Randall (1998a).

COMMON NAMES: North Pacific squirrelfish.

HAWAIIAN RECORDS: O‘ahu at 230 m (Randall, 1998a). This species was also photographed from a submersible at ca. 120 m off Haleiwa, O‘ahu (C. Kelley, pers. comm., Jan. 1998).

GENERAL RANGE: A western and central North Pacific endemic known from Taiwan and southern Korea to Okinawa, southern Japan, the Ogasawara Islands and the Hawaiian Islands, with records from the South China Sea that are in need of confirmation. Engybenthic in or near crevices and caves of rocky substrates at ca. 120–230 m (Shimizu & Yamakawa, 1979; Masuda *et al.*, 1984; Randall *et al.*, 1997b; Kotlyar, 1998; Randall, 1998a).

***Sargocentron tiere*** (Cuvier)

*Holocentrum tiere* Cuvier in Cuvier & Valenciennes, 1829a, p. 202, Tahiti, Society Islands.

*Holocentrum erythraeum* Günther, 1859: Günther (1875).

*Holocentrus erythraeus* Günther, 1859: Smith & Swain (1882), Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1949).

*Holocentrus tiere* Cuvier, 1829: Fowler (1928), Gosline & Brock (1960), Hobson (1974).

*Adioryx tiere* (Cuvier, 1829): Shimizu & Yamakawa (1979), Tinker (1982), Okamoto & Kanenaka (1984).

*Sargocentron tiere* (Cuvier, 1829): Randall & Heemstra (1985), Randall (1985a, 1996a, 1998a), Randall *et al.* (1985a, 1990a, 1997a), Myers (1989), Winterbottom *et al.* (1989), Hoover (1993, 2003), Kotlyar (1998).

TAXONOMY: Randall (1998a).

COMMON NAMES: ‘Ala‘ihi (Hoover, 1993, 2003; Randall, 1996a), Tahitian squirrelfish (FAO; Randall 1996a; Hoover, 2003), Bluestripe squirrelfish (Hoover, 1993, 2003).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to Lisianski at 4–183 m (Günther, 1875; Smith & Swain, 1882; Jordan & Evermann, 1905; Gosline & Brock, 1960; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall, 1985a, 1998a; Randall *et al.*, 1985b; Hoover, 1993).

GENERAL RANGE: Indo-Pacific from east Africa, Mauritius, the Seychelles, and Chagos Archipelago to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, French Polynesia and the Pitcairn Group. Engybenthic in or near crevices and caves at 1–183 m, but usually <26

m (Shimizu & Yamakawa, 1979; Randall & Heemstra, 1985; Winterbottom *et al.*, 1989; Myers, 1989; Randall *et al.*, 1990a, 1997b; Kotlyar, 1998; Randall, 1998a).

[*Sargocentron tieereoides* (Bleeker)]

*Holocentrum tieereoides* Bleeker, 1853c, p. 334, Ambon Island, Moluccas Islands, Indonesia.

*Adioryx tieereoides* (Bleeker, 1853c): Shimizu & Yamakawa (1979).

*Adioryx tieroides* (Bleeker, 1853c) [*lapsus* for *tieereoides*]: Tinker (1982).

*Sargocentron tieereoides* (Bleeker, 1853c): Shimizu *in* Masuda *et al.* (1984), Randall & Heemstra (1985), Myers (1989), Randall *et al.* (1990a), Kotlyar (1998), Randall (1998a).

TAXONOMY: Randall (1998a).

COMMON NAMES: Pink squirrelfish (Randall *et al.*, 1997a; Myers, 1999).

HAWAIIAN RECORDS: Although Tinker (1982) listed this species, there are no confirmed Hawaiian records. Shimizu & Yamakawa (1979), Randall & Heemstra (1985) and Randall (1998a) discussed the range and basis for erroneous records of *S. tieereoides* in other areas, but not Hawai'i.

GENERAL RANGE: Indo-Pacific from Mozambique Island and the Chagos Archipelago to Indonesia, the Ryukyus, New Guinea, Australia, Micronesia, Wake Island, the Line Islands, and Society Islands. Eurybenthic in or near crevices and caves of coral reefs at 6–45 m, with most records from >15 m (Shimizu & Yamakawa, 1979; Shimizu *in* Masuda *et al.*, 1984; Randall & Heemstra, 1985; Myers, 1989; Randall *et al.*, 1990a; Kotlyar, 1998; Randall, 1998a).

*Sargocentron xantherythrum* (Jordan & Evermann)

*Holocentrus xantherythrus* Jordan & Evermann, 1903a, p. 175, Honolulu, O'ahu, Hawaiian Islands.

*Holocentrum microstoma* non Günther, 1859 [a valid species found at Johnston Atoll but not in the Hawaiian Islands]: Günther (1875) [Hawaiian Islands specimens only?].

*Holocentrus microstomus* non Günther, 1859: Jenkins (1903), Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949, in part), Gosline & Brock (1960).

*Holocentrus xantherythrus* Jordan & Evermann, 1903a: Jordan & Evermann (1903a, 1905), Snyder (1904), Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Struhsaker (1973a), Hobson (1974).

*Adioryx microstomus* non (Günther, 1859): Tinker (1982)?

*Adioryx xantherythrus* (Jordan & Evermann, 1903a): Tinker (1982), Okamoto & Kanenaka (1984).

*Sargocentron xantherythrum* (Jordan & Evermann, 1903a): Randall & Heemstra (1985), Randall (1985a, 1996a, 1998a), Randall *et al.* (1985a, 1993b), Uchida & Uchiyama (1986), Hoover (1993, 2003), Chave & Mundy (1994), Kotlyar (1998).

TAXONOMY: Randall (1998a).

COMMON NAMES: 'Ala'ihī (Hoover, 1993, 2003; Randall, 1996a), Hawaiian squirrelfish (Hoover, 1993, 2003; Randall, 1996a), Indianfish.

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 6–217 m (Günther, 1875; Jordan & Evermann, 1905; Okamoto & Kanenaka, 1984; Hobson, 1974; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Chave & Mundy, 1994; Randall, 1998a). Records from 61–217 m may be based on misidentifications of *S. spinosissimum* (Temminck & Schlegel, 1843).

GENERAL RANGE: Hawaiian Islands and Johnston Atoll endemic. Eurybenthic in or near caves and crevices at 1–60 m (see above), usually below 20 m (Hobson, 1974; Randall & Heemstra, 1985; Chave & Mundy, 1994; Kotlyar, 1998; Randall, 1998a).

**Zeiformes<sup>47</sup>**

**Zeioidei**

**Macrurocyttidae**

***Zenion* sp.**

*Zenion* sp.: Miller *et al.* (1979), Clarke (1991).

Unidentified zeid: Loeb (1979)?

Various *Zenion* species [taxonomic listings, but no Hawaiian Islands records]: Shimizu *in* Uyeno *et al.* (1983), Machida *in* Masuda *et al.* (1984), Heemstra *in* Smith & Heemstra (1986), Paxton *et al.* (1989), Tyler, O'Toole, & Winterbottom (2003).

**TAXONOMY:** Five *Zenion* species have been described but their taxonomy is controversial (Shimizu *in* Uyeno *et al.*, 1983; Heemstra *in* Smith & Heemstra, 1986; Paxton *et al.*, 1989; Heemstra, 1999). The species occurring in the central North Pacific have not been determined. Family name follows Paxton *et al.* (1989). Tyler, O'Toole, & Winterbottom (2003) removed *Zenion* from the Macrurocyttidae, which itself was subsumed as subfamily within an expanded Grammicolepididae, and place it in a separate family, Zeniontidae, that also includes *Capromimus* and *Cyttomimus*.

**HAWAIIAN RECORDS:** Larvae were collected at 0–200 m near O'ahu (Miller *et al.*, 1979; Clarke, 1991).

**GENERAL RANGE:** Unknown but *Zenion japonicum* Kamohara, 1934, (which might be a junior synonym of *Z. hololepis* Goode & Bean, 1896, according to Heemstra, 1999) appears to be the only species reported from the North Pacific; it is probably Indo-Pacific (perhaps circumsubtropical), known from Japan, Australia, and perhaps South Africa. Meso- and benthopelagic at 200–700 m (Machida *in* Masuda *et al.*, 1984; Heemstra *in* Smith & Heemstra, 1986; Paxton *et al.*, 1989; Heemstra, 1999).

## Zeidae — Dories

### *Cyttomimus stelgis* Gilbert

*Cyttomimus stelgis* Gilbert, 1905, p. 624, Pl. 80 (fig. 2), Near Barbers Point, southwest O'ahu, Hawaiian Islands.

*Cyttomimus stelgis* Gilbert, 1905: Gilbert (1905), Fowler (1928), Gosline & Brock (1960), Novikov *et al.* (1981), Tinker (1982), Uchida & Uchiyama (1986), Parin (1990, 1991), Chave & Mundy (1994), Tyler, O'Toole, & Winterbottom (2003).

**TAXONOMY:** Parin (1990, 1991), Paxton *et al.* (1989), Eschmeyer (1990), and Nelson (1994) retained this genus in the Zeidae. Heemstra (1980) and Parin (1990) suggested that it did not belong in that family. Tyler, O'Toole, & Winterbottom (2003) placed *Cyttomimus* in the Zeniontidae.

**HAWAIIAN RECORDS:** Hawai'i Island to Koko Seamount at 336–644 m (Gilbert, 1905; Novikov *et al.*, 1981; Uchida & Uchiyama, 1986; Chave & Mundy, 1994).

**GENERAL RANGE:** Pacific endemic known from the Hawaiian Islands, the southern Emperor Seamounts, and the southeastern Pacific. Engybenthic at 330–644 m (Parin, 1990, 1991; Chave & Mundy, 1994).

### *Stethopristes eos* Gilbert

*Stethopristes eos* Gilbert, 1905, p. 622, Fig. 241, Pailolo Channel between Moloka'i and Maui, Hawaiian Islands.

*Stethopristes eos* Gilbert, 1905: Gilbert (1905), Fowler (1928), Gosline & Brock (1960), Struhsaker (1973a), Heemstra (1980), Tinker (1982), Humphreys *et al.* (1984), Parin (1991), Chave & Mundy (1994), Tyler, O'Toole, & Winterbottom (2003).

**TAXONOMY:** Heemstra (1980), Tyler, O'Toole, & Winterbottom (2003) placed *Stethopristes* in the Parazenidae.

**HAWAIIAN RECORDS:** Hawai'i Island to the Hancock Seamounts at 343–686 m (Gilbert, 1905; Struhsaker, 1973a; Humphreys *et al.*, 1984; Chave & Mundy, 1994).

**GENERAL RANGE:** Pacific endemic known from the Hawaiian Islands and the southeastern Pacific. Engybenthic at 343–686 m (Struhsaker, 1973a; Heemstra, 1980; Parin, 1991; Chave & Mundy, 1994).

### *Zenopsis nebulosus* (Temminck & Schlegel)

*Zeus nebulosus* Temminck & Schlegel, 1845, p. 123, Pl. 66, Sea of Japan.

*Zenopsis nebulosus* (Temminck & Schlegel, 1845): Fowler (1923, 1928), Struhsaker (1973a), Iwai (1976), Borets & Sokolovsky (1978), Novikov *et al.* (1981), Humphreys *et al.* (1984), Heemstra (1980), Randall (1981a), Tinker (1982), Ida *in* Okamura *et al.* (1982), Uchida & Uchiyama (1986), Borets (1986), Paxton *et al.* (1989), Chave & Mundy (1994), Tyler, O'Toole, & Winterbottom (2003).

**TAXONOMY:** Heemstra (1980).

**COMMON NAMES:** Mirror dory (AFS).

**HAWAIIAN RECORDS:** Maui to Koko Seamount at 200–600 m (Fowler, 1923; Struhsaker, 1973a; Novikov *et al.*, 1981; Humphreys *et al.*, 1984; Uchida & Uchiyama, 1986; Borets, 1986; Chave & Mundy, 1994). The upper depth range of 20 m given by Borets (1986) may be a misprint.

**GENERAL RANGE:** Antitropical Pacific endemic known from Japan, southern Australia, New Zealand, the Hawaiian Islands, and California. Engybenthic at 200–800 m (Heemstra, 1980; Randall, 1982; Ida *in* Okamura *et al.*, 1982; Borets, 1986; Paxton *et al.*, 1989; Chave & Mundy, 1994).

**Oreosomatidae — Oreos***[Allocyttus folletti* Myers]

*Allocyttus folletti* Myers, 1960, p. 93, Fig. 1, off the mouth of the Eel River, northern California, U.S.A.

*Allocyttus verrucosus* non (Gilchrist, 1906) [a valid Southern Hemisphere species]: Novikov *et al.* (1981), Kido *in Amaoka et al.* (1983), Machida *in Masuda et al.* (1984), Borets (1986).

*Allocyttus folletti* Myers, 1960: Nagtegaal (1983), James *et al.* (1988), Tyler, O'Toole, & Winterbottom (2003).

TAXONOMY: James *et al.* (1988).

COMMON NAMES: Oxeye oreo, Coster dory.

HAWAIIAN RECORDS: None but records from Koko Seamount and northward at 550–1430 m (Novikov *et al.*, 1981; Borets, 1986) indicate that *A. folletti* could be expected to occur at the Hancock Seamounts.

GENERAL RANGE: North Pacific endemic from Japan to California, south to Koko Seamount in the central North Pacific. Benthopelagic at 600–1647 m; juveniles are epi- and mesopelagic at 47–600 m (Kido *in Amaoka et al.*, 1983; Machida *in Masuda et al.*, 1984; Nagtegaal, 1983; Borets, 1986; James *et al.*, 1988).

**Grammicolepididae — Diamond dories, Grammicolepidids***Grammicolepis brachiusculus* Poey

*Grammicolepis brachiusculus* Poey, 1873, p. 403, Pl. 12, Havana, Cuba.

*Vesposus egregius* Jordan, 1921: Jordan (1921a).

*Grammicolepis brachiusculus* Poey, 1873: Fowler (1928, 1949), Myers (1937), Gosline & Brock (1960), Tinker (1982), Machida *in Masuda et al.* (1984), Quéro *in Whitehead et al.* (1984), Borets (1986), Karrer & Heemstra *in Smith & Heemstra* (1986), Chave & Mundy (1994), Tyler, O'Toole, & Winterbottom (2003).

TAXONOMY: Karrer & Heemstra *in Smith & Heemstra* (1986).

COMMON NAMES: Thorny tinselfish (AFS).

HAWAIIAN RECORDS: Hawai'i Island to the Hancock Seamounts at 170–600 m (Jordan, 1921a; Fowler, 1928, 1949; Borets, 1986; Chave & Mundy, 1994).

GENERAL RANGE: Probably circumglobal in tropical and temperate waters but known from the West Indies, Caribbean Sea, eastern North Atlantic, South Africa, Japan, and the Hawaiian Islands. Engy-benthic at 250–>900 m (Myers, 1937; Machida *in Masuda et al.*, 1984; Quéro *in Whitehead et al.*, 1984; Karrer & Heemstra *in Smith & Heemstra*, 1986; Chave & Mundy, 1994).

**Caproidei****Caproidae — Boarfishes<sup>48</sup>***Antigonia capros* Lowe

*Antigonia capros* Lowe, 1843, p. 86, off Madeira, eastern North Atlantic.

*Antigonia steindachneri* Jordan & Evermann *in* Jordan & Fowler, 1902: Jordan & Evermann *in* Jordan & Fowler (1902), Jordan & Evermann (1905), Gilbert (1905), Gosline & Brock (1960), Clarke (1972), Struhsaker (1973a), Tinker (1982), Humphreys *et al.* (1984), Uchida & Uchiyama (1986).

*Antigonia capros* Lowe, 1843: Fowler (1931), Parin & Borodulina (1986), Borets (1986).

TAXONOMY: Parin & Borodulina (1986).

COMMON NAMES: Deepbody boarfish (AFS), Senbei fish.

HAWAIIAN RECORDS: Hawai'i Island to the Hancock Seamounts at 115–380 m (Jordan & Evermann *in* Jordan & Fowler, 1902a; Jordan & Evermann, 1905; Gilbert, 1905; Clarke, 1972; Struhsaker, 1973a; Humphreys *et al.*, 1984; Uchida & Uchiyama, 1986; Borets, 1986). The *Antigonia* species recorded from Johnston Atoll, Cross Seamount, and the Hawaiian Archipelago at 199–367 m by Chave & Mundy (1994) were not identified to species.

GENERAL RANGE: Circumglobal between 30°N–35°S in the tropical through warm-temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans except the eastern North and eastern tropical Pacific. Engy-benthic at 50–900 m (Parin & Borodulina, 1986).

***Antigonia eos* Gilbert**

*Antigonia eos* Gilbert, 1905, p. 621, Pl. 80 (fig. 1), Pailolo Channel between Moloka'i and Maui, Hawaiian Islands.

*Antigonia eos* Gilbert, 1905: Gilbert (1905), Gosline & Brock (1960), Struhsaker (1973a), Novikov *et al.* (1981), Tinker (1982), Humphreys *et al.* (1984), Uchida & Uchiyama (1986), Parin & Borodulina (1986), Borets (1986).

TAXONOMY: Parin & Borodulina (1986).

COMMON NAMES: Senbei fish.

HAWAIIAN RECORDS: Hawai'i Island to Koko Seamount at 19–600 m, usually below 97 m (Gilbert, 1905; Struhsaker, 1973a; Novikov *et al.*, 1981; Humphreys *et al.*, 1984; Uchida & Uchiyama, 1986; Borets, 1986).

GENERAL RANGE: Hawaiian Archipelago and southern Emperor Seamounts endemic. Engybenthic at 19–600 m, usually below 97 m (Gilbert, 1905; Struhsaker, 1973a; Uchida & Uchiyama, 1986; Borets, 1986; Parin & Borodulina, 1986).

***Antigonia rubescens* (Günther)**

*Hypsinothus rubescens* Günther, 1860, p. 63, Nagasaki, Japan.

*Antigonia rubescens* (Günther, 1860): Humphreys *et al.* (1984), Ida *in* Okamura *et al.* (1982), Parin & Borodulina (1986).

TAXONOMY: Parin & Borodulina (1986).

COMMON NAMES: Senbei fish.

HAWAIIAN RECORDS: The Hancock to Milwaukee Seamount at 400–480 m (Humphreys *et al.*, 1984; Parin & Borodulina, 1986).

GENERAL RANGE: Eastern Indian Ocean and western-central Pacific from southern Japan, the Philippines, and western Australia to southeastern Australia and the Emperor Seamounts. Engybenthic at 50–750 m (Ida *in* Okamura *et al.*, 1982; Parin & Borodulina, 1986).

**[*Antigonia xenolepis* Parin & Borodulina]**

*Antigonia xenolepis* Parin & Borodulina, 1986, p. 164, Fig. 10, Emperor Seamounts, central North Pacific, at 31°59'N, 173°08'E.

*Antigonia xenolepis* Parin & Borodulina, 1986: Parin & Borodulina (1986).

TAXONOMY: Parin & Borodulina (1986).

HAWAIIAN RECORDS: No Hawaiian records but this species is known from three specimens collected in the vicinity of Koko Seamount, suggesting that it could occur at the Hancock Seamounts (Parin & Borodulina, 1986).

GENERAL RANGE: Emperor Seamounts endemic. Engybenthic at ca. 500 m (Parin & Borodulina, 1986).

## Syngnathiformes Syngnathoidei

### Pegasidae — Seamoths

***Eurypegasus papilio* (Gilbert)**

*Pegasus papilio* Gilbert, 1905, p. 614, Fig. 239, near Bird Island [Nihoa], Hawaiian Islands.

*Pegasus* sp.: Bennett (1840).

*Pegasus papilio* Gilbert, 1905: Gilbert (1905), Fowler (1928), Gosline & Brock (1960), Struhsaker (1973a), Tinker (1982), Uchida & Uchiyama (1986).

*Eurypegasus papilio* (Gilbert, 1905): Palsson & Pietsch (1989), Randall *et al.* (1993b).

TAXONOMY: Palsson & Pietsch (1989).

COMMON NAMES: Hawaiian sea moth.

HAWAIIAN RECORDS: Hawai'i Island to Kure Atoll at 1–291 m, adults usually at 80–115 m (Bennett, 1840; Gilbert, 1905; Uchida & Uchiyama, 1986; Palsson & Pietsch, 1989; Randall *et al.*, 1993b).

GENERAL RANGE: Hawaiian Islands endemic. Benthic at 1–291 m, adults usually at 80–115 m (Palsson & Pietsch, 1989; Randall *et al.*, 1993b).

**Solenostomidae — Ghost pipefishes***[Solenostomus cyanopterus* Bleeker]

*Solenostoma cyanopterus* Bleeker, 1854b, p. 507, Wahai, Ceram, Indonesia.

*Solenostomus cyanopterus* Bleeker, 1854b: Jordan & Evermann (1905), Orr & Fritzsche (1993), Kuitert (1993), Randall *et al.* (1997a), Myers (1999).

TAXONOMY: Orr & Fritzsche (1993).

COMMON NAMES: Robust ghost pipefish (Myers, 1999), Ghost pipefish (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Jordan & Evermann (1905) stated that Bleeker recorded this species from the Hawaiian Islands, but that its occurrence in Hawai'i was doubtful. This an example of the confusing records resulting from the use of "Hawaii" as an older spelling of Wahai, Ceram, in eastern Indonesia, Bleeker's type locality for *S. cyanopterus*. The species has never been collected in the central North Pacific Ocean (Orr & Fritzsche, 1993).

GENERAL RANGE: Indo-west Pacific from South Africa and the Red Sea to Indonesia, southern Japan, Australia, the Marianas, and Fiji. Engybenitic on rocky and coral reefs and in vegetation at 0–25 m (Orr & Fritzsche, 1993; Kuitert, 1993).

**Syngnathidae — Pipefishes and Seahorses*****Cosmocampus balli*** (Fowler)

*Corythoichthys balli* Fowler, 1925, p. 24, Waikiki reef, Honolulu, O'ahu, Hawaiian Islands.

*Corythoichthys balli* Fowler, 1925: Fowler (1925).

*Micrognathus balli* (Fowler, 1925): Fowler (1928, 1934).

*Syngnathus balli* (Fowler, 1925): Gosline & Brock (1960), Tinker (1982).

*Cosmocampus balli* (Fowler, 1925): Dawson (1985).

TAXONOMY: Dawson (1985).

COMMON NAMES: Ball's pipefish.

HAWAIIAN RECORDS: O'ahu to Kaua'i in "protected, shallow reefs" (Fowler, 1925, 1928, 1934; Dawson, 1985).

GENERAL RANGE: Hawaiian Islands endemic. Benthic in shallow reefs at unspecified depths (Dawson, 1985).

***Doryrhamphus (Doryrhamphus) excisus excisus*** Kaup

*Doryrhamphus excisus* Kaup, 1856, p. 54, Pl. 3 (fig. 5), Massawa, Eritrea, Red Sea.

*Doryichthys pleurotaenia* Günther, 1880: Günther (1880).

*Doryrhamphus pleurotaenia* (Günther, 1880): Snyder (1904), Jordan & Evermann (1905).

*Doryrhamphus melanopleura* (Bleeker, 1858): Fowler (1928, 1931), Gosline & Brock (1960), Tinker (1982).

*Doryrhamphus excisus* Kaup, 1856: Dawson (1985), Randall (1985a, 1996a), Randall *et al.* (1985a, 1993b, 1997a), Myers (1989), Hoover (1993, 2003), Allen & Robertson (1994).

TAXONOMY: Dawson (1985).

COMMON NAMES: Bluestripe pipefish (FAO; Hoover, 1993, 2003; Randall, 1996a), Fantail pipefish.

HAWAIIAN RECORDS: Johnston Atoll and O'ahu to Midway at 3–6 m (Günther, 1880; Randall, 1985a; Randall *et al.*, 1985b, 1993b; Hoover, 1993).

GENERAL RANGE: Indo-Pacific from South Africa to southern Japan, the Ogasawara Islands, Micronesia, the Hawaiian Islands, the Tuamotus, the Galapagos Islands, Baja California, and Ecuador. Engybenitic in crevices and caves at 1–49 m (Randall, 1985a; Dawson, 1985; Myers, 1989; Allen & Robertson, 1994; Randall *et al.*, 1997b).

***Doryrhamphus (Dunckerocampus) baldwini*** (Herald & Randall)

*Dunckerocampus baldwini* Herald & Randall, 1972, p. 128, Fig. 2, southeast of Pokai Bay, Waianae Coast of O'ahu, Hawaiian Islands.

*Dunckerocampus baldwini* Herald & Randall, 1972: Herald & Randall (1972), Tinker (1982), Chave & Mundy (1994), Randall (1996a).

*Doryrhamphus baldwini* (Herald & Randall, 1972): Randall (1976a), Dawson (1985), Hoover (1993, 2003).



TAXONOMY: Dawson (1985).

COMMON NAMES: Redstripe pipefish (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Hawai'i Island to O'ahu at 6–128 m (Herald & Randall, 1972; Hoover, 1993; Chave & Mundy, 1994).

GENERAL RANGE: Hawaiian Islands endemic. Engybenthic in crevices and caves at 6–128 m (Dawson, 1985; Hoover, 1993; Chave & Mundy, 1994).

***Festucalex erythraeus*** (Gilbert)

*Ichthyocampus erythraeus* Gilbert, 1905, p. 613, Fig. 238, off the south coast of Moloka'i, Hawaiian Islands.

*Ichthyocampus erythraeus* Gilbert, 1905: Gilbert (1905), Fowler (1928), Gosline & Brock (1960), Tinker (1982).

*Festucalex erythraeus* Gilbert, 1905: Dawson (1985), Dawson *in* Smith & Heemstra (1986).

TAXONOMY: Dawson (1985).

COMMON NAMES: Red pipefish.

HAWAIIAN RECORDS: Moloka'i at 42–44 m (Gilbert, 1905).

GENERAL RANGE: Indo-Pacific from Mozambique and the Maldives to Indonesia, southern Japan, New Caledonia, and the Hawaiian Islands. Engybenthic in crevices and caves of reefs at 18–81 m (Dawson, 1985; Dawson *in* Smith & Heemstra, 1986).

***Halicampus edmondsoni*** (Pietschmann)

*Ichthyocampus edmondsoni* Pietschmann, 1928, p. 298, Fig. 3, Waikiki reef, Honolulu, O'ahu, Hawaiian Islands.

*Ichthyocampus edmondsoni* Pietschmann, 1928: Pietschmann (1930), Fowler (1934).

*Micrognathus edmondsoni* (Pietschmann, 1928): Gosline & Brock (1960), Tinker (1982).

*Halicampus edmondsoni* (Pietschmann, 1928): Dawson (1985).

TAXONOMY: Dawson (1985).

COMMON NAMES: Edmondson's pipefish.

HAWAIIAN RECORDS: Maui to Midway from 1–33 m (Pietschmann, 1928; Fowler, 1934a; Gosline & Brock, 1960; BPBM 37831).

GENERAL RANGE: Hawaiian Islands endemic. Benthic in on turf algae and sand of tidepools and deeper reefs at 1–33 m (Dawson, 1985; BPBM 37831).

***Hippocampus fisheri*** Jordan & Evermann

*Hippocampus fisheri* Jordan & Evermann, 1903a, p. 169, Kailua, Hawai'i Island, Hawaiian Islands.

*Hippocampus kuda* non Bleeker, 1852 [a valid species also found in the Hawaiian Islands]: Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Tinker (1982), Hoover (1993), all *in part*.

*Hippocampus fisheri* Jordan & Evermann, 1903a: Jordan & Evermann (1903a, 1905), Lourie *et al.* (1999), Hoover (2003).

TAXONOMY: Lourie *et al.* (1999). *Hippocampus fisheri* was considered to be a junior synonym of *H. kuda* between 1905–1999 and appears to be part of the *H. kuda* species complex.

COMMON NAMES: Fisher's seahorse (Hoover, 2003).

HAWAIIAN RECORDS: Hawai'i Island to Maui from the sea surface to unknown depths (Jordan & Evermann, 1903a, 1905; Hoover, 1993). The species undoubtedly has a greater range in the archipelago.

GENERAL RANGE: Perhaps a Hawaiian Islands endemic, although single specimens identified as *H. fisheri* have been collected at New Caledonia and Lord Howe Island. The identities of these specimens need confirmation but if they are *H. fisheri*, the species is a Pacific Ocean endemic (Lourie *et al.*, 1999).

***Hippocampus histrix*** Kaup

*Hippocampus histrix* Kaup, 1853, p. 229, Pl. 2 (fig. 5), Japan.

*Hippocampus histrix* Kaup, 1853: Fowler (1928), Gosline & Brock (1960), Tinker (1982), Dawson *in* Smith & Heemstra (1986), Myers (1989), Randall (1996a), Randall *et al.* (1997a), Lourie *et al.* (1999).

TAXONOMY: Lourie *et al.* (1999). The description of this species is usually attributed to an 1856 paper by Kaup, but Eschmeyer (1998) noted that it was first described in Kaup's 1853 publication.

COMMON NAMES: Thorny seahorse (FAO; Randall, 1996a), Spiny seahorse (Hoover, 1993).

HAWAIIAN RECORDS: Known from the Hawaiian Islands only by Fowler's (1928) record from Maui which was listed by Myers (1989) but not by Dawson (*in* Smith & Heemstra, 1986). The specimen is poor-

ly preserved (Randall, 1996a). Lourie *et al.* (1999) verified the identification of the Hawaiian specimen.

GENERAL RANGE: Indo-Pacific from South and East Africa to southern Japan, the Ogasawara Islands, Micronesia, the Society Islands and the Hawaiian Islands. Benthic to pelagic but always clinging to sessile or floating objects, usually on sponges and tunicates, at 1–>6 m (Dawson *in* Smith & Heemstra, 1986; Myers, 1989; Randall *et al.*, 1997b; Lourie *et al.*, 1999).

### *Hippocampus kuda* Bleeker

*Hippocampus kuda* Bleeker, 1852a, p. 82, Singapore.

*Hippocampus hilonis* Jordan & Evermann, 1903: Jordan & Evermann (1903a, 1905).

*Hippocampus kuda* Bleeker, 1852a: Fowler (1928, 1931, 1934, 1949, in part), Gosline & Brock (1960, in part), Struhsaker (1973a), Tinker (1982, in part), Dawson *in* Smith & Heemstra (1986), Myers (1989), Hoover (1993 text, in part, 2003), Randall (1996a), Lourie *et al.* (1999).

TAXONOMY: Lourie *et al.* (1999), who noted that “*Hippocampus kuda*” as presently recognized is a species complex, and that at least some specimens from the Hawaiian Islands differ in morphology from other “*H. kuda*,” needing more taxonomic investigation.

COMMON NAMES: Yellow seahorse (FAO; Randall, 1996a; Hoover, 2003), Spotted seahorse (Hoover, 1993, 2003; Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Hawai‘i Island to Necker at 0–110 m (Jordan & Evermann, 1903a, 1905; Struhsaker, 1973a).

GENERAL RANGE: Indo-Pacific from Pakistan and India to Indonesia, the Ryukyu Islands, Australia, Micronesia, the Hawaiian Islands, and the Society Islands. Benthic to pelagic but always clinging to sessile or floating objects, usually on vegetation, at 0–110 m (Struhsaker, 1973a; Dawson *in* Smith & Heemstra, 1986; Myers, 1989; Hoover, 1993; Lourie *et al.*, 1999).

### *Minyichthys brachyrhinus* (Herald)

*Micrognathus brachyrhinus* Herald *in* Schultz *et al.*, 1953, p. 262, Fig. 39f, south coast of O‘ahu, Hawaiian Islands.

*Micrognathus brachyrhinus* Herald, 1953: Herald (1953), Gosline & Brock (1960), Tinker (1982).

*Minyichthys brachyrhinus* (Herald, 1953): Dawson (1985).

TAXONOMY: Dawson (1985).

HAWAIIAN RECORDS: O‘ahu to Nero Bank at 72–137 m (Herald, 1953).

GENERAL RANGE: Eastern Indian and western-central Pacific oceans from Sumatra to the Philippines, Fiji, and the Hawaiian Islands. Engybenthic at 72–137 m, but known primarily from pelagic juveniles (Dawson, 1985).

### [*Syngnathoides biaculeatus* (Bloch)]

*Syngnathus biaculeatus* Bloch, 1785, p. 10, Pl. 121 (figs. 1–2), “East Indies”.

*Syngnathoides biaculeatus* Bloch, 1785: Fowler (1928, 1931), Dawson (1985), Myers (1989), Randall *et al.* (1997a).

TAXONOMY: Dawson (1985).

COMMON NAMES: Alligator pipefish (FAO), Spiraltail pipefish (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Fowler (1928) recorded a specimen of *S. biaculeatus* from the Hawaiian Islands and expressed doubt about the locality data. He later (1931) recorded multiple specimens from O‘ahu, stating that the species was “common”. It has not been listed in subsequent publications (Dawson, 1985). The first record may be among the puzzling listings that have resulted from the use of “Hawaii” as an older spelling of Wahai, Ceram, Indonesia, but the records from O‘ahu cannot be explained in this way.

GENERAL RANGE: Indo-west-Pacific from South Africa and the Red Sea to southern Japan, Australia, Micronesia, Samoa, and Tonga. Engybenthic near or in vegetation in shallow water (Dawson, 1985; Myers, 1989; Randall *et al.*, 1997a).

**Aulostomidae — Trumpetfishes*****Aulostomus chinensis*** (Linnaeus)

*Fistularia chinensis* Linnaeus, 1766, p. 515, “East Indies”.

*Aulostomus chinense* (Linnaeus, 1766): Streets (1877), Günther (1880), Steindachner (1900).

*Aulostomus valentini* (Bleeker, 1853): Jenkins (1903), Jordan & Snyder (1904a), Snyder (1904), Jordan & Evermann (1905).

*Aulostomus chinensis* (Linnaeus, 1766): Smith & Swain (1882), Fowler (1900, 1928, 1931, 1934, 1949), Gosline & Brock (1960), Clarke (1972), Struhsaker (1973a), Hobson (1974), Tinker (1982), Springer (1982), Okamoto & Kanenaka (1984), Randall (1985a, 1996a), Randall *et al.* (1985, 1993b, 1997a), Uchida & Uchiyama (1986), Heemstra *in* Smith & Heemstra (1986), Myers (1989), Hoover (1993, 2003), Chave & Mundy (1994), Allen & Robertson (1994), Bowen *et al.* (2001), Robertson & Allen (2002).

TAXONOMY: Bowen *et al.* (2001).

COMMON NAMES: Nūnū (Hoover, 1993, 2003; Randall, 1996a), Chinese trumpetfish (FAO), Trumpetfish (Hoover, 1993, 2003; Randall, 1996a), Stickfish (Gosline & Brock, 1960).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to Kure Atoll at 1–150 m (Streets, 1877a; Smith & Swain, 1882; Jordan & Evermann, 1905; Clarke, 1972; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986).

GENERAL RANGE: Indo-transPacific from South Africa to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, Easter Island, the offshore islands of the eastern tropical Pacific, southern Baja California, and Panama to Ecuador. Engyebenthic near coral reefs at 1–200 m, with juveniles to 1800 m fishing depths (Clarke, 1972; Springer, 1982; Randall, 1985a; Myers, 1989; Chave & Mundy, 1994; Allen & Robertson, 1994; Randall *et al.*, 1997b; Bowen *et al.*, 2001; Robertson & Allen, 2002).

**Fistulariidae — Cornetfishes*****Fistularia commersonii*** Rüppell

*Fistularia commersonii* Rüppell, 1838, p. 142, Mohila, Red Sea.

*Fistularia serrata* Cuvier, 1816: Streets (1877), Jenkins (1903), Jordan & Evermann (1905).

*Fistularia petimba* non Lacépède, 1803 [a valid species that also occurs in the Hawaiian Islands]: Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Struhsaker (1973a), Hobson (1974), Tinker (1982).

*Fistularia commersonii* Rüppell, 1838: Fritzsche (1976), Okamoto & Kanenaka (1984), Randall *et al.* (1985a, 1993b, 1997a), Uchida & Uchiyama (1986), Myers (1989), Hoover (1993, 2003), Allen & Robertson (1994), Randall (1996a), Robertson & Allen (2002).

TAXONOMY: Fritzsche (1976).

COMMON NAMES: Nūnū (Hoover, 1993, 2003), Nūnū peke (Randall, 1996a), Bluespotted cornetfish (FAO), Cornetfish (Hoover, 1993, 2003; Randall, 1996a), Smooth flutemouth (Randall *et al.*, 1997a), Stickfish.

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to Kure Atoll at 1–132 m, 15–296 m fishing depths (Streets, 1877a; Jordan & Evermann, 1905; Struhsaker, 1973a; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Hoover, 1993).

GENERAL RANGE: Indo-transPacific from South Africa and the Red Sea to Indonesia, southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, Easter Island, the offshore islands of the eastern tropical Pacific, and the Gulf of California to northern Peru. Engyebenthic at 1–132 m (Struhsaker, 1973a; Fritzsche, 1976; Uchida & Uchiyama, 1986; Myers, 1989; Allen & Robertson, 1994; Randall *et al.*, 1997b; Robertson & Allen, 2002).

***Fistularia petimba*** Lacépède

*Fistularia petimba* Lacépède, 1803, p. 349, several type localities including the Straits of New Britain in the Bismarck Archipelago, Réunion, and the “Antilles”.

*Fistularia villosa* Klunzinger, 1871: Duncker & Mohr (1925), Fowler (1928, 1934), Gosline & Brock (1960), Struhsaker (1973a), Tinker (1982), Humphreys *et al.* (1984).

*Fistularia petimba* Lacépède, 1803: Fritzsche (1976), Iwai (1976), Uchida & Uchiyama (1986), Fritzsche *in* Quérou *et al.* (1990), Kuiter (1993), Randall *et al.* (1997a, 1997a).

TAXONOMY: Fritzsche (1976).

COMMON NAMES: Red cornetfish (AFS; FAO), Serrate cornetfish (Randall *et al.*, 1997a), Red nūnū.

HAWAIIAN RECORDS: Nihoa to Ladd Seamount at 36–77 m (Duncker & Mohr, 1925; Iwai, 1976; Humphreys *et al.*, 1984; Uchida & Uchiyama, 1986).

GENERAL RANGE: Circumtropical and subtropical in the Atlantic, Indian, and western Pacific oceans; known only from the Hawaiian Islands in the central Pacific. Engyobenthic at 10–200 m (Fritzsche, 1976; Fritzsche *in* Quéro *et al.*, 1990; Kuitert, 1993; Randall *et al.*, 1997a, 1997).

### Macroramphosidae — Snipefishes<sup>49</sup>

#### *Macroramphosus gracilis* (Lowe)

*Centriscus gracilis* Lowe, 1839, p. 86, off Madeira, eastern North Atlantic.

*Macrorhamphosus hawaiiensis* Gilbert, 1905: Gilbert (1905), Struhsaker (1973a).

*Macrorhamphosus velitaris* (Pallas, 1770) [a species of uncertain taxonomic status]: Fowler (1928).

*Macrorhamphosus scolopax* non (Linnaeus, 1758) [a valid species]: Ehrich (1976, in part), Heemstra *in* Smith & Heemstra (1986, in part), Ehrich *in* Quéro *et al.* (1990, in part).

*Macrorhamphosus gracilis* (Lowe, 1839): Mohr (1937), Gosline & Brock (1960), Tinker (1982), Uchida & Uchiyama (1986).

*Macroramphosus gracilis* (Lowe, 1839): Paxton *et al.* (1989).

TAXONOMY: The taxonomy of *Macroramphosus* is in confusion. Mohr (1937) recognized only two species, *M. gracilis* (Lowe, 1839) and *M. scolopax* (Linnaeus, 1758), in the most recent worldwide revision of the genus. Ehrich (1976) concluded that *M. gracilis* was only the pelagic young stage of *M. scolopax*, and synonymized the two. Clarke (1984b) gave evidence that two species occurred in Australian waters, corresponding to slender pelagic and deep-bodied benthic species, but declined to formally assign names to those forms. He suggested that two species might occur in many areas, and inferred that more than one species of at least the deep bodied form exists worldwide. Heemstra (*in* Smith & Heemstra, 1986) accepted Ehrich's conclusion that there is only one species in the genus. Paxton *et al.* (1989) recognized four valid species and discussed this problem. Assis (1993) gave evidence that *M. gracilis* is not the juvenile of *M. scolopax* and concluded that the two forms should not be synonymized. The number and identity of *Macroramphosus* species in the central North Pacific Ocean cannot be determined until a worldwide revision of the genus is completed. A genetic analysis may be required to resolve this problem.

COMMON NAMES: Slender snipefish (AFS).

HAWAIIAN RECORDS: Hawai'i Island to Laysan at 77–238 m (Gilbert, 1905; Struhsaker, 1973a; Uchida & Uchiyama, 1986).

GENERAL RANGE: Circumglobal in the tropical and subtropical Mediterranean, Atlantic, Indian, and Pacific oceans. Mesopelagic and benthopelagic at 50–500 m, usually at 50–150 m; juveniles are epipelagic (Heemstra *in* Smith & Heemstra, 1986; Ehrich *in* Quéro *et al.*, 1990).

#### *Macroramphosus scolopax* (Linnaeus)

*Balistes scolopax* Linnaeus, 1758, p. 329, "Habitat in Mari Mediterraneo".

*Macrorhamphosus scolopax* (Linnaeus, 1758): Borets & Sokolovsky (1978), Humphreys *et al.* (1984), Uchida & Uchiyama (1986), Borets (1986), Heemstra *in* Smith & Heemstra (1986, in part), Ehrich *in* Quéro *et al.* (1990, in part).

*Macroramphosus scolopax* (Linnaeus, 1758): Paxton *et al.* (1989).

TAXONOMY: See *M. gracilis*.

COMMON NAMES: Longspine snipefish (AFS; FAO), Deepbody snipefish.

HAWAIIAN RECORDS: The Hancock Koko seamounts at 108–311 m (Humphreys *et al.*, 1984; Uchida & Uchiyama, 1986; Borets, 1986). The macroramphosid species reported by Chave & Mundy (1994) from O'ahu at 245–366 m was a reddish, deep-bodied species more similar to *M. scolopax* than to *M. gracilis*. Recent images of this form from French Frigate (C. Kelley, pers. comm., Sept. 2001) indicate that Chave and Mundy's (1994) macroramphosid species was a *Macroramphosus*. *Macroramphosus scolopax* or a related species may therefore occur throughout the archipelago.

GENERAL RANGE: Circumglobal in the tropical and subtropical Mediterranean, Atlantic, Indian, and

Pacific oceans. Mesopelagic and benthopelagic at 50–500 m, usually at 50–150 m; juveniles may be epipelagic (Heemstra *in* Smith & Heemstra, 1986; Ehrich *in* Quéro *et al.*, 1990).

### Centriscidae — Shrimpfishes

[*Aeoliscus strigatus* (Günther)]

*Amphisile strigata* Günther, 1861, p. 528, 566, Java, Indonesia.

*Centriscus strigatus* (Günther, 1861): Fowler (1928, 1949), Gosline & Brock (1960), Tinker (1982).

*Aeoliscus strigatus* (Günther, 1861): Springer (1982), Heemstra *in* Smith & Heemstra (1986), Myers (1989).

TAXONOMY: Heemstra *in* Smith & Heemstra (1986).

COMMON NAMES: Shrimpfish (FAO; Myers, 1999), Razorfish (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Fowler (1928) recorded this species from O'ahu but this record is considered highly questionable (Springer, 1982).

GENERAL RANGE: Indo-west-Pacific from the western Indian Ocean to southern Japan, Australia, and Micronesia (Myers, 1989).

### Synbranchiformes

#### Synbranchidae — Swamp-eels

*Monopterus albus* (Zuiew)

*Muraena alba* Zuiew, 1793, p. 299, Pl. 7 (fig. 2), no type locality given.

*Monopterus albus* (Zuiew, 1793): Brock (1960), Maciolek (1984), Roberts (1989), Kottelat (1989), Paxton *et al.* (1989), Devick (1991), Kottelat *et al.* (1993), Fuller *et al.* (1999), Yamamoto & Tagawa (2000).

TAXONOMY: Roberts (1989), Paxton *et al.* (1989).

COMMON NAMES: Swamp eel (AFS), Rice eel, Rice paddy eel (Yamamoto & Tagawa, 2000).

HAWAIIAN RECORDS: *Monopterus albus* was introduced to O'ahu prior to 1900. It is established in a variety of low-current freshwater habitats there, particularly on the windward side of the island (Brock, 1960; Maciolek, 1984; Devick, 1991; Fuller *et al.*, 1999; Yamamoto & Tagawa, 2000).

GENERAL RANGE: Southeast Asia from northern and southern China to Japan, Thailand, Indo-China, Indonesia, and perhaps Australia. Introduced to the Hawaiian Islands, Georgia, and Florida in the United States. Benthic in shallow, still or slow-moving freshwaters (Roberts, 1989; Kottelat, 1989; Paxton *et al.*, 1989; Kottelat *et al.*, 1993; Fuller *et al.*, 1999).

### Scorpaeniformes<sup>50</sup>

#### Dactylopteroidei

#### Dactylopteridae — Flying gurnards<sup>51</sup>

*Dactyloptena orientalis* (Cuvier)

*Dactylopterus orientalis* Cuvier, 1829, p. 162, Red Sea.

*Dactylopterus orientalis* (Cuvier, 1829): Günther (1877), Steindachner (1900).

*Cephalacanthus orientalis* (Cuvier, 1829): Fowler (1900), Jenkins (1903), Jordan & Snyder (1904a, 1904b), Snyder (1904), Jordan & Evermann (1905).

*Dactyloptena orientalis* (Cuvier, 1829): Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Struhsaker (1973a), Tinker (1982), Springer (1982), Okamura *in* Masuda *et al.* (1984), Uchida & Uchiyama (1986), Eschmeyer *in* Smith & Heemstra (1986), Myers (1989), Randall *et al.* (1990a, 1997a), Hoover (1993, 2003), Kuitert (1993), Randall (1996a), Eschmeyer (1997).

TAXONOMY: Eschmeyer (1997).

COMMON NAMES: Loloa'u (Hoover, 1993, 2003; Randall, 1996a), Pinao (Hoover, 1993, 2003), Oriental helmet gurnard (FAO), Helmet gurnard (Hoover, 1993, 2003; Randall, 1996a), Flying gurnard (Hoover, 1993, 2003).

HAWAIIAN RECORDS: Hawai'i Island to Kure Atoll at 1–185 m (Steindachner, 1900; Jordan & Evermann, 1905; Struhsaker, 1973a; Uchida & Uchiyama, 1986).

GENERAL RANGE: Indo-Pacific from South Africa to southern Japan, the Ogasawara Islands, New Zealand,

Micronesia, the Hawaiian Islands, the Society Islands, Tuamotu Islands and Pitcairn Island. Benthic on sand bottoms at 1–185 m (Struhsaker, 1973a; Springer, 1982; Okamura *in* Masuda *et al.*, 1984; Uchida & Uchiyama, 1986; Eschmeyer *in* Smith & Heemstra, 1986; Myers, 1989; Randall *et al.*, 1990a, 1997b; Kuitert, 1993; Eschmeyer, 1997).

### Scorpaenoidei

#### Scorpaenidae — Scorpionfishes<sup>52</sup>

[*Adelosebastes latens* Eschmeyer, Abe, & Nakano]

*Adelosebastes latens* Eschmeyer, Abe & Nakano, 1979, p. 80, Pl. 1 (figs. 1–2), Emperor Seamounts Chain, central North Pacific.

*Adelosebastes latens* Eschmeyer, Abe & Nakano, 1979: Eschmeyer *et al.* (1979), Kanayama (1981), Humphreys *et al.* (1984), Amaoka *in* Masuda *et al.* (1984), Borets (1986), Orr & Baker (1996).

TAXONOMY: Eschmeyer *et al.* (1979), Kanayama (1981).

HAWAIIAN RECORDS: None but *A. latens* has been taken as far south as Koko Seamount at 980–1100 m (Kanayama, 1981; Humphreys *et al.*, 1984; Borets, 1986) and could be expected at the Hancock Seamounts.

GENERAL RANGE: Subarctic North Pacific endemic known only from a few collections at the Emperor Seamounts and Aleutian Islands. Benthic and epi/benthic at 687–1320 m (Eschmeyer *et al.*, 1979; Kanayama, 1981; Amaoka *in* Masuda *et al.*, 1984; Borets, 1986; Orr & Baker, 1996).

*Dendrochirus barberi* (Steindachner)

*Pterois barberi* Steindachner, 1900a, p. 175, a small specimen from the plankton taken between “Honolulu to Cape Horn”.

*Pterois barberi* Steindachner, 1900a: Steindachner (1900a).

*Dendrochirus hudsoni* Jordan & Evermann, 1903: Jordan & Evermann (1903a).

*Dendrochirus chloreus* Jenkins, 1903: Jenkins (1903), Jordan & Snyder (1904a, 1904b), Jordan & Evermann (1905).

*Dendrochirus brachypterus* non (Cuvier *in* Cuvier & Valenciennes, 1829) [a valid Indo-Pacific species that is replaced by *D. barberi* in Hawai‘i]: Fowler (1928, 1931, 1934, 1949, in part), Gosline & Brock (1960).

*Brachirus hudsoni* (Jordan & Evermann, 1900): Struhsaker (1973a).

*Dendrochirus barberi* (Steindachner, 1900a): Jordan & Evermann (1904a), Gilbert (1905), Jordan & Evermann (1905), Hobson (1974), Eschmeyer & Randall (1975), Tinker (1982), Humphreys *et al.* (1984), Randall *et al.* (1985a, 1993b), Randall (1985a, 1996a), Uchida & Uchiyama (1986), Hoover (1993, 2003).

TAXONOMY: Eschmeyer & Randall (1975).

COMMON NAMES: Nohu (Hoover, 1993, 2003), Hawaiian lionfish (AFS; Randall, 1996a), Green lionfish (Hoover, 1993, 2003).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to Kure Atoll and Bank 8 at 1–134 m (Steindachner, 1900a; Jordan & Evermann, 1905; Gilbert, 1905; Hobson, 1974; Eschmeyer & Randall, 1975; Humphreys *et al.*, 1984; Randall *et al.*, 1985b, 1993b; Randall, 1985a; Uchida & Uchiyama, 1986).

GENERAL RANGE: Hawaiian Islands and Johnston Atoll endemic. Benthic in crevices and caves during day, or occasionally benthopelagic at night, at 1–134 m (Gilbert, 1905; Eschmeyer & Randall, 1975; Randall *et al.*, 1985b; Randall, 1985a).

*Ectreposebastes imus* Garman

*Ectreposebastes imus* Garman, 1899, p. 53, Pls. 8, 9, 71 (fig. 1), Galapagos Islands at 0°58'30"S, 89°17'W.

*Ectreposebastes imus* Garman, 1899: Eschmeyer (1969), Struhsaker (1973a), Eschmeyer & Randall (1975), Randall (1976a), Tinker (1982), Kanayama *in* Okamura *et al.* (1982), Amaoka *in* Masuda *et al.* (1984), Yatou *in* Okamura (1985), Eschmeyer *in* Smith & Heemstra (1986), Paxton *et al.* (1989), Eschmeyer & Dempster *in* Quéro *et al.* (1990), Reid *et al.* (1991), Chave & Mundy (1994).

TAXONOMY: Eschmeyer & Randall (1975).

COMMON NAMES: Black scorpionfish (FAO).

HAWAIIAN RECORDS: Maui to O‘ahu at 200–775 m (Eschmeyer, 1969; Struhsaker, 1973a; Eschmeyer & Randall, 1975; Reid *et al.*, 1991; Chave & Mundy, 1994).

GENERAL RANGE: Circumglobal in the tropical and subtropical Atlantic, Indian, and Pacific oceans; in the Pacific from Japan, New Caledonia, Australia, the Line Islands, the Hawaiian Islands, the Marquesas, the Galapagos Islands, and off Peru. Benthopelagic at 150–2000 m, usually at 500–850 m (Eschmeyer & Randall, 1975; Kanayama *in* Okamura *et al.*, 1982; Amaoka *in* Masuda *et al.*, 1984; Yatou *in* Okamura *et al.*, 1985; Eschmeyer *in* Smith & Heemstra, 1986; Paxton *et al.*, 1989; Eschmeyer & Dempster *in* Quéro *et al.*, 1990; Reid *et al.*, 1991; Chave & Mundy, 1994).

[*Helicolenus avius* Abe & Eschmeyer]

*Helicolenus avius* Abe & Eschmeyer, 1972, p. 49, Figs. 1–2, southern Emperor Seamounts, central North Pacific, between 32°40'N, 172°17'E and 35°05'N, 171°46'E.

*Helicolenus avius* Abe & Eschmeyer, 1972: Abe & Eschmeyer (1972), Fedorov *et al.* (1975), Iwai (1976), Novikov *et al.* (1981), Kanayama (1981), Humphreys *et al.* (1984), Shimizu *in* Masuda *et al.* (1984), Borets (1986).

TAXONOMY: Abe & Eschmeyer (1972), Kanayama (1981).

HAWAIIAN RECORDS: None but *H. avius* has been taken just to the north of the Hancock Seamounts at the Milwaukee and Koko seamounts at 290–400 m (Fedorov *et al.*, 1975; Kanayama, 1981; Humphreys *et al.*, 1984; Borets, 1986). At least one species of *Helicolenus* occurs at the Hancock Seamounts but its identity has not been determined (R. Humphreys, pers. comm., March 1995).

GENERAL RANGE: Emperor Seamounts and northern Hawaiian Ridge endemic. Benthic and eurybenthic at 290–1200 m (Abe & Eschmeyer, 1972; Iwai, 1976; Kanayama, 1981; Shimizu *in* Masuda *et al.*, 1984; Borets, 1986).

[*Helicolenus fedorovi* Barsukov]

*Helicolenus fedorovi* Barsukov, 1973, p. 195, Fig., Kinmei [Koko] Seamount, central North Pacific, at 35°26'05"N, 171°16'05"E.

*Helicolenus fedorovi* Barsukov, 1973: Barsukov (1973), Novikov *et al.* (1981), Kanayama (1981), Barsukov & Borets (1983), Humphreys *et al.* (1984), Amaoka *in* Masuda *et al.* (1984), Yatou *in* Okamura (1985), Borets (1986).

TAXONOMY: Kanayama (1981), Barsukov & Borets (1983).

HAWAIIAN RECORDS: None but records from the Colahan Koko seamounts at 300–550 m (Barsukov, 1973; Barsukov & Borets, 1983; Borets, 1986) suggest that this species occurs at the Hancock Seamounts.

GENERAL RANGE: Pacific endemic known from the Okinawa Trough, Emperor Seamounts, and northern Hawaiian Ridge. Benthic and benthopelagic at 270–650 m (Kanayama, 1981; Humphreys *et al.*, 1984; Amaoka *in* Masuda *et al.*, 1984; Yatou *in* Okamura *et al.*, 1985; Borets, 1986).

[*Helicolenus* sp.]

*Helicolenus* sp.: Kanayama (1981), Humphreys *et al.* (1984), Borets (1986)?

TAXONOMY: The species identity of Kanayama's (1981) *Helicolenus* sp. has never been determined.

HAWAIIAN RECORDS: A *Helicolenus* sp. recorded from Koko Seamount at 380 m was not identified to species but was described as distinct from *H. avius* Abe & Eschmeyer, 1972, and *H. fedorovi* Barsukov, 1973, and most similar to *H. hilgendorfi* (Döderlein, 1884) from Japan (Kanayama, 1981; Humphreys *et al.*, 1984).

GENERAL RANGE: Emperor Seamounts endemic known only from Koko Seamount. Benthic at 380 m (Kanayama, 1981; Borets, 1986).

***Hozukius guyotensis* Barsukov & Fedorov**

*Hozukius guyotensis* Barsukov & Fedorov, 1975, p. 976, Fig., Lyra Guyots, central North Pacific, at 36°49'N, 171°26'W.

*Hozukius guyotensis* Barsukov & Fedorov, 1975: Kanayama (1981), Humphreys *et al.* (1984), Amaoka *in* Masuda *et al.* (1984), Borets (1986).

TAXONOMY: Kanayama (1981).

HAWAIIAN RECORDS: The Hancock Seamounts (R. Humphreys, pers. comm. March 1995); also from the Milwaukee, and Koko seamounts at 540–1100 m (Kanayama, 1981; Humphreys *et al.*, 1984).

GENERAL RANGE: Emperor Seamounts endemic. Benthic at 420–1200 m (Kanayama 1981, Amaoka *in* Masuda *et al.*, 1984; Borets, 1986).

***Iracundus signifer*** Jordan & Evermann

*Iracundus signifer* Jordan & Evermann, 1903b, p. 210, Honolulu, O'ahu, Hawaiian Islands.

*Iracundus signifer* Jordan & Evermann, 1903b: Jordan & Evermann (1903b, 1905), Jordan & Snyder (1904b), Fowler (1928, 1949), Gosline & Brock (1960), Struhsaker (1973a), Eschmeyer & Randall (1975), Tinker (1982), Kishimoto *in* Masuda *et al.* (1984), Randall (1985a, 1996a), Uchida & Uchiyama (1986), Eschmeyer *in* Smith & Heemstra (1986), Hoover (1994, 2003).

TAXONOMY: Eschmeyer & Randall (1975).

COMMON NAMES: Nohu (Hoover, 1994, 2003), Decoy scorpionfish (AFS; FAO; Hoover, 1994, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Hawai'i Island to Maro Reef at 9–110 m (Jordan & Evermann, 1903b, 1905; Struhsaker, 1973a; Eschmeyer & Randall, 1975; Uchida & Uchiyama, 1986; Hoover, 1994).

GENERAL RANGE: Indo-Pacific from east Africa and Mauritius to southern Japan, Taiwan, the Hawaiian Islands, the Cook Islands, and the Pitcairn Group. Benthic on reefs, rock, and sand near rock or reefs at 9–110 m (Eschmeyer & Randall, 1975; Kishimoto *in* Masuda *et al.*, 1984; Randall, 1985a; Eschmeyer *in* Smith & Heemstra, 1986).

***Neomerinthe rufescens*** (Gilbert)

*Helicolenus rufescens* Gilbert, 1905, p. 631, Fig. 246, vicinity of Kaua'i, Hawaiian Islands.

*Helicolenus rufescens* Gilbert, 1905: Gilbert (1905), Fowler (1928), Gosline & Brock (1960).

*Neomerinthe rufescens* (Gilbert, 1905): Struhsaker (1973a), Eschmeyer & Randall (1975), Tinker (1982), Grigg *et al.* (1987), Chave & Mundy (1994).

TAXONOMY: Eschmeyer & Randall (1975).

HAWAIIAN RECORDS: Johnston Atoll, Cross Seamount, and Hawai'i Island to Kaua'i at 75–420 m (Gilbert, 1905; Struhsaker, 1973a; Eschmeyer & Randall, 1975; Grigg *et al.*, 1987; Chave & Mundy, 1994).

GENERAL RANGE: Hawaiian Islands and Johnston Atoll endemic. Benthic at 75–420 m (Eschmeyer & Randall, 1975; Grigg *et al.*, 1987; Chave & Mundy, 1994).

***Phenacoscorpius megalops*** Fowler

*Phenacoscorpius megalops* Fowler, 1938a, p. 70, Fig. 30, Bagatao Island Light between Burias and Luzon, Philippines.

*Phenacoscorpius megalops* Fowler, 1938a: Eschmeyer & Randall (1975), Tinker (1982).

TAXONOMY: Eschmeyer & Randall (1975).

COMMON NAMES: Noline scorpionfish (FAO).

HAWAIIAN RECORDS: O'ahu at 366 m (Eschmeyer & Randall, 1975).

GENERAL RANGE: Eastern Indian Ocean and Pacific from Indonesia and the Philippines to the Hawaiian Islands. Benthic, perhaps associated with pink coral, at 68–622 m (Eschmeyer & Randall, 1975).

***Plectrogenium nanum*** Gilbert

*Plectrogenium nanum* Gilbert, 1905, p. 634, Fig. 248, off the northern coast of Moloka'i, Hawaiian Islands.

*Plectrogenium nanum* Gilbert, 1905: Gilbert (1905), Fowler (1928, 1949), Gosline & Brock (1960), Clarke (1972), Struhsaker (1973a), Eschmeyer & Randall (1975), Tinker (1982), Kanayama *in* Okamura *et al.* (1982), Amaoka *in* Masuda *et al.* (1984), Mandritsa (1992).

TAXONOMY: Eschmeyer & Randall (1975), Mandritsa (1992).

COMMON NAMES: Dwarf thornyhead (FAO).

HAWAIIAN RECORDS: Hawai'i Island to Laysan at 262–642 m (Gilbert, 1905; Struhsaker, 1973a; Eschmeyer & Randall, 1975).

GENERAL RANGE: Indo-Pacific from Madagascar, Japan, the Kyushu-Palau Ridge, and the Hawaiian Islands. Benthic at 250–650 m (Kanayama *in* Okamura *et al.*, 1982; Amaoka *in* Masuda *et al.*, 1984; Mandritsa, 1992).



***Pontinus macrocephalus*** (Sauvage)

*Sebastes macrocephalus* Sauvage, 1882, p. 169, “Hawaiian Islands”.

*Sebastes macrocephalus* Sauvage, 1882: Sauvage (1882).

*Merinthe macrocephala* (Sauvage, 1882): Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1931, 1949), Gosline & Brock (1960).

*Pontinus spilistius* Gilbert, 1905: Gilbert (1905), Fowler (1928, 1934, 1949), Gosline & Brock (1960).

*Pontinus macrocephalus* (Sauvage, 1882): Clarke (1972), Struhsaker (1973a), Eschmeyer & Randall (1975), Tinker (1982), Humphreys *et al.* (1984), Shimizu *in* Masuda *et al.* (1984), Randall *et al.* (1985a, 1997a), Uchida & Uchiyama (1986), Myers (1989), Chave & Mundy (1994), Myers & Donaldson (1997).

**TAXONOMY:** Eschmeyer & Randall (1975), but the taxonomic status of the populations recently identified as this species needs further study (Myers & Donaldson, 1997). Regardless of the identification of populations from other regions, it seems likely that *P. macrocephalus* will remain as the identity of the Hawaiian Islands population because of the early date of the species’ description.

**COMMON NAMES:** O’opu-kai-nohu (Gosline & Brock, 1960), Hogo.

**HAWAIIAN RECORDS:** Johnston Atoll and Hawai’i Island to Kure Atoll at 120–367 m (Sauvage, 1882; Jordan & Evermann, 1905; Gilbert, 1905; Clarke, 1972; Struhsaker, 1973a; Eschmeyer & Randall, 1975; Humphreys *et al.*, 1984; Randall *et al.*, 1985b; Uchida & Uchiyama, 1986; Chave & Mundy, 1994).

**GENERAL RANGE:** Pacific endemic known from southern Japan, the Ogasawara Islands, Micronesia, Samoa, Johnston Atoll, and the Hawaiian Islands. Benthic at 120–367 m (Eschmeyer & Randall, 1975; Shimizu *in* Masuda *et al.*, 1984; Wass, 1984; Myers, 1989; Chave & Mundy, 1994; Myers & Donaldson, 1997; Randall *et al.*, 1997b). Indian Ocean records of this species are probably misidentifications (Winterbottom *et al.*, 1989).

***Pterois sphex*** Jordan & Evermann

*Pterois sphex* Jordan & Evermann, 1903a, p. 201, Honolulu, O’ahu, Hawaiian Islands.

*Pteropterus sphex* (Jordan & Evermann, 1903): Mandritsa (2002a).

*Pterois sphex* Jordan & Evermann, 1903a: Jordan & Evermann (1903a, 1905), Fowler (1928), Gosline & Brock (1960), Hobson (1972), Struhsaker (1973a), Eschmeyer & Randall (1975), Tinker (1982), Okamoto & Kanenaka (1984), Randall (1985a, 1996a), Uchida & Uchiyama (1986), Hoover (1993), Randall *et al.* (1993b), Chave & Mundy (1994).

**TAXONOMY:** Eschmeyer & Randall (1975). In a recent reclassification the scorpaenoids, Mandritsa placed this species and three others in the genus *Pteropterus* Swainson, 1839 [*vide* Mandritsa (2002a), who described a fifth species in the genus].

**COMMON NAMES:** Nohu pinao (Hoover, 1993, 2003; Randall, 1996a), Hawaiian turkeyfish (AFS; Randall, 1996a; Hoover, 2003), Hawaiian lionfish (Hoover, 1993, 2003).

**HAWAIIAN RECORDS:** Hawai’i Island to Kure Atoll at 3–124 m (Jordan & Evermann, 1903a, 1905; Hobson, 1972; Struhsaker, 1973a; Okamoto & Kanenaka, 1984; Uchida & Uchiyama, 1986; Randall *et al.*, 1993b; Chave & Mundy, 1994).

**GENERAL RANGE:** Hawaiian Islands endemic. Benthic on rocky and coral reefs, under ledges and in caves during day, at 3–124 m (Eschmeyer & Randall, 1975; Randall, 1985a; Chave & Mundy, 1994).

***Rhinopias xenops*** (Gilbert)

*Peloropsis xenops* Gilbert, 1905, p. 630, Fig. 245, Avau Channel between Maui and Lāna’i, Hawaiian Islands.

*Peloropsis xenops* Gilbert, 1905: Gilbert (1905), Fowler (1928), Gosline & Brock (1960).

*Rhinopias xenops* (Gilbert, 1905): Struhsaker (1973a), Eschmeyer & Randall (1975), Tinker (1982), Shimizu *in* Masuda *et al.* (1984), Uchida & Uchiyama (1986), Randall (2001a), Mandritsa (2002b).

**TAXONOMY:** Eschmeyer & Randall (1975).

**HAWAIIAN RECORDS:** Maui to Midway at 36–124 m (Gilbert, 1905; Struhsaker, 1973a; Uchida & Uchiyama, 1986; Randall, 2001).

**GENERAL RANGE:** Northwestern and central Pacific endemic known from Japan and the Hawaiian Islands. Benthic on rocks or coral at 36–124 m (Eschmeyer & Randall, 1975; Shimizu *in* Masuda *et al.*, 1984; Uchida & Uchiyama, 1986). Mandritsa (2002b) recorded *R. xenops* from the Seychelles and the Coral Sea at 30–75 m. If those specimens are identified correctly, the species has an Indo-Pacific distribution.

*[Scorpaena asperella* Bennett]

*Scorpaena asperella* Bennett, 1828, p. 40, "Hawaiian Islands"?

*Sebastapistes asperella* (Bennett, 1829): Jordan & Evermann (1905), Fowler (1928, 1931, 1949).

*Scorpaena asperella* Bennett, 1829: Bennett (1829), Eschmeyer & Randall (1975).

TAXONOMY: Eschmeyer & Randall (1975).

HAWAIIAN RECORDS: This species, described with the Hawaiian Islands as the type locality, is not identifiable and the collection locality may have been mislabeled (Eschmeyer & Randall, 1975). Fowler (1928) argued that this is a senior synonym of *Sebastapistes ballieui* (Sauvage, 1875). It is not regarded as a valid species in this checklist. Pietschmann's (1938) report of *Sebastapistes asperella* was based upon a specimen of *Scorpaenopsis brevifrons* Eschmeyer & Randall, 1975 (see Randall & Eschmeyer, 2002).

GENERAL RANGE: A *nomen dubium* with no general range.

*Scorpaena colorata* (Gilbert)

*Sebastapistes coloratus* Gilbert, 1905, p. 627, Fig. 243, south of Moloka'i, Hawaiian Islands.

*Sebastapistes coloratus* Gilbert, 1905: Gilbert (1905), Struhsaker (1973a).

*Sebastapistes bynoensis* non (Richardson, 1845) [a valid species not found in the Hawaiian Islands]: Fowler (1928, in part).

*Scorpaena coloratus* (Gilbert, 1905): Gosline & Brock (1960).

*Scorpaena colorata* (Gilbert, 1905): Eschmeyer & Randall (1975), Tinker (1982), Randall *et al.* (1985a), Uchida & Uchiyama (1986), Borets (1986).

TAXONOMY: Eschmeyer & Randall (1975).

HAWAIIAN RECORDS: Johnston Atoll and Moloka'i to Bank 11 at 79–272 m (Gilbert, 1905; Struhsaker, 1973a; Eschmeyer & Randall, 1975; Randall *et al.*, 1985b; Uchida & Uchiyama, 1986; Borets, 1986).

GENERAL RANGE: Hawaiian Islands and Johnston Atoll endemic. Benthic at 79–272 m (Eschmeyer & Randall, 1975).

*Scorpaena pele* Eschmeyer & Randall

*Scorpaena pele* Eschmeyer & Randall, 1975, p. 320, Figs. 24, 25a, north coast of O'ahu, Hawaiian Islands.

*Scorpaena* sp.: Struhsaker (1973a).

*Scorpaena pele* Eschmeyer & Randall, 1975: Eschmeyer & Randall (1975), Tinker (1982).

TAXONOMY: Eschmeyer & Randall (1975).

HAWAIIAN RECORDS: Maui to O'ahu at 176–243 m (Struhsaker, 1973a; Eschmeyer & Randall, 1975).

GENERAL RANGE: Hawaiian Islands endemic. Benthic at 176–243 m (Eschmeyer & Randall, 1975).

*Scorpaenodes corallinus* Smith

*Scorpaenodes corallinus* Smith, 1957, p. 64, Pl. 3 (fig. E), Fig. 5, Baixo Pinda, Mozambique.

*Scorpaenodes corallinus* Smith, 1957: Eschmeyer & Randall (1975), Tinker (1982).

TAXONOMY: Eschmeyer & Randall (1975).

HAWAIIAN RECORDS: Hawai'i Island to O'ahu at 8–18 m (Eschmeyer & Randall, 1975).

GENERAL RANGE: Indo-Pacific from east Africa to Indonesia, the Hawaiian Islands, and the Society Islands. Benthic in coral reefs at 2–18 m (Eschmeyer & Randall, 1975).

*Scorpaenodes hirsutus* (Smith)

*Parascorpaenodes hirsutus* Smith, 1957, p. 63, Pl. 1 (fig. E), Fig. 5, Bazaruto Island, Mozambique, at 21°30'S, 35°30'E.

*Scorpaenodes hirsutus* (Smith, 1957): Eschmeyer & Randall (1975), Tinker (1982), Eschmeyer *in* Smith & Heemstra (1986), Myers (1989), Winterbottom *et al.* (1989), Paxton *et al.* (1989), Randall *et al.* (1990a, 1993b), Kosaki *et al.* (1991).

TAXONOMY: Eschmeyer & Randall (1975).

COMMON NAMES: Hairy scorpionfish (FAO; Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Johnston Atoll and O'ahu to Midway at 8–30 m (Eschmeyer & Randall, 1975; Kosaki *et al.*, 1991; Randall *et al.*, 1993b).

GENERAL RANGE: Indo-Pacific from east Africa and the Red Sea to the Ryukyus, Taiwan, Australia, Micronesia, the Hawaiian Islands, and Pitcairn Island. Benthic in coral reefs at 1–40 m (Eschmeyer & Randall, 1975; Eschmeyer *in* Smith & Heemstra, 1986; Myers, 1989; Winterbottom *et al.*, 1989; Paxton *et al.*, 1989; Randall *et al.*, 1990a; Kosaki *et al.*, 1991).

***Scorpaenodes kelloggi* (Jenkins)**

*Sebastopsis kelloggi* Jenkins, 1903, p. 492, Fig. 37, Honolulu, O'ahu, Hawaiian Islands.

*Sebastopsis kelloggi* Jenkins, 1903: Jenkins (1903), Snyder (1904), Jordan & Evermann (1905).

*Scorpaenodes parvipinnis* non (Garrett, 1864) [a valid species also found in the Hawaiian Islands]: Gosline & Brock (1960, in part).

*Scorpaenodes kelloggi* (Jenkins, 1903): Fowler (1928, 1934, 1949), Eschmeyer & Randall (1975), Tinker (1982), Shimizu *in* Masuda *et al.* (1984), Randall *et al.* (1985a, 1993b), Eschmeyer *in* Smith & Heemstra (1986), Myers (1989), Winterbottom *et al.* (1989), Randall (1996a).

TAXONOMY: Eschmeyer & Randall (1975).

COMMON NAMES: Dwarf scorpionfish (FAO), Kellogg's scorpionfish (Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at 6–24 m (Jenkins, 1903; Jordan & Evermann, 1905; Eschmeyer & Randall, 1975; Randall *et al.*, 1985b, 1993b).

GENERAL RANGE: Indo-Pacific from east Africa to southern Japan, Taiwan, Micronesia, the Line Islands, the Hawaiian Islands, and the Society Islands. Benthic in coral reefs from 6–24 m (Eschmeyer & Randall, 1975; Shimizu *in* Masuda *et al.*, 1984; Eschmeyer *in* Smith & Heemstra, 1986; Myers, 1989; Winterbottom *et al.*, 1989).

***Scorpaenodes littoralis* (Tanaka)**

*Sebastella littoralis* Tanaka, 1917, p. 10, Misaki, Japan.

*Sebastopsis guamensis* non (Quoy & Gaimard, 1824) [a valid species that does not occur in the Hawaiian Islands]: Fowler (1900).

*Scorpaenodes guamensis* non (Quoy & Gaimard, 1824): Gosline & Brock (1960).

*Scorpaenodes littoralis* (Tanaka, 1917): Eschmeyer & Randall (1975), Tinker (1982), Shimizu *in* Masuda *et al.* (1984), Uchida & Uchiyama (1986), Eschmeyer *in* Smith & Heemstra (1986), Paxton *et al.* (1989), Randall *et al.* (1993b, 1997a), Randall (1996a).

TAXONOMY: Eschmeyer & Randall (1975).

COMMON NAMES: Cheekspot scorpionfish (FAO; Randall, 1996a), Shore scorpionfish (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: O'ahu to Midway at 21–104 m (Gosline & Brock, 1960; Eschmeyer & Randall, 1975; Uchida & Uchiyama, 1986; Randall *et al.*, 1993b).

GENERAL RANGE: Indo-Pacific from east Africa to southern Japan, the Ogasawara Islands, Australia, Taiwan, the Hawaiian Islands, Rapa, and the Marquesas. Benthic in caves and crevices of rocky and coral reefs at 21–104 m (Eschmeyer & Randall, 1975; Shimizu *in* Masuda *et al.*, 1984; Eschmeyer *in* Smith & Heemstra, 1986; Uchida & Uchiyama, 1986; Paxton *et al.*, 1989; Randall *et al.*, 1997b).

***Scorpaenodes parvipinnis* (Garrett)**

*Scorpaena parvipinnis* Garrett, 1864, p. 105, "Hawaiian Islands".

*Scorpaena parvipinnis* Garrett, 1864: Garrett (1864).

*Sebastopsis parvipinnis* (Garrett, 1864): Snyder (1904), Jordan & Evermann (1905).

*Scorpaenodes parvipinnis* (Garrett, 1864): Fowler (1928, 1949), Gosline & Brock (1960, in part), Hobson (1972), Eschmeyer & Randall (1975), Tinker (1982), Shimizu *in* Masuda *et al.* (1984), Randall (1985a, 1996a), Randall *et al.* (1985a, 1990a), Eschmeyer *in* Smith & Heemstra (1986), Myers (1989), Winterbottom *et al.* (1989), Paxton *et al.* (1989).

TAXONOMY: Eschmeyer & Randall (1975).

COMMON NAMES: Lowfin scorpionfish (AFS; Randall, 1996a), Coral scorpionfish (FAO), Shortfinned scorpionfish (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to O'ahu at 1–45 m (Garrett, 1864; Jordan & Evermann, 1905; Hobson, 1972; Eschmeyer & Randall, 1975; Randall *et al.*, 1985b).

GENERAL RANGE: Indo-Pacific from east Africa and the Red Sea to the Ryukyus, Australia, Lord Howe Island, Micronesia, the Hawaiian Islands, and the Marquesas. Benthic in coral at 1–49 m (Eschmeyer & Randall, 1975; Shimizu *in* Masuda *et al.*, 1984; Randall, 1985a; Eschmeyer *in* Smith & Heemstra, 1986; Myers, 1989; Winterbottom *et al.*, 1989; Paxton *et al.*, 1989; Randall *et al.*, 1990a).

[*Scorpaenodes* sp.]

*Scorpaenodes* sp.: Randall *et al.* (1985a).

TAXONOMY: Randall *et al.* (1985b).

HAWAIIAN RECORDS: The *Scorpaenodes* sp. recorded by Randall *et al.* (1985b) from Johnston Atoll at 220 m was not identified.

GENERAL RANGE: Unknown.

### *Scorpaenopsis altirostris* Gilbert

*Scorpaenopsis altirostris* Gilbert, 1905, p. 628, Fig. 244, off the south coast of Moloka'i, Hawaiian Islands.

*Scorpaenopsis altirostris* Gilbert, 1905; Gilbert (1905), Gosline & Brock (1960), Eschmeyer & Randall (1975), Tinker (1982), Chave & Mundy (1994), Randall & Eschmeyer (2002).

TAXONOMY: Eschmeyer & Randall (1975), Randall & Eschmeyer (2002).

HAWAIIAN RECORDS: Hawai'i Island to Moloka'i at 79–190 m (Gilbert, 1905; Eschmeyer & Randall, 1975; Chave & Mundy, 1994; Randall & Eschmeyer, 2002).

GENERAL RANGE: Hawaiian Islands endemic. Benthic at 79–190 m (Eschmeyer & Randall, 1975; Chave & Mundy, 1994; Randall & Eschmeyer, 2002).

### *Scorpaenopsis brevifrons* Eschmeyer & Randall

*Scorpaenopsis brevifrons* Eschmeyer & Randall, 1975, p. 299, Figs. 14–15, Kāne'ohe Bay, O'ahu, Hawaiian Islands.

*Sebastapistes asperella* non (Bennett, 1829): Pietschmann (1938).

*Scorpaenopsis brevifrons* Eschmeyer & Randall, 1975; Eschmeyer & Randall (1975), Tinker (1982), Randall (1985a, 1992b, 1996a), Eschmeyer *in* Smith & Heemstra (1986), Randall *et al.* (1993b, 1997a), Randall & Eschmeyer (2002).

TAXONOMY: Eschmeyer & Randall (1975). Accounts of this species from areas other than the Hawaiian Islands were based upon other, similar species (Randall & Eschmeyer, 2001).

COMMON NAMES: Bigmouth scorpionfish (FAO), Shortnose scorpionfish (Randall, 1996a).

HAWAIIAN RECORDS: Hawai'i Island to Midway at 1–38 m (Eschmeyer & Randall, 1975; Randall *et al.*, 1993b; Randall & Eschmeyer, 2002).

GENERAL RANGE: Hawaiian Islands endemic. Benthic on coral or rocks at 1–35 m (Eschmeyer & Randall, 1975; Randall, 1992b; Randall *et al.*, 1997b; Randall & Eschmeyer, 2002).

### *Scorpaenopsis cacopsis* Jenkins

*Scorpaenopsis cacopsis* Jenkins, 1901b, p. 401, Figs. 13–14, Honolulu, O'ahu, Hawaiian Islands.

*Scorpaena cookii* non Günther, 1873 [a valid species not found in the Hawaiian Islands]: Günther (1873–1910b, in part).

*Scorpaenopsis cacopsis* Jenkins, 1901b; Jenkins (1901, 1903), Jordan & Evermann (1905), Fowler (1928, 1949), Gosline & Brock (1960), Hobson (1972), Eschmeyer & Randall (1975), Tinker (1982), Okamoto & Kanenaka (1984), Randall (1985a, 1996a), Hoover (1993, 2003), Randall *et al.* (1993b), Randall & Eschmeyer (2002).

TAXONOMY: Eschmeyer & Randall (1975), Randall & Eschmeyer (2002).

COMMON NAMES: Nohu (Hoover, 1993, 2003; Randall, 1996a), Titan scorpionfish (Hoover, 1993, 2003; Randall, 1996a), Uglyface scorpionfish (Hoover, 1993), Hogo (DLNR).

HAWAIIAN RECORDS: Hawai'i Island to Kure Atoll at 4–61 m (Günther, 1873–1910; Jordan & Evermann, 1905; Hobson, 1972; Eschmeyer & Randall, 1975; Okamoto & Kanenaka, 1984; Randall, 1985a; Randall *et al.*, 1993b; Randall & Eschmeyer, 2002).

GENERAL RANGE: Hawaiian Islands endemic. Benthic on reefs at 4–61 m (Eschmeyer & Randall, 1975; Randall, 1985a; Randall & Eschmeyer, 2002).

***Scorpaenopsis diabolus*** (Cuvier)

*Scorpaena diabolus* Cuvier, 1829, p. 166, New Guinea.

*Scorpaenopsis diabolus* (Cuvier, 1829) [*lapsus* for *Scorpaenopsis*]: Fowler (1900).

*Scorpaena gibbosa* non Bloch & Schneider, 1801 [a valid Indian Ocean *Scorpaenopsis* species]: Steindachner (1900).

*Scorpaena catocala* Jordan & Evermann, 1903: Jordan & Evermann (1903a).

*Scorpaenopsis catocala* (Jordan & Evermann, 1903): Jordan & Snyder (1904a).

*Scorpaenopsis gibbosa* non (Bloch & Schneider, 1801): Jordan & Evermann (1905), Gosline & Brock (1960).

*Scorpaenopsis gibbosus* non (Bloch & Schneider, 1801): Fowler (1928, 1931, 1934, 1949, in part).

*Scorpaenopsis diabolus* (Cuvier, 1829): Eschmeyer & Randall (1975), Tinker (1982), Shimizu *in Masuda et al.* (1984), Randall (1985a, 1996a), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Uchida & Uchiyama (1986), Eschmeyer *in* Smith & Heemstra (1986), Myers (1989), Winterbottom *et al.* (1989), Paxton *et al.* (1989), Hoover (1993, 2003), Randall & Eschmeyer (2001).

TAXONOMY: Eschmeyer & Randall (1975), Randall & Eschmeyer (2002).

COMMON NAMES: Nohu-‘omakaha (Hoover, 1993, 2003; Randall, 1996a), False stonefish (FAO; Randall *et al.*, 1997a), Devil scorpionfish (Hoover, 1993, 2003; Randall, 1996a), Hogo (DLNR), Common scorpion (DLNR).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to Midway at 1–55 m (Fowler, 1900; Jordan & Evermann, 1905; Eschmeyer & Randall, 1975; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986).

GENERAL RANGE: Indo-Pacific from east Africa and the Red Sea to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Line Islands, the Hawaiian Islands, the Society Islands, and the Marquesas. Benthic on or near coral, rock, or rubble bottoms at 1–70 m (Eschmeyer & Randall, 1975; Shimizu *in* Masuda *et al.*, 1984; Uchida & Uchiyama, 1986; Eschmeyer *in* Smith & Heemstra, 1986; Myers, 1989; Winterbottom *et al.*, 1989; Paxton *et al.*, 1989; Randall *et al.*, 1990a, 1997b; Randall & Eschmeyer, 2002).

***Scorpaenopsis pluralis*** Randall & Eschmeyer

*Scorpaenopsis pluralis* Randall & Eschmeyer, 2002, p. 50, Fig. 12, Laysan, Hawaiian Islands.

*Scorpaenopsis pluralis* Randall & Eschmeyer, 2002: Randall & Eschmeyer (2002).

TAXONOMY: Randall & Eschmeyer (2002).

HAWAIIAN RECORDS: Laysan at 100 m (Randall & Eschmeyer, 2002).

GENERAL RANGE: Hawaiian Islands endemic known only from the holotype. Benthic at 110 m (Randall & Eschmeyer, 2002).

***Sebastapistes ballieui*** (Sauvage)

*Scorpoena ballieui* Sauvage *in* Vaillant & Sauvage, 1875, p. 278, “Hawaiian Islands” [generic spelling in original description is a *lapsus* for *Scorpaena*].

*Scorpoena ballieui* Sauvage, 1875: Sauvage *in* Vaillant & Sauvage (1875).

*Scorpaena ballieui* Sauvage, 1875: Gosline & Brock (1960), Hobson (1972), Eschmeyer & Randall (1975), Iwai (1976)?, Tinker (1982).

*Sebastapistes corallicola* Jenkins, 1903: Jenkins (1903), Jordan & Evermann (1905).

*Sebastapistes albobrunneus* non (Günther, 1874) [a junior synonym of *S. cyanostigma* (Bleeker, 1856), a valid species not found in the Hawaiian Islands]: Fowler (1928, 1949, in part).

*Sebastapistes nuchalis* non (Günther, 1874) [a junior synonym of *S. strongia* (Cuvier, 1829), a valid species not found in the Hawaiian Islands]: Fowler (1928, 1949, in part).

*Sebastapistes asperella* non (Bennett, 1828) [a species of uncertain status]: Fowler (1928, 1931, 1949).

*Sebastapistes ballieui* (Sauvage, 1875): Jordan & Evermann (1905), Randall (1985a, 1996a), Randall *et al.* (1985a, 1993b), Myers (1989), Hoover (1993, 2003).

TAXONOMY: Randall (1985a).

COMMON NAMES: Poopa‘a, Spotfin scorpionfish (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to Midway at 1–11 m (Sauvage *in* Vaillant & Sauvage, 1875; Jordan & Evermann, 1905; Hobson, 1972; Eschmeyer & Randall, 1975; Randall *et al.*, 1985b, 1993b). The specimen from 77 m in the region of the Hawaiian Ridge that Iwai (1976) tentatively identified as *S. ballieui* is probably not this species but its correct identity was not ascertained.

GENERAL RANGE: Hawaiian Islands and Johnston Atoll endemic. Records from Wake Island are based on specimens with erroneous collection labels (J.E. Randall, pers. comm., Jan. 2003). Benthic in or near coral at 1–11 m (Eschmeyer & Randall, 1975; Randall, 1985a; Myers, 1989).

***Sebastapistes coniatora* Jenkins**

*Sebastapistes coniatora* Jenkins, 1903, p. 495, Fig. 39, Honolulu, O'ahu, Hawaiian Islands.

*Sebastapistes strongia* non (Cuvier, 1829) [a valid species not found in the Hawaiian Islands]: Streets (1877).

*Sebastapistes strongia* non (Cuvier, 1829): Fowler (1900).

*Sebastapistes albobruneus* non (Günther, 1874) [a junior synonym of *Sebastapistes cyanostigma* (Bleeker, 1856), a valid species not found in the Hawaiian Islands]: Fowler (1928, 1934, 1949, in part).

*Scorpaena coniatora* (Jenkins, 1903): Gosline & Brock (1960), Hobson (1972), Eschmeyer & Randall (1975), Tinker (1982).

*Sebastapistes coniatora* Jenkins, 1903: Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Randall (1985a, 1996a), Randall *et al.* (1985a, 1993b), Uchida & Uchiyama (1986), Hoover (1993, 2003).

TAXONOMY: Randall (1985a, 1996a).

COMMON NAMES: Speckled scorpionfish (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at 1–33 m (Streets, 1877a; Hobson, 1972; Eschmeyer & Randall, 1975; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986).

GENERAL RANGE: Central Pacific endemic from Wake Island, the Hawaiian Islands, Johnston Atoll, and the Line Islands. Benthic and inquiline in the coral *Pocillopora meandrina* Dana, 1846, during day at 1–33 m (Hobson, 1972; Eschmeyer & Randall, 1975; Randall, 1985a).

***Sebastapistes fowleri* (Pietschmann)**

*Scorpaena fowleri* Pietschmann, 1934a, p. 100, Makua, O'ahu, Hawaiian Islands.

*Scorpaena fowleri* Pietschmann, 1934a: Pietschmann (1934a).

*Scorpaenodes fowleri* (Pietschmann, 1934): Fowler (1949).

*Scorpaena ballieui* non (Sauvage, 1875) [a valid *Sebastapistes* species that also occurs in the Hawaiian Islands]: Gosline & Brock (1960, in part).

*Scorpaenopsis fowleri* (Pietschmann, 1934a): Eschmeyer & Randall (1975), Miller *et al.* (1979), Tinker (1982), Myers (1989), Winterbottom *et al.* (1989), Kosaki *et al.* (1991), Randall (1996a), Randall *et al.* (1997a).

*Sebastapistes fowleri* (Pietschmann, 1934a): Randall & Poss (2002).

TAXONOMY: Randall & Poss (2002).

COMMON NAMES: Fowler's scorpionfish (FAO), Dwarf scorpionfish (Randall, 1996a), Pygmy scorpionfish.

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to O'ahu at 14–30 m (Pietschmann, 1934a; Fowler, 1949; Eschmeyer & Randall, 1975; Kosaki *et al.*, 1991).

GENERAL RANGE: Indo-Pacific from the Comoro Islands and Mauritius to Indonesia, the Ogasawara Islands, Micronesia, the Hawaiian Islands, Samoa, French Polynesia, and Pitcairn Island. Benthic on sand, coral, or coral rubble at 3–61 m (Eschmeyer & Randall, 1975; Myers, 1989; Winterbottom, *et al.*, 1989; Kosaki *et al.*, 1991; Randall *et al.*, 1997b; Randall & Poss, 2002).

***Sebastapistes galactacma* Jenkins**

*Sebastapistes galactacma* Jenkins, 1903, p. 496, Fig. 40, Honolulu, O'ahu, Hawaiian Islands.

*Sebastapistes albobruneus* non (Günther, 1874) [a junior synonym of *Sebastapistes cyanostigma* (Bleeker, 1856), a valid species not found in the Hawaiian Islands]: Fowler (1928, 1931, 1949, in part).

*Scorpaena ballieui* non Sauvage, 1875 [a valid species also found in the Hawaiian Islands]: Gosline & Brock (1960, in part).

*Scorpaena galactacma* (Jenkins, 1903): Eschmeyer & Randall (1975), Tinker (1982).

*Sebastapistes galactacma* Jenkins, 1903: Jenkins (1903), Jordan & Evermann (1905), Randall (1985a), Myers (1989), Randall *et al.* (1993b, 1997a), Myers & Donaldson (1997).

TAXONOMY: Randall (1985a).

COMMON NAMES: Galactacma scorpionfish (FAO).

HAWAIIAN RECORDS: Maui to Midway at 8–64 m (Jenkins, 1903; Jordan & Evermann, 1905; Fowler, 1928; Eschmeyer & Randall, 1975; Randall *et al.*, 1993b).

GENERAL RANGE: Pacific endemic from the Ogasawara Islands, Micronesia, the Hawaiian Islands, and

Rapa. Benthic in coral and coral rubble at 6–64 m (Eschmeyer & Randall, 1975; Myers, 1989; Myers & Donaldson, 1997; Randall *et al.*, 1997b).

[*Sebastes flammeus* (Jordan & Starcks)]

*Sebastes flammeus* Jordan & Starcks, 1904a, p. 108, Fig. 21, Misaki, Japan.

*Sebastes flammeus* (Jordan & Starcks, 1904a): Humphreys *et al.* (1984)?, Amaoka *in* Masuda *et al.* (1984).

*Sebastes iracundus* (Jordan & Starcks, 1904a): Balanov *et al.* (2004).

TAXONOMY: Amaoka *in* Masuda *et al.* (1984).

HAWAIIAN RECORDS: None but *S. flammeus* has been reported from the Milwaukee and Koko seamounts (Humphreys *et al.*, 1984). This is far from the range otherwise known for this species (Amaoka *in* Masuda *et al.*, 1984) and these records may be misidentifications of *Sebastes iracundus* (Jordan & Starcks, 1904), which has been recorded at Jingu Seamount to the north of Koko Seamount (Borets, 1986). Balanov *et al.* (2004) argued that *Sebastes flammeus* is a junior synonym of *S. iracundus*, which would eliminate the question about which nominal species occurs in the Emperor Seamounts; however, the synonymy of the two species has yet to be generally accepted (<http://www.calacademy.org/research/ichthyology/catalog/fishcatmain.asp>, updated on 14 Jan. 2005, viewed 15 March 2005).

GENERAL RANGE: *Sebastes flammeus* is known only from Japan, where it is benthopelagic at 200–1000 m. *Sebastes iracundus* is known from Japan, the Kuril Islands, and the Emperor Seamounts, where it is benthopelagic at 400–1300 m (Kanayama, 1981; Kanayama *in* Amaoka *et al.*, 1983; Amaoka *in* Masuda *et al.*, 1984).

*Setarches guentheri* Johnson

*Setarches guentheri* Johnson, 1862, p. 177, Pl. 23, Madeira, eastern North Atlantic.

*Scorpaena remigera* Gilbert & Cramer, 1897: Gilbert & Cramer (1897).

*Setarches remiger* (Gilbert & Cramer, 1897): Gilbert (1905), Fowler (1928, 1949), Gosline & Brock (1960), Clarke (1972).

*Setarches* sp.: Novikov *et al.* (1981)?

*Setarches guentheri* Johnson, 1862: Struhsaker (1973a), Eschmeyer & Randall (1975), Tinker (1982), Kanayama *in* Okamura *et al.* (1982), Yatou *in* Okamura (1985), Uchida & Uchiyama (1986), Borets (1986), Eschmeyer *in* Smith & Heemstra (1986), Paxton *et al.* (1989), Eschmeyer & Dempster *in* Quéro *et al.* (1990), Parin (1991), Chave & Mundy (1994).

TAXONOMY: Eschmeyer & Randall (1975).

COMMON NAMES: Deepwater scorpionfish.

HAWAIIAN RECORDS: Cross Seamount and Hawai'i Island to Colahan Seamount at 177–780 m (Gilbert & Cramer, 1897; Gilbert, 1905; Struhsaker, 1973a; Eschmeyer & Randall, 1975; Uchida & Uchiyama, 1986; Borets, 1986; Chave & Mundy, 1994).

GENERAL RANGE: Circumglobal in the tropical and subtropical Atlantic, Indian, and Pacific oceans. Benthic and perhaps benthopelagic at 150–780 m, most common at ca. 400 m (Kanayama *in* Okamura *et al.*, 1982; Yatou *in* Okamura *et al.*, 1985; Eschmeyer *in* Smith & Heemstra, 1986; Paxton *et al.*, 1989; Eschmeyer & Dempster *in* Quéro *et al.*, 1990; Parin, 1991; Chave & Mundy, 1994).

*Taenianotus triacanthus* Lacépède

*Taenianotus triacanthus* Lacépède, 1802, p. 303, 306, no type locality given.

*Taenianotus garretti* Günther, 1873: Günther (1873–1910b), Jordan & Evermann (1905).

*Taenianotus citrinellus* Gilbert, 1905: Gilbert (1905).

*Taenianotus triacanthus* (Lacépède, 1802): Kuiter (1993).

*Taenianotus triacanthus* Lacépède, 1802: Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Hobson (1974), Eschmeyer & Randall (1975), Tinker (1982), Springer (1982), Nakabo *in* Masuda *et al.* (1984), Randall (1985a, 1996a), Eschmeyer *in* Smith & Heemstra (1986), Myers (1989), Winterbottom *et al.* (1989), Paxton *et al.* (1989), Randall *et al.* (1990a, 1993b), Hoover (1993, 2003), Robertson & Allen (2002).

TAXONOMY: Eschmeyer & Randall (1975).

COMMON NAMES: Leaf Scorpionfish (AFS; FAO; Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Hawai'i Island to Midway at 1–134 m, usually at 1–14 m (Günther, 1873–1910; Gilbert, 1905; Hobson, 1972; Eschmeyer & Randall, 1975; Randall *et al.*, 1993b).

GENERAL RANGE: Indo-Pacific from South Africa and the Chagos Archipelago to the Ryukyus, Australia, Micronesia, the Hawaiian Islands, and the Tuamotus. A single record from the Galapagos Islands is likely based on a waif. Benthic on reefs and rock at 1–134 m, usually at 1–20 m (Gilbert, 1905; Eschmeyer & Randall, 1975; Springer, 1982; Nakabo *in* Masuda *et al.*, 1984; Randall, 1985a; Eschmeyer *in* Smith & Heemstra, 1986; Myers, 1989; Winterbottom *et al.*, 1989; Paxton *et al.*, 1989; Randall *et al.*, 1990a; Kuitert, 1993; Robertson & Allen, 2002).

### Caracanthidae — Orbicular velvetfishes

#### *Caracanthus typicus* Krøyer

*Caracanthus typicus* Krøyer, 1845, p. 264, “Hawaiian Islands”.

*Micropus maculatus* non Gray, 1831 [a valid species not found in the Hawaiian Islands]: Günther (1874b).

*Micropus unipinna* non Gray, 1831: Günther (1874).

*Caracanthus unipinna* non (Gray, 1831): Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Tinker (1982).

*Caracanthus maculatus* non (Gray, 1831): Fowler (1900), Jenkins (1903), Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Tinker (1982).

*Caracanthus typicus* Krøyer, 1845: Krøyer (1845), Randall *et al.* (1993b), Randall (1996a).

TAXONOMY: Randall *et al.* (1993b), Gosline & Brock (1960) and Randall (1996a) suggested that the record by Günther (1874) of *C. unipinna* (Gray) from the Hawaiian Islands was dubious.

COMMON NAMES: Hawaiian orbicular velvetfish (Randall, 1996a).

HAWAIIAN RECORDS: O‘ahu to Midway (Jordan & Evermann, 1905; Randall *et al.*, 1993b).

GENERAL RANGE: Hawaiian Islands endemic. Springer (1982) included Johnston Atoll within the range of the Hawaiian Island species but no *Caracanthus* were recorded from there by Randall *et al.* (1985b) or Kosaki *et al.* (1991). Benthic and inquiline in the branches of the coral *Pocillopora meandrina* Dana (Springer, 1982; Randall *et al.*, 1993b).

### Triglidae — Searobins, Gurnards

#### *Chelidonichthys kumu* (Cuvier)

*Trigla kumu* Cuvier, 1829, p. 50. New Zealand.

*Chelidonichthys kumu* (Cuvier, 1829): Pietschmann (1930), Fowler (1934), Springer (1982), Heemstra *in* Smith & Heemstra (1986), Paxton *et al.* (1989), Richards (1992, 1997), Kuitert (1993).

TAXONOMY: Richards (1992, 1997).

COMMON NAMES: Bluefin gurnard (FAO), Red gurnard.

HAWAIIAN RECORDS: Hawai‘i Island at Napo‘opo‘o (Pietschmann, 1930; Fowler, 1934a). The specimen is catalogued in the Bishop Museum and the identification is correct (Richards, 1992). This record is extremely puzzling, as the species is otherwise known only from the Southern Hemisphere (Springer, 1982; records of *C. kumu* from China, Japan and Korea are of a different species according to Kuitert, 1993). The Hawaiian record was regarded as valid by Richards (1997).

GENERAL RANGE: Indo-West Pacific from South Africa to Australia, New Zealand, and perhaps the Hawaiian Islands and South America. Benthic at 1–200 m, usually at 80–200 m, juveniles sometimes found in brackish water (Springer, 1982; Heemstra *in* Smith & Heemstra, 1986; Paxton *et al.*, 1989; Richards, 1992, 1997; Kuitert, 1993).

#### *Satyrichthys engyceros* (Günther)

*Peristethus engyceros* Günther, 1872a, p. 663, [unnumbered] Fig., “Hawaiian Islands”.

*Peristethus engyceros* Günther, 1872a: Günther (1872).

*Peristedion engyceros* (Günther, 1872a): Gilbert (1905), Fowler (1928, 1934, 1949), Gosline & Brock (1960), Clarke (1972), Novikov *et al.* (1981), Tinker (1982), Humphreys *et al.* (1984), Uchida & Uchiyama (1986).

*Satyrichthys engyceros* (Günther, 1872a): Struhsaker (1973a), Yatou *in* Okamura *et al.* (1982), Ochiai & Yatou *in* Masuda *et al.* (1984), Randall *et al.* (1985a), Yatou *in* Okamura (1985), Borets (1986), Chave & Mundy (1994).

TAXONOMY: Struhsaker (1973a), Ochiai & Yatou *in* Masuda *et al.* (1984).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to the Hancock and Milwaukee Seamounts at 101–



662 m (Günther, 1872a; Gilbert, 1905; Humphreys *et al.*, 1984; Uchida & Uchiyama, 1986; Struhsaker, 1973a; Randall *et al.*, 1985b; Borets, 1986; Chave & Mundy, 1994).

GENERAL RANGE: Western-central North Pacific endemic known from southern Japan, the East China Sea, Okinawa Trough, Kyushu-Palau Ridge, Emperor Seamounts, and the Hawaiian Islands. Benthic on rock and sand bottoms at 101–662 m (Gilbert, 1905; Yatou *in* Okamura *et al.*, 1982; Ochiai & Yatou *in* Masuda *et al.*, 1984; Yatou *in* Okamura *et al.*, 1985; Chave & Mundy, 1994).

***Satyrichthys hians*** (Gilbert & Cramer)

*Peristedion hians* Gilbert & Cramer, 1897, p. 419, Pl. 41 (figs. 1–2), off the south coast of O‘ahu, Hawaiian Islands, at 21°12'00"N, 157°49'00"W.

*Peristedion hians* Gilbert & Cramer, 1897: Gilbert & Cramer (1897), Gilbert (1905), Fowler (1928, 1949), Gosline & Brock (1960), Novikov *et al.* (1981), Tinker (1982), Uchida & Uchiyama (1986).

*Peristedion gilberti* Jordan, 1921: Jordan (1921a).

*Satyrichthys hians* (Gilbert & Cramer, 1897): Struhsaker (1973a), Ochiai & Yatou *in* Masuda *et al.* (1984), Chave & Mundy (1994).

TAXONOMY: Struhsaker (1973a), Ochiai & Yatou *in* Masuda *et al.* (1984), del Cerro & Lloris (1997) suggested that *S. investigoris* (Alcock) and *S. amiscus* (Jordan & Starcks) may be junior synonyms of *S. hians* (Gilbert & Cramer). If so, the species is Indo-Pacific in distribution.

HAWAIIAN RECORDS: Hawai‘i Island to Laysan at 311–858 m (Gilbert & Cramer, 1897; Gilbert, 1905; Uchida & Uchiyama, 1986; Struhsaker, 1973a; Chave & Mundy, 1994).

GENERAL RANGE: Western-central North Pacific endemic from Japan and the Hawaiian Islands. Benthic on sand at 275–858 m (Ochiai & Yatou *in* Masuda *et al.*, 1984; Chave & Mundy, 1994).

## Platycephaloidei

### Bembridae — Deepwater Flatheads

***Bembradium roseum*** Gilbert

*Bembradium roseum* Gilbert, 1905, p. 637, Pl. 82, Pailolo Channel between Maui and Moloka‘i, Hawaiian Islands.

*Bembradium roseum* Gilbert, 1905: Gilbert (1905), Fowler (1928), Gosline & Brock (1960), Clarke (1972), Struhsaker (1973a), Novikov *et al.* (1981), Tinker (1982), Kanayama *in* Okamura *et al.* (1982), Humphreys *et al.* (1984), Ochiai *in* Masuda *et al.* (1984), Yatou *in* Okamura (1985), Borets (1986), Parin (1991), Chave & Mundy (1994).

TAXONOMY: No recent revision; Struhsaker (1973a).

HAWAIIAN RECORDS: Hawai‘i Island to Koko Seamount at 210–450 m (Gilbert, 1905; Struhsaker, 1973a; Humphreys *et al.*, 1984; Borets, 1986; Chave & Mundy, 1994).

GENERAL RANGE: Pacific endemic from southern Japan, the Okinawa Trough, the Kyushu-Palau Ridge, the Emperor Seamounts, the Hawaiian Islands, and seamounts of the southeastern Pacific. Benthic on sand at 210–650 m (Kanayama *in* Okamura *et al.*, 1982; Ochiai *in* Masuda *et al.*, 1984; Yatou *in* Okamura *et al.*, 1985; Parin, 1991; Chave & Mundy, 1994).

### Hoplichthyidae — Ghost Flatheads

***Hoplichthys citrinus*** Gilbert

*Hoplichthys citrinus* Gilbert, 1905, p. 640, Fig. 249, Pailolo Channel between Maui and Moloka‘i, Hawaiian Islands.

*Hoplichthys citrinus* Gilbert, 1905: Gilbert (1905), Fowler (1928, 1934), Gosline & Brock (1960), Struhsaker (1973a), Tinker (1982), Uchida & Uchiyama (1986), Paxton *et al.* (1989), Parin (1991).

TAXONOMY: Struhsaker (1973a).

HAWAIIAN RECORDS: Hawai‘i Island to Laysan at 183–402 m, perhaps to 642 m (Gilbert, 1905; Struhsaker, 1973a; Uchida & Uchiyama, 1986). The *Hoplichthys* sp. recorded from Hancock was not identified to species (Humphreys *et al.*, 1984).

GENERAL RANGE: Antitropical Pacific endemic from Australia, the Hawaiian Islands, and seamounts of the southeastern Pacific. Benthic at 183–490 m (Gilbert, 1905; Struhsaker, 1973a; Uchida & Uchiyama, 1986; Paxton *et al.*, 1989; Parin, 1991).

[*Hoplichthys platophrys* Gilbert]

*Hoplichthys platophrys* Gilbert, 1905, p. 642, Fig. 250, near Laysan Island, Northwestern Hawaiian Islands.

*Hoplichthys platophrys* Gilbert, 1905: Gilbert (1905), Fowler (1928), Gosline & Brock (1960), Struhsaker (1973a), Tinker (1982), Uchida & Uchiyama (1986).

TAXONOMY: Struhsaker (1973a) suggested that *Hoplichthys platophrys* is probably the juvenile of *H. citrinus* but this needs verification.

HAWAIIAN RECORDS: Necker to Laysan at 342–642 m (Gilbert, 1905; Uchida & Uchiyama, 1986).

GENERAL RANGE: Hawaiian Islands endemic, if a valid species. Benthic at 342–642 m (Gilbert, 1905; Uchida & Uchiyama, 1986).

### Anoplopomatoidei

#### Anoplopomatidae — Sablefishes

[*Erilepis zonifer* (Lockington)]

*Myriolepis zonifer* Lockington, 1880, p. 248, Monterey, California, U.S.A.

*Erilepis zonifer* (Lockington, 1880): Humphreys *et al.* (1984), Amaoka *in* Masuda *et al.* (1984), Washington *et al.* (1984).

TAXONOMY: Washington *et al.* (1984).

COMMON NAMES: Skilfish (AFS).

HAWAIIAN RECORDS: None but a record Koko Seamount (Humphreys *et al.*, 1984) suggests that *E. zonifer* might occur at the Hancock Seamounts.

GENERAL RANGE: Subarctic Pacific endemic from Japan through the Bering Sea to California and south to Koko Seamount in the central North Pacific. Epi- and bathypelagic (Amaoka *in* Masuda *et al.*, 1984).

### Cottoidei

#### Ereuniidae

[*Marukawichthys pacificus* Yabe]

*Marukawichthys pacificus* Yabe, 1983, p. 18, Figs. 1–5, Emperor Seamounts, central North Pacific.

*Marukawichthys ambulator* non Sakamoto, 1931 [a valid species that probably does not occur in Hawaiian waters]: Borets (1986).

*Marukawichthys pacificus* Yabe, 1983: Yabe (1983), Humphreys *et al.* (1984).

TAXONOMY: Yabe (1983).

HAWAIIAN RECORDS: None but *M. pacificus* has been recorded from Koko Seamount at 550 m (Humphreys *et al.*, 1984; Borets, 1986) and could be expected at the Hancock Seamounts.

GENERAL RANGE: Emperor Seamounts endemic. Benthic at 550–570 m (Yabe, 1983; Borets, 1986).

### Cottidae — Sculpins

[*Cottus filamentosus* Sauvage *in* Vaillant & Sauvage]

*Cottus filamentosus* Sauvage *in* Vaillant & Sauvage, 1875, p. 279, “Hawaiian Islands”.

*Cottus filamentosus* Sauvage, 1875: Vaillant & Sauvage (1875).

*Gymnocanthus intermedius* Temminck & Schlegel, 1843: Jordan & Evermann (1905).

TAXONOMY: Jordan & Evermann (1905) stated in a footnote (their p. 474) that *Cottus filamentosus* appears to be a junior synonym of *Gymnocanthus intermedius*, implying that the type locality of *C. filamentosus* was erroneous. No recent determination of the taxonomic status of *C. filamentosus* was found. The Cottidae is otherwise unknown from the Hawaiian Islands.

HAWAIIAN RECORDS: No verified records from the region.

GENERAL RANGE: *Gymnocanthus intermedius* is a temperate-water western North Pacific endemic known from seas around Japan. Benthic at 20–150 m (Nakabo, 2002).

### Liparidae — Snailfishes

#### *Paraliparis meridionalis* Kido

*Paraliparis meridionalis* Kido, 1985, p. 364, Figs. 5–6, Okinawa Trough, East China Sea, at 29°46'N, 127°59'E.

*Paraliparis meridionalis* Kido, 1985; Kido (1985, 1988), Yatou in Okamura (1985).

TAXONOMY: Kido (1985, 1988).

HAWAIIAN RECORDS: The remarkable occurrence of this family in Hawai'i was discovered when four specimens of *Paraliparis* tentatively identified as *P. meridionalis* were collected in a shrimp trap off O'ahu (R. Moffitt, pers. comm., Nov. 1993).

GENERAL RANGE: Pacific endemic from the Okinawa Trough, the Marianas, and the Hawaiian Islands. Benthic at 600–932 m (Kido, 1985, 1988; Yatou in Okamura *et al.*, 1985; R. Moffitt, unpubl. data).

### Perciformes

#### Percoidei

### Moronidae — Temperate basses

#### [*Morone saxatilis* (Walbaum)]

*Perca saxatilis* Walbaum, 1792, p. 330, New York, U.S.A.

*Roccus saxatilis* (Walbaum, 1792): Brock (1960).

*Morone saxatilis* (Walbaum, 1792): Setzler *et al.* (1980), Maciolek (1984), Randall (1987a), Fuller *et al.* (1999).

TAXONOMY: Setzler *et al.* (1980), Fuller *et al.* (1999).

COMMON NAMES: Striped bass (AFS).

HAWAIIAN RECORDS: Striped bass were introduced to Kaua'i from San Francisco Bay in 1922 but did not survive (Brock, 1960; Maciolek, 1984; Randall, 1987a).

GENERAL RANGE: Indigenous to eastern North America from the St. Lawrence River to northern Florida with a disjunct population in the eastern Gulf of Mexico. Introduced to Europe, to western North America from Vancouver Island to northern Baja California, and to reservoirs of many inland states. Anadromous, with adults benthopelagic in coastal marine and estuarine waters at 0 to ca. 200 m, moving into the lower reaches of rivers to spawn (Setzler *et al.*, 1980; Fuller *et al.*, 1999).

### Acropomatidae — Temperate ocean basses

#### *Synagrops argyreus* (Gilbert & Cramer)

*Melanostoma argyreum* Gilbert & Cramer, 1897, p. 416, Pl. 39 (fig. 3), off the south coast of O'ahu, Hawaiian Islands, at 21°12'N, 157°49'W.

*Melanostoma argyreum* Gilbert & Cramer, 1897: Gilbert & Cramer (1897).

*Synagrops japonica* non (Döderlein, 1883) [a valid species also found in the Hawaiian Islands]: Fowler (1928, 1949, in part).

*Synagrops argyrea* (Gilbert & Cramer, 1897): Gilbert (1905), Jordan & Evermann (1905), Gosline & Brock (1960), Struhsaker (1973a), Tinker (1982), Mochizuki & Sano (1984), Uchida & Uchiyama (1986), Chave & Mundy (1994).

TAXONOMY: Mochizuki & Sano (1984). The species' suffix is changed to *-us* because it was originally proposed as an adjective to *Melanostoma* (neuter) and therefore requires a masculine suffix to match the gender of the genus when classified in *Synagrops* (D.G. Smith, pers. comm., April, 2003).

HAWAIIAN RECORDS: Hawai'i Island to Laysan at 75–630 m (Gilbert & Cramer, 1897; Gilbert, 1905; Struhsaker, 1973a; Uchida & Uchiyama, 1986; Chave & Mundy, 1994).

GENERAL RANGE: Hawaiian Islands endemic. Benthopelagic over hard substrates at 75–630 m, usually at 95–185 m (Struhsaker, 1973a; Chave & Mundy, 1994).

***Synagrops japonicus*** (Döderlein)

*Melanostoma japonicum* Döderlein in Steindachner & Döderlein, 1883, p. 124, Tokyo, Japan.

*Synagrops japonica* (Döderlein, 1883): Fowler (1928, 1949, in part).

*Synagrops* sp.: Struhsaker (1973a), Uchida & Uchiyama (1986).

*Synagrops japonicus* (Döderlein, 1883): Mochizuki in Masuda *et al.* (1984), Yamakawa in Okamura (1985), Heemstra in Smith & Heemstra (1986), Paxton *et al.* (1989).

TAXONOMY: Heemstra in Smith & Heemstra (1986).

HAWAIIAN RECORDS: Hawai'i Island to Kure Atoll at 88–686 m (Fowler, 1928; Struhsaker, 1973a; Uchida & Uchiyama, 1986).

GENERAL RANGE: Indo-Pacific from South Africa to the Philippines, southern Japan, Australia, and the Hawaiian Islands. Benthopelagic at 88–800 m (Struhsaker, 1973a; Uchida & Uchiyama, 1986; Mochizuki in Masuda *et al.*, 1984; Yamakawa in Okamura *et al.*, 1985; Heemstra in Smith & Heemstra, 1986; Paxton *et al.*, 1989).

**Howellidae — Oceanic cardinalfishes<sup>53</sup>*****Bathysphyraenops simplex*** Parr

*Bathysphyraenops simplex* Parr, 1933, p. 29, Fig. 13, Caicos Passage, Bahamas, at 21°44'N, 72°43'W.

*Howella* sp.: Boehlert & Mundy (1992)?

*Bathysphyraenops simplex* Parr, 1933: Mead & de Falla (1965), Fedoryako (1976), Mochizuki in Masuda *et al.* (1984).

TAXONOMY: Fedoryako (1976).

HAWAIIAN RECORDS: Collections of juvenile *B. simplex* at the Hancock Seamounts indicate that larval “*Howella* sp.” recorded from there (Boehlert & Mundy, 1992) may have been this species.

GENERAL RANGE: Circumtropical and subtropical in the Atlantic, Indian, and Pacific oceans; in the Pacific known from the Philippines, Japan, the Line Islands, and the Hawaiian Islands. Epi- and mesopelagic at 100–500 m (Mead & de Falla, 1965; Fedoryako, 1976; Mochizuki in Masuda *et al.*, 1984).

***Brephostoma carpenteri*** Alcock

*Brephostoma carpenteri* Alcock, 1889a, p. 383, summit of Carpenter Ridge, Bay of Bengal, Indian Ocean, at 6°16–18'N, 90°40–44'E.

*Brinkmannella elongata* Parr, 1933: Mead & de Falla (1965).

*Brephostoma carpenteri* Alcock, 1889a: Mead & de Falla (1965), Fedoryako (1976), Borets & Sokolovsky (1978).

TAXONOMY: Fedoryako (1976) considered *Brinkmannella elongata* Parr, 1933, to be a junior synonym of *Brephostoma carpenteri* Alcock, 1889, but Eschmeyer (1990) listed both genera as valid. Eschmeyer (1998) did not comment on the validity of these species but they are both listed as valid species in the more recent website for that catalog.

HAWAIIAN RECORDS: Main Hawaiian Islands to the Hancock Seamounts (Fedoryako, 1976; T. Clarke, pers. comm., Dec. 1990).

GENERAL RANGE: Probably circumglobal in the tropical and subtropical Atlantic, Indian, and Pacific oceans; in the Pacific recorded from southern Japan, off New Guinea, the Emperor Seamounts, and the Hawaiian Islands. Benthic and mesopelagic at 500–1878 m (Mead & de Falla, 1965; Fedoryako, 1976; Borets & Sokolovsky, 1978).

***Howella brodiei brodiei*** Ogilby

*Howella brodiei* Ogilby, 1899, p. 735, Fig., Lord Howe Island, western South Pacific.

*Howella sherborni* non (Norman, 1930) [a valid Southern Hemisphere species]; Clarke (1987).

*Howella brodiei* Ogilby, 1899: Mead & de Falla (1965), Fedoryako (1976), Tortonese in Whitehead *et al.* (1984), Paxton *et al.* (1989), Post & Quéro (1991).

TAXONOMY: Post & Quéro (1991).

HAWAIIAN RECORDS: Hawai'i Island to O'ahu and probably throughout the region. This is the most common “oceanic cheilodipterid” in the main Hawaiian Islands (Clarke, 1987; T. Clarke, pers. comm., Dec. 1990). *Howella* larvae collected the main Hawaiian Islands and at Johnston Atoll were not iden-

tified to species (Miller *et al.*, 1979; Boehlert *et al.*, 1992).

GENERAL RANGE: Circumglobal in the tropical through temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans. Two subspecies, *H. b. atlantica* Post & Quéro, 1991, in the Atlantic and *H. b. brodiei* Ogilby, 1899, in the Indo-Pacific from South Africa to southern Japan, Australia, the Hawaiian Islands, and California. Epi-, meso-, bathy-, and perhaps benthopelagic at 25–3200 m (Mead & de Falla, 1965; Fedoryako, 1976; Tortonese *in* Whitehead *et al.*, 1984; Paxton *et al.*, 1989; Post & Quéro, 1991).

***Howella parini*** Fedoryako

*Howella parini* Fedoryako, 1976, p. 177, Fig. 12, central North Pacific at 31°N, 176°E.

*Howella* sp. nov.: Loeb (1979)?

*Howella parini* Fedoryako, 1976: Fedoryako (1976), Amaoka *et al.* (1978), Borets & Sokolovsky (1978), Mochizuki *in* Masuda *et al.* (1984), Parin *et al.* (1995).

TAXONOMY: Fedoryako (1976), Amaoka *et al.* (1978).

HAWAIIAN RECORDS: The Hancock Seamounts (Fedoryako, 1976).

GENERAL RANGE: Western Pacific transition zone endemic from the Kuril Islands, Japan, the Emperor Seamounts, and the northern Hawaiian Ridge. Epi- and mesopelagic to 500 m; adults may be benthopelagic at 320–430 m (Fedoryako, 1976; Amaoka *et al.*, 1978; Borets & Sokolovsky, 1978; Mochizuki *in* Masuda *et al.*, 1984; Parin *et al.*, 1995).

***Howella zina*** Fedoryako

*Howella zina* Fedoryako, 1976, p. 176, Fig. 11, western North Pacific at 29°20'N, 142°41'E.

*Howella zina* Fedoryako, 1976: Fedoryako (1976), Yamakawa *in* Okamura *et al.* (1982), Mochizuki *in* Masuda *et al.* (1984).

TAXONOMY: Fedoryako (1976).

HAWAIIAN RECORDS: *Howella zina* has been collected near the main Hawaiian Islands (T. Clarke, pers. comm., Dec. 1990).

GENERAL RANGE: Western Pacific transition zone endemic from the Kyushu-Palau Ridge, southern Japan, and the Hawaiian Islands. Mesopelagic at 322–400 m (Fedoryako, 1976; Yamakawa *in* Okamura *et al.*, 1982; Mochizuki *in* Masuda *et al.*, 1984).

***Pseudohowella intermedia*** Fedoryako

*Pseudohowella intermedia* Fedoryako, 1976, p. 180, Fig. 13, western tropical Pacific off New Guinea at 4°28'N, 142°16'E.

*Pseudohowella intermedia* Fedoryako, 1976: Fedoryako (1976).

TAXONOMY: Fedoryako (1976).

HAWAIIAN RECORDS: *Pseudohowella* have been collected near the main Hawaiian Islands (T. Clarke, pers. comm., Dec. 1990).

GENERAL RANGE: Pacific endemic from New Guinea and the Hawaiian Islands. Mesopelagic at 100–700 m (Fedoryako, 1976; T. Clarke, pers. comm., Dec. 1990).

## Symphysanodontidae

***Symphysanodon maunaloae*** Anderson

*Symphysanodon maunaloae* Anderson, 1970, p. 335, Fig. 3, off the northeast coast of Hawai'i Island at 20°07'–08'N, 155°25'–28'W.

*Rhyacanthias* species: Jordan (1921a).

*Symphysanodon typus* non Bleeker, 1878 [a valid species also found in the Hawaiian Islands]: Gosline & Brock (1960, in part).

*Symphysanodon maunaloae* Anderson, 1970: Anderson (1970), Struhsaker (1973a), Randall (1976a), Tinker (1982), Tameka *in* Okamura *et al.* (1982), Humphreys *et al.* (1984), Katayama *in* Masuda *et al.* (1984), Randall *et al.* (1985a), Uchida & Uchiyama (1986), Parin (1991), Chave & Mundy (1994).

TAXONOMY: Anderson (1970).

COMMON NAMES: Beautiful wampeejaw, Longtailed slopefish (FAO).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to the Hancock Seamounts at 88–398 m (Jordan 1921a; Struhsaker, 1973a; Humphreys *et al.*, 1984; Randall *et al.*, 1985b; Uchida & Uchiyama, 1986; Chave & Mundy, 1994).

GENERAL RANGE: Eastern Indian Ocean and Pacific from Indonesia and the Kyushu-Palau Ridge to Johnston Atoll, the Hawaiian Islands, and the southeastern Pacific. Benthopelagic at 88–500 m (Tameka *in Okamura et al.*, 1982; Katayama *in Masuda et al.*, 1984; Randall *et al.*, 1985b; Parin, 1991).

***Symphysanodon typus* Bleeker**

*Symphysanodon typus* Bleeker, 1878, p. 61, Pl. 3 (fig. 1), New Guinea.

*Rhyacanthias carlsmithi* Jordan, 1921: Jordan (1921a).

*Symphysanodon typus* Bleeker, 1878: Fowler (1928), Gosline & Brock (1960, in part), Anderson (1970), Clarke (1972), Randall (1976a), Tinker (1982), Humphreys *et al.* (1984), Uchida & Uchiyama (1986), Chave & Mundy (1994).

TAXONOMY: Anderson (1970).

COMMON NAMES: Aristocratic bunquelovely (FAO), Insular shelf beauty.

HAWAIIAN RECORDS: Hawai'i Island to the Hancock Seamounts at 80–245 m (Jordan, 1921a; Clarke, 1972; Humphreys *et al.*, 1984; Uchida & Uchiyama, 1986; Chave & Mundy, 1994).

GENERAL RANGE: Eastern Indian Ocean and Pacific from Indonesia, the Philippines, New Guinea, and the Hawaiian Islands. Benthopelagic at 80–245 m (Anderson, 1970; Chave & Mundy, 1994).

**Serranidae — Sea basses<sup>54</sup>**  
**Anthiinae**

***Caprodon longimanus* (Günther)**

*Anthias longimanus* Günther, 1859, p. 94, “Indian or Australian Seas”.

*Caprodon unicolor* Katayama, 1975: Katayama (1975), Iwai (1976), Randall (1980a), Tinker (1982 appendix), Humphreys *et al.* (1984).

*Caprodon longimanus* Günther, 1859: Fowler (1928, 1949), Kharin & Dudarev (1983), Borets (1986), Paxton *et al.* (1989), Parin (1991), Kuitert (1993).

TAXONOMY: Kharin & Dudarev (1983), but records of *C. longimanus* (Günther, 1859) in the Hawaiian Islands are based on the hypothesized synonymy of *C. unicolor* Katayama, 1975, with that species. There is a possibility that *C. unicolor* was described from females of *C. schlegelii* (Günther, 1859) and that the latter species is the only *Caprodon* that occurs in the Hawaiian 200-nmi EEZ. The type material of *C. unicolor* no longer exists to verify its identity. *Caprodon longimanus* is otherwise unknown from the northern hemisphere.

COMMON NAMES: Long-finned perch.

HAWAIIAN RECORDS: O'ahu to Bank 11 at 75–400 m (Fowler, 1928; Katayama, 1975; Humphreys *et al.*, 1984; Borets, 1986).

GENERAL RANGE: Pacific endemic from Australia, New Zealand, the Hawaiian Islands, and the southeastern Pacific off Chile. Benthic and enybenthic at 10–400 m (Iwai, 1976; Kharin & Dudarev, 1983; Borets, 1986; Paxton *et al.*, 1989; Parin, 1991; Kuitert, 1993).

***Caprodon schlegelii* (Günther)**

*Anthias schlegelii* Günther, 1859, p. 93, “Japanese Seas”.

*Anthias schlegelii* Günther, 1859: Jordan & Snyder (1907).

*Caprodon schlegelii* (Günther, 1859): Fowler (1928, 1949), Gosline & Brock (1960), Tinker (1982), Kharin & Dudarev (1983), Humphreys *et al.* (1984), Katayama *in Masuda et al.* (1984), Yamakawa *in Okamura* (1985, in part), Uchida & Uchiyama (1986), Paxton *et al.* (1989), Chave & Mundy (1994), Randall *et al.* (1997a).

TAXONOMY: Kharin & Dudarev (1983). J.E. Randall (pers. comm., Mar. 2005) may recognize the Hawaiian Islands population of *Caprodon* as an endemic species that takes the name *C. unicolor* (see discussion of taxonomy of *C. longimanus*, above).

HAWAIIAN RECORDS: Hawai'i Island to Kure Atoll and Bank 11 at 75–251 m (Jordan & Snyder, 1907; Humphreys *et al.*, 1984; Uchida & Uchiyama, 1986; Chave & Mundy, 1994).

GENERAL RANGE: Pacific endemic from Australia, Japan, the Okinawa Trough, the Ogasawara Islands, and

the Hawaiian Islands. Benthic and engybenthic on hard substrates at 70–302 m (Kharin & Dudarev, 1983; Katayama *in* Masuda *et al.*, 1984; Yamakawa *in* Okamura *et al.*, 1985 *in part*; Uchida & Uchiyama, 1986; Paxton *et al.*, 1989; Chave & Mundy, 1994; Randall *et al.*, 1997b).

***Holanthias elizabethae*** (Fowler)

*Odontanthias elizabethae* Fowler, 1923, p. 380, Honolulu, O'ahu, Hawaiian Islands.

*Odontanthias elizabethae* Fowler, 1923: Fowler (1923, 1928, 1949), Gosline & Brock (1960), Tinker (1982).

*Holanthias elizabethae* (Fowler, 1923): Randall *et al.* (1979, 1985a), Chave & Mundy (1994).

TAXONOMY: Randall *et al.* (1979, 1985a). J.E. Randall (pers. comm., Mar. 2005) has concluded that the genus *Holanthias* is restricted to the Atlantic, and thus Pacific species assigned to this genus should be treated in the genus *Odontanthias*.

HAWAIIAN RECORDS: Johnston Atoll and Maui to Raita Bank at 107–291 m (Fowler, 1923, 1928; Randall *et al.*, 1985b; Chave & Mundy, 1994; B. Mundy, pers. observ., Sept. 2001).

GENERAL RANGE: Hawaiian Islands and Johnston Atoll endemic. Engybenthic over hard substrates with holes at 107–291 m (Chave & Mundy, 1994).

***Holanthias fuscipinnis*** (Jenkins)

*Anthias fuscipinnis* Jenkins, 1901b, p. 389, Fig. 3, Honolulu, O'ahu, Hawaiian Islands.

*Anthias fuscipinnis* Jenkins, 1901: Jenkins (1901b, 1903), Jordan & Snyder (1904a), Snyder (1904).

*Odontanthias fuscipinnis* (Jenkins, 1901b): Jordan & Evermann (1905), Fowler (1928, 1931, 1949), Gosline & Brock (1960), Tinker (1982).

*Holanthias fuscipinnis* (Jenkins, 1901b): Randall *et al.* (1979, 1985a), Severns & Fiene-Severns (1993), Chave & Mundy (1994), Hoover (1994, 2003), Randall (1996a).

TAXONOMY: Randall *et al.* (1979, 1985b). J.E. Randall (pers. comm., Mar. 2005) has concluded that the genus *Holanthias* is restricted to the Atlantic, and thus Pacific species assigned to this genus should be treated in the genus *Odontanthias*.

COMMON NAMES: Hawaiian deep anthias (Hoover, 1994, 2003), Yellow anthias (Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Raita Bank at 43–260 m (Jenkins, 1901b; Jordan & Evermann, 1905; Fowler, 1928; Randall *et al.*, 1985b; Severns & Fiene-Severns, 1993; Chave & Mundy, 1994; Hoover, 1994; B. Mundy, pers. observ., Sept. 2001).

GENERAL RANGE: Hawaiian Islands and Johnston Atoll endemic. Engybenthic over hard substrates with holes at 43–260 m (Randall *et al.*, 1979; Chave & Mundy, 1994; Hoover, 1994).

***Luzonichthys earlei*** Randall

*Luzonichthys earlei* Randall, 1981b, p. 14, Fig. 4, off Ma'ile Point, Waianae (west) coast of O'ahu, Hawaiian Islands.

*Luzonichthys* sp.: Randall (1979), Randall *et al.* (1985a).

*Luzonichthys earlei* Randall, 1981b: Randall (1981b, 1996a), Tinker (1982 appendix), Randall & McCosker (1992), Chave & Mundy (1994).

TAXONOMY: Randall & McCosker (1992).

COMMON NAMES: Earle's splitfin (Randall, 1996a).

HAWAIIAN RECORDS: Hawai'i Island to St. Rogatien Bank at 15–205 m. The *Luzonichthys* sp. recorded from Johnston Atoll at 107 m were probably *L. earlei* (Randall, 1979, 1982, 1996a; Randall *et al.*, 1985b; Randall & McCosker, 1992; Chave & Mundy, 1994).

GENERAL RANGE: Indo-Pacific from the Maldives and perhaps Christmas Island (Indian Ocean) to the Marshall Islands, the Hawaiian Islands, and perhaps Johnston Atoll. Benthopelagic at 15–205 m (Randall *et al.*, 1985b; Randall & McCosker, 1992; Chave & Mundy, 1994; Randall, 1996a).

***Plectranthias helenae*** Randall

*Plectranthias helenae* Randall, 1980, p. 131, Fig. 10, off the north shore of O'ahu, Hawaiian Islands, at 21°40'–43°36'N, 158°04'06"–07°18"W.

*Plectranthias helenae* Randall, 1980: Randall (1980a, 1980b, 1992b), Tinker (1982 appendix), Randall *et al.* (1985a), Chave & Mundy (1994).

TAXONOMY: Randall (1980).

HAWAIIAN RECORDS: Probably throughout the main Hawaiian Islands, recorded from Johnston Atoll and O'ahu to French Frigate at 119–263 m (Randall, 1980; Randall *et al.*, 1985b; Chave & Mundy, 1994; B. Mundy, pers. observ., Sept. 2002).

GENERAL RANGE: Pacific endemic known only from Johnston Atoll, the Hawaiian Islands, and Taiwan. Benthic in rubble at 119–263 m (Randall, 1980; Randall *et al.*, 1985b; Randall, 1992b; Chave & Mundy, 1994).

***Plectranthias kelloggi kelloggi*** (Jordan & Evermann)

*Anthias kelloggi* Jordan & Evermann, 1903a, p. 179, off Kailua, Hawai'i Island.

*Anthias kelloggi* Jordan & Evermann, 1903a: Jordan & Evermann (1903a), Fowler (1928, 1949).

*Pseudanthias kelloggi* (Jordan & Evermann, 1903a): Jordan & Evermann (1905), Gosline & Brock (1960), Clarke (1972), Tinker (1982).

*Zalanthias kelloggi* (Jordan & Evermann, 1903a): Jordan *et al.* (1927), Struhsaker (1973a).

*Anthias rubromaculatus* Borets, 1982: Humphreys *et al.* (1984), Borets (1986).

*Plectranthias kelloggi* (Jordan & Evermann, 1903a): Randall (1980b, 1981a), Amaoka *in* Okamura *et al.* (1982), Humphreys *et al.* (1984), Yamakawa *in* Okamura (1985), Uchida & Uchiyama (1986), Chave & Mundy (1994), Randall *et al.* (1997a).

TAXONOMY: Randall (1980). J.E. Randall (pers. comm., Mar. 2005) may elevate the nominal subspecies of *P. kelloggi* to full species, with the Hawaiian species retaining its name.

HAWAIIAN RECORDS: Hawai'i Island to Milwaukee Seamount at 221–450 m (Jordan & Evermann, 1903a, 1905; Clarke, 1972; Struhsaker, 1973a; Humphreys *et al.*, 1984; Borets, 1986; Uchida & Uchiyama, 1986; Chave & Mundy, 1994).

GENERAL RANGE: Antiequatorial Pacific endemic with three subspecies known from (1) Japan, the Ogasawara Islands, the Kyushu-Palau Ridge, and Okinawa Trough, (2) the Hawaiian Islands and the Emperor Seamounts, and (3) New Caledonia. Benthic in rubble at 100–450 m (Randall, 1980; Amaoka *in* Okamura *et al.*, 1982; Yamakawa *in* Okamura *et al.*, 1985; Chave & Mundy, 1994; Randall *et al.*, 1997b).

***Plectranthias nanus*** Randall

*Plectranthias nanus* Randall, 1980, p. 159, Fig. 22, off the northwestern side of Cocos Island, Guam, Mariana Islands.

*Pteranthias longimanus* non (Weber, 1913) [a valid *Plectranthias* species not found in the Hawaiian Islands]: Gosline & Brock (1960), Tinker (1982 text).

*Plectranthias nanus* Randall, 1980: Randall (1980a, 1980b, 1994), Tinker (1982 appendix), Myers (1989), Randall *et al.* (1990a, 1993b).

TAXONOMY: Randall (1980).

COMMON NAMES: Pygmy basslet, Dwarf perchlet (Randall *et al.*, 1997a; Myers, 1999).

HAWAIIAN RECORDS: O'ahu to Midway at 9–25 m (Gosline & Brock, 1960; Randall, 1980; Randall *et al.*, 1993b).

GENERAL RANGE: Oceanic islands of the eastern Indian Ocean and Pacific, plus the Red Sea, from Christmas Island (Indian Ocean) and Cocos-Keeling to Australia, Micronesia, the Hawaiian Islands, the Marquesas, and the Pitcairn group. Benthic in rubble and coral at 3–57 m (Randall, 1980, 1994; Myers, 1989; Randall *et al.*, 1990a, 1993b).

***Plectranthias winniensis*** (Tyler)

*Pteranthias winniensis* Tyler, 1966, p. 2, Fig. 1, St. Joseph Island, Amirante Group, Seychelles Islands, western Indian Ocean.

*Plectranthias winniensis* (Tyler, 1966): Randall (1980b), Tinker (1982 appendix), Heemstra & Randall *in* Smith & Heemstra (1986), Myers (1989), Kosaki *et al.* (1991).

TAXONOMY: Randall (1980).

COMMON NAMES: Redblotch perchlet (Randall *et al.*, 1997a; Myers, 1999).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to O'ahu at 23–40 m (Randall, 1980; Kosaki *et al.*, 1991).



GENERAL RANGE: Indo-Pacific from east Africa and the Red Sea to Australia, Micronesia, Johnston Atoll, the Hawaiian Islands, the Tuamotu Archipelago, and the Pitcairn Group. Benthic in coral and rubble at 15–58 m (Randall, 1980; Heemstra & Randall *in* Smith & Heemstra, 1986; Myers, 1989).

***Pseudanthias bicolor*** (Randall)

*Anthias (Mirolabrichthys) bicolor* Randall, 1979, p. 4, Figs. 1–3, off Pokai Bay on the Waianae (west) coast of O‘ahu, Hawaiian Islands.

*Anthias bicolor* Randall, 1979: Randall (1979, 1985a), Tinker (1982 appendix).

*Pseudanthias bicolor* (Randall, 1979): Katayama *in* Masuda *et al.* (1984), Myers (1989), Randall *et al.* (1990a), Kosaki *et al.* (1991), Hoover (1993, 2003), Chave & Mundy (1994), Randall (1996a).

TAXONOMY: Randall (1979). Western and central Pacific species usually assigned to *Anthias* have been placed in *Pseudanthias* (Katayama & Amaoka, 1986; Randall & Hutomo, 1988).

COMMON NAMES: Bicolor anthias (Hoover, 1993, 2003; Randall *et al.*, 1997a; Randall, 1996a).

HAWAIIAN RECORDS: Probably throughout the Hawaiian Archipelago, recorded from Johnston Atoll and O‘ahu at 5–104 m, and also from unpublished collections in the Northwestern Hawaiian Islands (Randall, 1979; Kosaki *et al.*, 1991; Hoover, 1993; Chave & Mundy, 1994; R. Moffitt, pers. comm., Sept. 2000).

GENERAL RANGE: Indo-Pacific from Mauritius and the Maldives to the Ryukyus, Australia, New Guinea, the Loyalty Islands, and the Marshall, Line, and Hawaiian Islands. Engybenthic in and near holes of reefs at 5–104 m (Randall, 1979; Katayama *in* Masuda *et al.*, 1984; Myers, 1989; Randall *et al.*, 1990a; Hoover, 1993; Chave & Mundy, 1994).

***Pseudanthias fucinus*** (Randall & Ralston)

*Anthias fucinus* Randall & Ralston, 1985, p. 222, Figs. 1–4, southwestern end of Penguin Bank off Moloka‘i, Hawaiian Islands, at 20°52.5'N, 157°39.3'W.

*Anthias fucinus* Randall & Ralston, 1984: Randall & Ralston (1984), Randall (1985a), Randall *et al.* (1985a).

*Pseudanthias fucinus* (Randall & Ralston, 1984): Chave & Mundy (1994), Randall (1996a).

TAXONOMY: Randall & Ralston (1984).

HAWAIIAN RECORDS: Probably throughout the Hawaiian Archipelago, known from Johnston Atoll and Moloka‘i to Raita Bank at 122–280 m (Randall & Ralston, 1984; Randall *et al.*, 1985b; Chave & Mundy, 1994; B. Mundy, pers. observ., Sept. 2001).

GENERAL RANGE: Hawaiian Islands and Johnston Atoll endemic. Engybenthic in and near holes of reef and rock drop-offs at 122–280 m (Randall & Ralston, 1984; Chave & Mundy, 1994).

***Pseudanthias hawaiiensis*** (Randall)

*Anthias (Pseudanthias) ventralis hawaiiensis* Randall, 1979, p. 9, Figs. 5–6, off the north side of Moku Manu Island, eastern coast of O‘ahu, Hawaiian Islands.

*Anthias ventralis hawaiiensis* Randall, 1979: Randall (1979), Randall *et al.* (1985a).

*Anthias ventralis* non Randall, 1979: Tinker (1982 appendix), Randall (1985a).

*Pseudanthias ventralis* non (Randall, 1979): Myers (1989), Paxton *et al.* (1989), Randall *et al.* (1990a) [references to Hawaiian Islands populations, only].

*Pseudanthias ventralis hawaiiensis* (Randall, 1979): Hoover (1993), Randall *et al.* (1993b), Chave & Mundy (1994).

*Pseudanthias hawaiiensis* (Randall, 1979): Randall (1996a), Hoover (2003).

TAXONOMY: Randall (1979). Randall (1996a) elevated the Hawaiian subspecies of *P. ventralis* that he had first described in 1976 to the taxonomic status of a distinct, valid, and endemic species, *P. hawaiiensis*. A more detailed justification of this decision would be useful. See Eschmeyer (1998) for comments on the type status of the two species in relation to their initial descriptions as subspecies.

COMMON NAMES: Hawaiian longfin anthias (Randall, 1996a; Hoover, 2003).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to Midway at 25–199 m (Randall, 1979; Randall *et al.*, 1985b; Randall *et al.*, 1993b; Hoover, 1993; Chave & Mundy, 1994).

GENERAL RANGE: Hawaiian Islands and Johnston Atoll endemic. The closely related *P. ventralis* is known from Australia, New Caledonia, the Marshalls, the Tuamotus, and the Pitcairn Islands. Engybenthic in or near holes in reefs at 25–199 m, usually at >40 m (Randall, 1979; Myers, 1989; Paxton *et al.*, 1989; Randall *et al.*, 1990a, 1993b; Chave & Mundy, 1994).

***Pseudanthias randalli*** (Lubbock & Allen)

*Anthias randalli* Lubbock & Allen, 1978, p. 260, Figs. 1–2, Baring Olango Island, Cebu Strait, Philippines.

*Pseudanthias randalli* (Lubbock & Allen, 1978): Katayama *in* Masuda *et al.* (1984), Myers (1989), Kosaki *et al.* (1991).

TAXONOMY: Myers (1989), Kosaki *et al.* (1991).

COMMON NAMES: Randall's anthias (Myers, 1999).

HAWAIIAN RECORDS: Kosaki *et al.* (1991) tentatively identified juveniles of this species from Johnston Atoll at 65–75 m. It is not known from the Hawaiian Islands.

GENERAL RANGE: Eastern Indian Ocean and Pacific from Indonesia to the Ryukyus, the Philippines, Micronesia, and perhaps Johnston Atoll. Engyebenthic near reef dropoffs at 15–68 m (Katayama *in* Masuda *et al.*, 1984; Myers, 1989).

***Pseudanthias thompsoni*** (Fowler)

*Caesioperca thompsoni* Fowler, 1923, p. 379, Honolulu, O'ahu, Hawaiian Islands.

*Caesioperca thompsoni* Fowler, 1923: Fowler (1923, 1928, 1949), Gosline & Brock (1960), Clarke (1972), Tinker (1982).

*Anthias thompsoni* (Fowler, 1923): Struhsaker (1973a), Randall (1979, 1985a), Uchida & Uchiyama (1986).

*Pseudanthias thompsoni* (Fowler, 1923): Randall (1992b, 1996a), Randall *et al.* (1993b, 1997a), Hoover (1993, 2003), Chave & Mundy (1994).

TAXONOMY: Randall (1979).

COMMON NAMES: Hawaiian anthias (Hoover, 1993), Thompson's anthias (Randall, 1996a; Hoover, 2003).

HAWAIIAN RECORDS: Moloka'i to Kure Atoll at 5–190 m (Fowler, 1923; Clarke, 1972; Struhsaker, 1973a; Randall, 1979; Uchida & Uchiyama, 1986; Randall *et al.*, 1993b; Hoover, 1993; Chave & Mundy, 1994).

GENERAL RANGE: Western and central Pacific endemic known only from the Hawaiian and Ogasawara islands. Engyebenthic in or near reefs at 5–190 m (Randall, 1979, 1992b, 1996a; Uchida & Uchiyama, 1986; Chave & Mundy, 1994; Randall *et al.*, 1997b).

**[*Tosanoides filamentosus* Kamohara]**

*Tosanoides filamentosus* Kamohara, 1953b, p. 3, Fig. 3, Okinoshima Kochi Prefecture, Japan.

*Tosanoides filamentosus* Kamohara, 1953b: Katayama *in* Masuda *et al.* (1984), Humphreys *et al.* (1984)?, Uchida & Uchiyama (1986)?

TAXONOMY: Katayama *in* Masuda *et al.* (1984).

HAWAIIAN RECORDS: The Hancock Seamounts at 283–302 m (Humphreys *et al.*, 1984; Uchida & Uchiyama, 1986). The occurrence of this species at the Hancock Seamounts needs to be verified. It is possible that records from the Hancock Seamounts are based on misidentified *Pseudanthias fucinus* or other anthiines.

GENERAL RANGE: Known with certainty only from Japan. Engyebenthic over rocky habitats at 5–60 m (Katayama *in* Masuda *et al.*, 1984).

## Epinephelinae Epinephelini — Groupers

***Cephalopholis argus*** Bloch & Schneider

*Cephalopholis argus* Bloch & Schneider, 1801, p. 311, Pl. 61, "East Indies".

*Serranus myriaster* Valenciennes *in* Cuvier & Valenciennes, 1828: Valenciennes *in* Cuvier & Valenciennes (1828).

*Cephalopholis guttatus* (Bloch, 1790): Maciolek (1984).

*Cephalopholis argus* Bloch & Schneider, 1801: Jordan & Evermann (1905), Fowler (1928), Brock (1960), Hobson (1974), Randall (1980a, 1985a, 1987a, 1996a), Tinker (1982), Myers (1989), Randall & Heemstra (1991), Heemstra & Randall (1993), Hoover (1993, 2003), Randall *et al.* (1993b, 1997a), Englund & Eldredge (2001).

TAXONOMY: Randall & Heemstra (1991); Heemstra & Randall (1993). *Bodianus guttatus* Bloch, 1790, is an older name for this species that has been officially rejected as an available name by the International Commission of Zoological Nomenclature in order to preserve nomenclatural stability (Eschmeyer, 1998).

COMMON NAMES: Roi (Hoover, 1993, 2003; Randall, 1996a; Englund & Eldredge, 2001), Bluespotted grouper (AFS), Peacock hind (FAO), Peacock grouper (Hoover, 1993, 2003; Randall, 1996a), Peacock rockcod (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Hawai'i Island to French Frigate at 6–12 m (Hobson, 1974; Randall *et al.*, 1993b; E. DeMartini, pers. comm., Mar. 2002). Valenciennes (in Cuvier & Valenciennes 1828) recorded *C. argus* from the Hawaiian Islands but was not found in later surveys. [Jordan & Evermann (1905) stated that Quoy & Gaimard (1824) also gave this record, but examination of a partial copy of the latter work failed to verify this.] It is possible but unlikely that these early records were valid, based on waifs (Randall & Heemstra, 1991). The species was next recorded from Hawai'i when it was introduced from Moorea to O'ahu and Hawai'i Island in 1956 (Brock, 1960). *Cephalopholis argus* is the only introduced *Cephalopholis* or *Epinephelus* now established in Hawaiian waters (Randall, 1987a). Although Heemstra & Randall (1993) mapped its range as throughout the Archipelago, Randall *et al.* (1993b) reported that it is only known as far north as Ni'ihau.

GENERAL RANGE: Indo-Pacific from East Africa and the Red Sea to Indonesia, the Ryukyu and Ogasawara Islands, northern Australia, Lord Howe Island, Wake Island, Micronesia, the Line Islands, the Marquesas, and Ducie. Introduced to the Hawaiian Islands. Benthic and engybenitic on and near reefs at 1–40 m (Randall & Heemstra, 1991; Heemstra & Randall, 1993).

[*Cephalopholis urodeta* (Forster)]

*Perca urodeta* Forster in Bloch & Schneider, 1801, p. 333, Santa Christina Island (Tahuata), Marquesas Islands. *Cephalopholis urodelis* (Forster, 1801) [a frequently seen *lapsus* in spelling]: Brock (1960), Tinker (1982), Maciolek (1984).

*Cephalopholis urodeta* (Forster, 1801): Randall (1987a), Randall & Heemstra (1991), Heemstra & Randall (1993).

TAXONOMY: Randall & Heemstra (1991); Heemstra & Randall (1993).

COMMON NAMES: Darkfin hind (FAO), Flagtail grouper (Myers, 1999), Flagtail rockcod (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: *Cephalopholis urodeta* was introduced to O'ahu from the Marquesas in 1958 and 1961. It did not become established (Brock, 1960; Tinker, 1982; Maciolek, 1984; Randall, 1987a).

GENERAL RANGE: Indo-Pacific from South Africa and the Maldives to Indonesia, southern Japan, northern Australia, the Line Islands, the Marquesas Islands, and Pitcairn. Benthic and engybenitic on or near reefs at 1–60 m (Randall & Heemstra, 1991; Heemstra & Randall, 1993).

[*Cromileptes altivelis* (Valenciennes)]

*Serranus altivelis* Valenciennes in Cuvier & Valenciennes, 1828, p. 324, Pl. 35, Java, Indonesia, and another, unknown locality.

*Cromileptes altivelis* (Valenciennes, 1828): Randall (1980a), Tinker (1982 appendix), Myers (1989), Randall & Heemstra (1991), Heemstra & Randall (1993), Randall *et al.* (1997a).

*Chromileptes altivelis* (Valenciennes, 1828): Eschmeyer (1990, 1998).

TAXONOMY: Randall & Heemstra (1991); Heemstra & Randall (1993). Although Eschmeyer (1990, 1998) stated that the correct spelling of the genus-group name was uncertain, *Cromileptes* was given as the correct spelling in the January 2004 version of the online "Catalog of Fishes" website: [<http://www.calacademy.org/research/ichthyology/catalog/fishmain.asp>].

COMMON NAMES: Humpback grouper (FAO), Panther grouper, Barramundi cod (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Reported from Hawai'i Island, Maui, and O'ahu at 1–20 m. Randall (1981a) first recorded this species from the Hawaiian Islands and suggested that both of his records were from isolated aquarium releases. Sightings and captures in the 1980s and early 1990s (Randall & Heemstra, 1991; K. Kawamoto, J. Naughton & S. Reid, pers. comm.) suggested that the species was established in Hawaiian waters through unknown sources but there were no records after the mid-1990s. Randall & Heemstra (1991) suggested that all of the records from the Hawaiian Islands were due to aquarium releases. *Cromileptes* does not appear to be established in the Hawaiian Islands.

GENERAL RANGE: Eastern Indian Ocean and western Pacific from Nicobar Islands and Indonesia to southern Japan, the Ogasawara Islands, northern Australia, Guam, and New Caledonia. Benthic and engybenitic on or near living and dead reefs at 1–40 m (Randall & Heemstra, 1991; Heemstra & Randall, 1993; Randall *et al.*, 1997b).

[*Epinephelus fasciatus* (Forsskål)]

*Perca fasciata* Forsskål, 1775, p. 40, Ras Mohammed, Red Sea.

*Epinephelus fasciatus* (Forsskål, 1775): Brock (1960), Tinker (1982), Maciolek (1984), Randall (1987a), Randall & Heemstra (1991, 1993).

TAXONOMY: Randall & Heemstra (1991); Heemstra & Randall (1993).

COMMON NAMES: Blacktip grouper (FAO; Myers, 1999), Redbanded grouper, Black-tipped rockcod (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: *Epinephelus fasciatus* was introduced to O'ahu in 1958 from the Marquesas. It did not become established (Brock, 1960; Tinker, 1982; Maciolek, 1984; Randall, 1987a).

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to southern Japan, Australia, Lord Howe Island, the Line Islands, the Marquesas, and Ducie. Benthic on reefs and rocky substrates at 1–160 m (Randall & Heemstra, 1991; Heemstra & Randall, 1993).

[*Epinephelus fuscoguttatus* (Forsskål)]

*Perca summana* var. *fuscoguttata* Forsskål, 1775, p. 42, Sams Pier, Jidda, Saudi Arabia, Red Sea.

*Epinephelus fuscoguttatus* (Forsskål, 1775): Randall & Heemstra (1991), Heemstra & Randall (1993).

TAXONOMY: Randall & Heemstra (1991); Heemstra & Randall (1993).

COMMON NAMES: Brownmarbled grouper (FAO; Myers, 1999), Flowery cod (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Tinker (1982) listed this species as if it occurs in the Hawaiian Islands but it does not occur here nor was it ever introduced (J.E. Randall, pers. comm.). Tinker's (1982) listing refers to Fowler's (1900) misidentification of *E. lanceolatus* (see below).

GENERAL RANGE: Indo-Pacific from east Africa and the Red Sea to Indonesia, the Ryukyus, northern Australia, the Marshall Islands, and Samoa. Benthic on reefs and rocky substrates at 1–60 m (Randall & Heemstra, 1991; Heemstra & Randall, 1993).

[*Epinephelus hexagonatus* (Forster)]

*Holocentrus hexagonatus* Forster in Bloch & Schneider, 1801, p. 323, Tahiti, Society Islands.

*Epinephelus hexagonatus* (Forster, 1801): Brock (1960), Tinker (1982), Maciolek (1984), Randall (1987a), Randall & Heemstra (1991), Heemstra & Randall (1993).

TAXONOMY: Randall & Heemstra (1991); Heemstra & Randall (1993).

COMMON NAMES: Star-spotted grouper (FAO), Hexagon grouper (Myers, 1999), Hexspot grouper, White-speckled grouper, Hexagon rockcod (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: *Epinephelus hexagonatus* was introduced from the Marquesas to Maui in 1958 and to O'ahu in 1961 but this species did not survive in Hawaiian waters (Brock, 1960; Tinker, 1982; Maciolek, 1984; Randall, 1987a).

GENERAL RANGE: Indo-Pacific from east Africa to Indonesia, southern Japan, Australia, the Line Islands, the Marquesas, and the Pitcairn group. Benthic on reefs exposed to surge, usually at 1–6 m (Randall & Heemstra, 1991; Heemstra & Randall, 1993).

[*Epinephelus irroratus* (Forster)]

*Perca irrorata* Forster in Bloch & Schneider, 1801, p. 333, St. Christian Island (Tahuata), Marquesas Islands.

*Epinephelus spiniger* (Günther, 1859): Brock (1960), Tinker (1982), Maciolek (1984), Randall (1987a).

*Epinephelus irroratus* (Forster, 1801): Randall & Heemstra (1991), Heemstra & Randall (1993).

TAXONOMY: Randall & Heemstra (1991); Heemstra & Randall (1993).

COMMON NAMES: Marquesan grouper (FAO), Longspine grouper.

HAWAIIAN RECORDS: *Epinephelus irroratus* was introduced to O'ahu in 1958 from the Marquesas. It did not become established (Brock, 1960; Tinker, 1982; Maciolek, 1984; Randall, 1987a).

GENERAL RANGE: Known with certainty only from the Marquesas, with one questionable record from Minami Tori Shima (Marcus Island). Benthic on fringing reefs in shallow water (Randall & Heemstra, 1991; Heemstra & Randall, 1993).

***Epinephelus lanceolatus* (Bloch)**

*Holocentrus lanceolatus* Bloch, 1790, p. 92, Pl. 242 (fig. 1), "East Indies".

*Epinephelus fuscoguttatus* non (Forsskål, 1775) [a valid species that does not occur in the Hawaiian Islands]: Fowler (1900; misidentification corrected in Fowler, 1907), Tinker (1982).

*Serranus phaeostigmaeus* Fowler, 1907: Fowler (1907).

*Stereolepoides thompsoni* Fowler, 1923: Fowler (1923, 1928, in part, 1949).

*Serranus tauvina* non (Forsskål, 1775) [a valid *Epinephelus* species that does not occur in Hawai'i]: Fowler (1928, 1949, in part).

*Serranus lanceolatus* (Bloch, 1790): Fowler (1928, 1949).

*Epinephelus tauvina* non (Forsskål, 1775): Gosline & Brock (1960), Tinker (1982 text).

*Promicrops lanceolatus* (Bloch, 1790): Randall *et al.* (1985a).

*Epinephelus lanceolatus* (Bloch, 1790): Randall (1980a, 1994, 1996a), Tinker (1982 appendix), Myers (1989), Randall & Heemstra (1991), Heemstra & Randall (1993), Hoover (1993, 2003), Randall *et al.* (1997a).

TAXONOMY: Randall & Heemstra (1991); Heemstra & Randall (1993).

COMMON NAMES: Giant grouper (FAO; Hoover, 1993, 2003), Queensland grouper (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Johnston Atoll and Maui to Kaua'i, probably throughout main islands at 12–61 m but rare (Fowler, 1900; Randall *et al.*, 1985b; Hoover, 1993). There is a lingering question about the existence of a reproductive population of this species in the Hawaiian Islands. Most specimens seen or captured here have been very large individuals. Fowler's holotype of *Serranus phaeostigmaeus* was a juvenile only 8.5 inches (21.5 cm) long, but that specimen apparently did not have the distinctive juvenile color pattern of *E. lanceolatus* [compare Fowler's (1907) description with Randall & Heemstra (1991) and Heemstra & Randall (1993)], creating further questions about the nature of the species' occurrence in the Hawaiian Islands.

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to Indonesia, the Ryukyu and Ogasawara Islands, southern Australia, Micronesia, the Hawaiian Islands, and the Pitcairn Group. Benthic and engyobenthic at 4–100 m (Randall & Heemstra, 1991; Heemstra & Randall, 1993; Randall, 1994; Randall *et al.*, 1997b).

#### [*Epinephelus merra* Bloch]

*Epinephelus merra* Bloch, 1793, p. 17, Pl. 329, "Japan Sea" [a questionable type locality].

*Epinephelus merra* Bloch, 1793: Brock (1960), Tinker (1982), Maciolek (1984), Randall (1987a), Randall & Heemstra (1991), Heemstra & Randall (1993).

TAXONOMY: Randall & Heemstra (1991); Heemstra & Randall (1993).

COMMON NAMES: Honeycomb grouper (FAO; Myers, 1999), Dwarf spotted rockcod (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: *Epinephelus merra* was introduced to Kaua'i and O'ahu from the Society Islands in 1956 and again to O'ahu in 1961. It did not become established (Brock, 1960; Tinker, 1982; Maciolek, 1984; Randall, 1987a).

GENERAL RANGE: Indo-Pacific from South Africa and the Laccadive Islands to Indonesia, southern Japan, Australia, Lord Howe Island, the Line Islands, and the Pitcairn Islands. Benthic on coral reefs at 1–50 m, usually at <20 m (Randall & Heemstra, 1991; Heemstra & Randall, 1993).

#### [*Epinephelus miliaris* (Valenciennes)]

*Serranus miliaris* Valenciennes in Cuvier & Valenciennes, 1830, p. 520, Vanikolo, Santa Cruz Islands.

*Epinephelus dictyophorus* var. non (Bleeker, 1856) [*lapsus* for *diktiophorus*]: Steindachner (1893), Fowler (1928).

*Epinephelus miliaris* (Valenciennes, 1830): Randall & Heemstra (1991), Heemstra & Randall (1993).

TAXONOMY: Randall & Heemstra (1991); Heemstra & Randall (1993).

COMMON NAMES: Netfin grouper (FAO).

HAWAIIAN RECORDS: Steindachner (1893) recorded *Epinephelus dictyophorus* "var." from the Hawaiian Islands and Fowler (1928) repeated the record. Randall and Heemstra (1991) discussed this record, stating that although *E. diktiophorus* is a junior synonym of *E. miliaris*, Steindachner's (1893) description of his specimen does not match that species or either of the two *Epinephelus* species known from the Hawaiian Islands. Randall and Heemstra (1991) concluded that not only was Steindachner's (1893) record a misidentification, but that it was also a locality error. The Hawaiian Islands record of *E. miliaris* is therefore considered false here.

GENERAL RANGE: Indo-Pacific from east Africa, the Comoros, the Seychelles, and Mauritius through Indonesia to the Ryukyu Islands, Palau, Kiribati, Fiji, and Samoa. Engyobenthic over a variety of habitats including mud bottom harbors, lagoons, seagrass beds, mangrove swamps, and offshore reefs at 1–180 and perhaps ca. 200 m (Randall & Heemstra, 1991).

*Epinephelus quernus* Seale

*Epinephelus quernus* Seale, 1901, p. 3, Fig. 1, Honolulu, O'ahu, Hawaiian Islands.

*Stereolepoides thompsoni* non Fowler, 1923 [a junior synonym of *Epinephelus lanceolatus* (Bloch, 1790), a species that also occurs in the Hawaiian Islands]: Fowler (1928, in part).

*Serranus quernus* (Seale, 1901): Fowler (1928, 1931, 1949).

*Epinephelus quernus* Seale, 1901: Seale (1901), Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Gosline & Brock (1960), Clarke (1972), Struhsaker (1973a), Iwai (1976), Randall (1980a, 1985a, 1996a), Tinker (1982), Humphreys *et al.* (1984), Randall *et al.* (1985a, 1993b), Borets (1986), Uchida & Uchiyama (1986), Randall & Heemstra (1991), Heemstra & Randall (1993), Hoover (1993, 2003), Chave & Mundy (1994).

TAXONOMY: Randall & Heemstra (1991); Heemstra & Randall (1993).

COMMON NAMES: Hāpu'u (Hoover, 1993, 2003; Randall, 1996a), Hāpu'upu'u (juveniles), Hawaiian group-er (FAO; Randall, 1996a), Hawaiian sea bass, Hawaiian black grouper (Hoover, 1993, 2003), Hapu-u-puu (DLNR), Sea bass (DLNR).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll and Bank 11 at 8–380 m, restricted to progressively deeper water in the southern parts of its range (Seale, 1901; Jordan & Evermann, 1905; Clarke, 1972; Iwai, 1976; Randall *et al.*, 1985b, 1993b; Borets, 1986; Uchida & Uchiyama, 1986; Randall & Heemstra, 1991; Chave & Mundy, 1994).

GENERAL RANGE: Hawaiian Islands and Johnston Atoll endemic. Benthic and engy-benthic at 8–380 m (Randall & Heemstra, 1991; Heemstra & Randall, 1993; Randall *et al.*, 1993b; Chave & Mundy, 1994).

[*Epinephelus spilotoceps* Schultz]

*Epinephelus spilotoceps* Schultz in Schultz *et al.*, 1953, p. 357, Figs. 56–57, Namu Island, Bikini Atoll, Marshall Islands.

*Epinephelus spilotoceps* Schultz, 1953: Tinker (1982), Randall & Heemstra (1991), Heemstra & Randall (1993).

TAXONOMY: Randall & Heemstra (1991); Heemstra & Randall (1993).

COMMON NAMES: Foursaddle grouper (FAO; Myers, 1999), Four-saddle rockcod (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Tinker (1982) listed this species as if it occurs in Hawaiian waters. It is not known from the Hawaiian Islands nor has it ever been introduced here (J.E. Randall, pers. comm.).

GENERAL RANGE: Indo-Pacific from east Africa and the Laccadive Islands to Indonesia, Palau, northern Australia, the Marshall and Line Islands, and the Cook Islands. Benthic on reefs in shallow water (Randall & Heemstra, 1991; Heemstra & Randall, 1993).

[*Gracila albomarginata* (Fowler & Bean)]

*Cephalopholis albomarginatus* Fowler & Bean, 1930, p. 235, Fig. 11, Danawan Island, vicinity of Sibuko Bay, Borneo.

*Gracila albomarginata* (Fowler & Bean, 1930): Tinker (1982), Randall & Heemstra (1991), Heemstra & Randall (1993).

TAXONOMY: Randall & Heemstra (1991); Heemstra & Randall (1993).

COMMON NAMES: Masked grouper (FAO), Slenderspine grouper (Myers, 1999), Red-edged grouper, Thinspine rockcod (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Tinker (1982) listed this species as if it occurs in Hawaiian waters. It is not known from Hawai'i nor was it ever introduced (J.E. Randall, pers. comm.).

GENERAL RANGE: Indo-Pacific from east Africa and the Laccadive Islands to Indonesia, the Ryukyus, northern Australia, the Marshall Islands, Line Islands, Society Islands, and the Marquesas. Engy-benthic over reefs at 15–120 m (Randall & Heemstra, 1991; Heemstra & Randall, 1993).

**Liopropomini***Liopropoma aurora* (Jordan & Evermann)

*Pikea aurora* Jordan & Evermann, 1903a, p. 178, Hilo, Hawai'i Island.

*Pikea japonica* non (Döderlein in Steindachner & Döderlein, 1883) [a valid western Pacific *Liopropoma* species]: Fowler (1928, 1949, in part).

*Pikea aurora* Jordan & Evermann, 1903a: Jordan & Evermann (1903a, 1905), Jenkins (1903), Jordan & Snyder (1904a), Snyder (1904), Gosline & Brock (1960), Tinker (1982).

*Liopropoma aurora* (Jordan & Evermann, 1903a): Randall & Taylor (1988), Chave & Mundy (1994), Hoover (1994, 2003), Randall (1996a).

TAXONOMY: Randall & Taylor (1988).

COMMON NAMES: Sunset bass (Hoover, 1994), Sunset basslet (Randall, 1996a; Hoover, 2003), Sunrise basslet (J.E. Randall, pers. comm., Mar. 2005).

HAWAIIAN RECORDS: Hawai'i Island to Raita Bank and perhaps the Hancock Seamounts at 21–184 m (Jordan & Evermann, 1903a, 1905; Randall & Taylor, 1988; Chave & Mundy, 1994; Hoover, 1994; B. Mundy, pers. observ., Sept. 2001).

GENERAL RANGE: Hawaiian Islands endemic. Engyebenthic over hard substrates with holes at 21–184 m (Randall & Taylor, 1988; Chave & Mundy, 1994; Hoover, 1994).

### *Liopropoma collettei* Randall & Taylor

*Liopropoma collettei* Randall & Taylor, 1988, p. 30, Pl. 3A, Kāne'ohe Bay, O'ahu, Hawaiian Islands.

*Liopropoma* species: Randall (1980a).

*Liopropoma collettei* Randall & Taylor, 1988: Randall & Taylor (1988), Kosaki *et al.* (1991).

TAXONOMY: Randall & Taylor (1988).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Laysan at 1–12 m (Randall, 1981a; Kosaki *et al.*, 1991).

GENERAL RANGE: Pacific endemic known only from the Philippines, Papua New Guinea, Johnston Atoll, and the Hawaiian Islands. The Hawaiian Islands and Johnston Atoll populations are morphologically distinct from western Pacific populations. Benthic in coral reefs at 1–34 m (Randall & Taylor, 1988; Kosaki *et al.*, 1991).

### *Liopropoma maculatum* (Döderlein)

*Pikea maculata* Döderlein in Steindachner & Döderlein, 1883, p. 50, Tokyo, Japan.

*Pikea maculatus* Döderlein, 1883: Strasburg (1966), Randall (1976a), Tinker (1982).

*Chorististium maculatum* (Döderlein, 1883): Amaoka in Okamura *et al.* (1982).

*Liopropoma maculatum* (Döderlein, 1883): Randall (1980a), Katayama in Masuda *et al.* (1984), Randall & Taylor (1988), Myers & Donaldson (1997), Randall *et al.* (1997a).

TAXONOMY: Randall & Taylor (1988).

HAWAIIAN RECORDS: Hawai'i Island to Lāna'i at 220–280 m (Strasburg, 1966; Randall & Taylor, 1988).

GENERAL RANGE: Western and central North Pacific endemic from Korea, Japan, the Ryukyu and Ogasawara Islands, the Kyushu-Palau Ridge, Guam and the Hawaiian Islands. Engyebenthic over rocky habitats at 100–400 m (Amaoka in Okamura *et al.*, 1982; Katayama in Masuda *et al.*, 1984; Randall & Taylor, 1988; Myers & Donaldson, 1997; Randall *et al.*, 1997b).

## Grammistini<sup>55</sup>

### *Aporops bilinearis* Schultz

*Aporops bilinearis* Schultz, 1943, p. 112, Fig. 9, Hull Island, Phoenix Islands.

*Pseudogramma bilinearis* (Schultz, 1943): Hayashi in Masuda *et al.* (1984), Myers (1989), Randall *et al.* (1990a, 1993b), Allen & Smith-Vaniz (1994).

*Aporops bilinearis* Schultz, 1943: Gosline & Brock (1960), Tinker (1982), Kosaki *et al.* (1991), Randall & Baldwin (1997).

TAXONOMY: Randall & Baldwin (1997).

COMMON NAMES: Twolined soapfish, Poreless podge (Randall *et al.*, 1997a; Myers, 1999).

HAWAIIAN RECORDS: Johnston Atoll and unspecified localities in the main Hawaiian Islands to Midway at 8–12 m (Gosline & Brock, 1960; Kosaki *et al.*, 1991; Randall *et al.*, 1993b; Randall & Baldwin, 1997).

GENERAL RANGE: Indo-Pacific from East Africa and the Seychelles to Cocos-Keeling Island, both coasts of Australia, the Ryukyu Islands, Micronesia, the Line Islands, Johnston Atoll, the Hawaiian Islands, the Tuamotu Archipelago and the Marquesas. Benthic in coral and caves of areas exposed to surge at 1–15 m (Hayashi in Masuda *et al.*, 1984; Myers, 1989; Randall *et al.*, 1990a, 1993b; Allen & Smith-Vaniz, 1994; Randall & Baldwin, 1997).

***Pseudogramma polyacantha hawaiiensis* Randall & Baldwin**

*Pseudogramma polyacanthum hawaiiensis* Randall & Baldwin, 1997, p. 42, Ke'ei at the southern end of Kealakekua Bay, Kona Coast of Hawai'i Island.

*Pseudochromis polyacantha* Bleeker, 1856: Fowler (1923, 1928).

*Pseudorhegma diagramma* Schultz, 1966: Schultz (1966).

*Pseudogramma polyacantha* (Bleeker, 1856): Fowler (1934, 1949), Gosline & Brock (1960), Tinker (1982), Hayashi in Masuda *et al.* (1984), Randall *et al.* (1985a, 1990a), Myers (1989).

*Pseudogramma polyacanthum* (Bleeker, 1956): Randall & Baldwin (1997), Randall *et al.* (1997a).

*Pseudogramma polyacanthum hawaiiensis* Randall & Baldwin, 1997: Randall & Baldwin (1997).

TAXONOMY: Randall & Baldwin (1997).

COMMON NAMES: Palespotted podge (Randall *et al.*, 1997a; Myers, 1999).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to O'ahu at unrecorded depths (Fowler, 1923; Gosline & Brock, 1960; Randall *et al.*, 1985b; Randall & Baldwin, 1997).

GENERAL RANGE: *Pseudogramma polyacantha hawaiiensis* Randall & Baldwin is a Hawaiian Islands endemic. *Pseudogramma polyacantha polyacantha* (Bleeker) is Indo-Pacific from east Africa to southern Japan, the Ogasawara Islands, Australia, Lord Howe Island, Micronesia, the Line Islands, French Polynesia and east through Ducie Island. Benthic in coral and rubble at 1–61 m (Hayashi in Masuda *et al.*, 1984; Myers, 1989; Randall *et al.*, 1990a; Randall & Baldwin, 1997; Randall *et al.*, 1997b).

***Suttonia lineata* Gosline**

*Suttonia lineata* Gosline, 1960, p. 28, Fig. 1, Wai'anae (west) coast of O'ahu, Hawaiian Islands.

*Suttonia lineata* Gosline, 1960: Gosline (1960), Tinker (1982), Randall (1976a), Allen & Smith-Vaniz (1994), Randall & Baldwin (1997).

TAXONOMY: Randall & Baldwin (1997).

COMMON NAMES: Palestripe podge (Myers, 1999).

HAWAIIAN RECORDS: O'ahu at 18–22 m (Gosline, 1960).

GENERAL RANGE: Eastern Indian Ocean and western/central Pacific Ocean from Cocos-Keeling Island to the Philippines, northeastern Australia, Guam, New Caledonia, Fiji, the Hawaiian and Line islands, and Tahiti. Benthic in coral at 6–31 m (Gosline, 1960; Allen & Smith-Vaniz, 1994; Randall & Baldwin, 1997).

**Callanthiidae****[*Callanthias japonicus* Franz]**

*Callanthias japonicus* Franz, 1910, p. 40, Pl. 6 (fig. 49), Aburatsubo, Sagami Sea, Japan.

*Callanthias japonicus* Franz, 1910: Novikov *et al.* (1981), Anderson & Johnson (1984), Katayama in Masuda *et al.* (1984), Yamakawa in Okamura (1985).

TAXONOMY: Anderson & Johnson (1984).

HAWAIIAN RECORDS: None but *C. japonicus* has been recorded from the Milwaukee and Koko seamounts (Novikov *et al.*, 1981) indicating that it could occur at the Hancock Seamounts (but see comments for next species).

GENERAL RANGE: Pacific transition zone endemic known from the East China Sea, Japan, the Okinawa Trough, and the Emperor Seamounts. Emybenthic at 100–200 m (Anderson & Johnson, 1984; Katayama in Masuda *et al.*, 1984; Yamakawa in Okamura *et al.*, 1985).

***Callanthias* sp.**

*Callanthias* species: Ralston *et al.* (1986), Chave & Mundy (1994).

TAXONOMY: Unknown. At least some of the records of *Callanthias* from the region are likely to be misidentified *Grammatonotus*.

HAWAIIAN RECORDS: *Callanthias* tentatively identified as an undescribed species have been photographed at Johnston Atoll and the Hawaiian Islands at 171–360 m (Ralston *et al.*, 1986; Chave & Mundy, 1994).



GENERAL RANGE: Unknown, perhaps an Hawaiian Islands and Johnston Atoll endemic, although more than one species may be involved in this problem. Engybenitic over hard substrates with holes at 171–360 m (Chave & Mundy, 1994).

***Grammatonotus laysanus* Gilbert**

*Grammatonotus laysanus* Gilbert, 1905, p. 619, Fig. 240, Laysan Island, Northwestern Hawaiian Islands.

*Grammatonotus laysanus* Gilbert, 1905: Gilbert (1905), Fowler (1928), Gosline & Brock (1960), Tinker (1982), Katayama *et al.* (1982), Humphreys *et al.* (1984), Randall *et al.* (1985a), Borets (1986), Parin (1991), Boehlert & Mundy (1992), Chave & Mundy (1994), Mundy & Parrish (2004).

TAXONOMY: Katayama *et al.* (1982).

HAWAIIAN RECORDS: Johnston Atoll and Cross Seamount to Koko Seamount at 170–372 m, with one record of a juvenile at 7.6 m (Gilbert, 1905; Humphreys *et al.*, 1984; Randall *et al.*, 1985b; Borets, 1986; Boehlert & Mundy, 1992; Mundy & Parrish, 2004).

GENERAL RANGE: Pacific endemic known from the Emperor Seamounts, Johnston Atoll, the Hawaiian Islands, the Line Islands, and the Nazca/Sala-y-Gomez Ridges. Engybenitic over hard substrates with holes at 170–372 m (Gilbert, 1905; Katayama *et al.*, 1982; Parin, 1991; Chave & Mundy, 1994; Mundy & Parrish, 2004).

***Grammatonotus macrophthalmus* Katayama, Yamamoto, & Yamakawa**

*Grammatonotus macrophthalmus* Katayama, Yamamoto & Yamakawa, 1982, p. 371, Fig. 4, Kyushu-Palau Ridge at 26°46.0'N, 135°21.5'E–26°45.6'N, 135°24.5'E.

*Grammatonotus macrophthalmus* Katayama, Yamamoto & Yamakawa, 1982: Katayama *et al.* (1982), Okamura & Amaoka (1997), Mundy & Parrish (2004).

TAXONOMY: Katayama *et al.* (1982).

HAWAIIAN RECORDS: French Frigate and Northampton Seamount at 340–440 m (Mundy & Parrish, 2004).

GENERAL RANGE: Western and central North Pacific endemic known from the Kyushu-Palau Ridge, the Ogasawara Islands, perhaps southern Japan, and the Northwestern Hawaiian Islands. Engybenitic on or near ledges and crevices in rock at ca. 300–500 m (Katayama *et al.*, 1982; Okamura & Amaoka, 1997; Mundy & Parrish, 2004).

**Pseudochromidae — Dottybacks<sup>55</sup>**

[*Pseudochromis tapeinosoma* Bleeker]

*Pseudochromis tapeinosoma* Bleeker, 1853b, p. 115, Ambon Island, Moluccas Islands, Indonesia.

*Pseudochromis tapeinosoma* Bleeker, 1853b: Chapman & Schultz (1952), Myers (1989).

TAXONOMY: Gill (1995). Past confusion of *P. tapeinosoma* Bleeker, 1953, and *P. cyanotaenia* Bleeker, 1857, the blue-barred dottyback, (Randall *et al.*, 1990a; Gill, 1995) casts doubt upon the identification of the specimens collected in the Hawaiian Islands.

COMMON NAMES: Blackbanded dottyback, Horseshoe-tailed dottyback (Myers, 1999).

HAWAIIAN RECORDS: Specimens of *P. tapeinosoma* were collected on a drydock that had been moved to Pearl Harbor, O'ahu, from Guam in 1949 (Chapman & Schultz, 1952). This drydock also harbored several other species of western Pacific fishes otherwise unrecorded from the Hawaiian Islands. *Pseudochromis tapeinosoma* did not become established in the Hawaiian Islands.

GENERAL RANGE: Western Pacific and Indonesian endemic, found from the Ryukyus to Timor in Indonesia and eastward through Micronesia. Benthic in shallow waters of tidepools and lagoons (Myers, 1989).

**Centrarchidae — Sunfishes**

***Lepomis cyanellus* Rafinesque**

*Lepomis cyanellus* Rafinesque, 1819, p. 420, Ohio River, U.S.A.

*Lepomis cyanellus* Rafinesque, 1819: Fuller *et al.* (1999), Yamamoto & Tagawa (2000).

TAXONOMY: Fuller *et al.* (1999).

COMMON NAMES: Green sunfish (AFS).

HAWAIIAN RECORDS: *Lepomis cyanellus* were collected in lagoons of western Kaua'i that had been stocked with "*Lepomis macrochirus*" from other reservoirs of Kaua'i prior to 1991 (Fuller *et al.*, 1999). Green sunfish were abundant in those locations on Kaua'i around that time but surveys in 1999 failed to collect them and the species may no longer be established within the Hawaiian Islands (Yamamoto & Tagawa, 2000).

GENERAL RANGE: Indigenous to central North America from New York and North Carolina to Minnesota, Wyoming, Mississippi, and eastern New Mexico. Widely introduced throughout North America and identified as a threat to indigenous fish species. Engybenthic in lentic and lotic freshwater habitats (Fuller *et al.*, 1999).

### *Lepomis macrochirus* Rafinesque

*Lepomis macrochirus* Rafinesque, 1819, p. 420, Ohio River, U.S.A.

*Lepomis macrochirus* Rafinesque, 1819: Brock (1960), Scott & Crossman (1973), Lee in Lee *et al.* (1980), Maciolek (1984), Devick (1991), Fuller *et al.* (1999), Yamamoto & Tagawa (2000).

TAXONOMY: Scott & Crossman (1973), Fuller *et al.* (1999).

COMMON NAMES: Bluegill (AFS), Bluegill sunfish (DLNR).

HAWAIIAN RECORDS: *Lepomis macrochirus* was first introduced to the Hawaiian Islands at O'ahu in 1946.

It is established in freshwater reservoirs and ponds of Hawai'i Island, Maui, O'ahu, and Kaua'i (Brock, 1960; Maciolek, 1984; Devick, 1991; Fuller *et al.*, 1999; Yamamoto & Tagawa, 2000).

GENERAL RANGE: Indigenous to eastern-central North America, except the northeastern seaboard, from Minnesota to northern Mexico. Widely introduced throughout North America, South America, and Eurasia. Engybenthic in still or slow-moving, shallow freshwaters (Scott & Crossman, 1973; Lee in Lee *et al.*, 1980; Fuller *et al.*, 1999).

### *Micropterus dolomieu* Lacépède

*Micropterus dolomieu* Lacépède, 1802, p. 324, 325, Pl. 3 (fig. 3), no type locality given, but probably South Carolina, U.S.A.

Black bass (no scientific name given): Jordan & Evermann (1905, p. 527) [largemouth black bass also mentioned as a potential species for importation to the Hawaiian Islands, but the mention of an importation of black bass to the Hawaiian Islands in 1896 apparently refers to *M. dolomieu*].

*Micropterus dolomieu* Lacépède, 1802: Brock (1960), Scott & Crossman (1973), Lee in Lee *et al.* (1980), Maciolek (1984), Devick (1991), Fuller *et al.* (1999), Yamamoto & Tagawa (2000), Englund & Eldredge (2001).

TAXONOMY: Scott & Crossman (1973), Fuller *et al.* (1999).

COMMON NAMES: Smallmouth bass (AFS), Smallmouth black bass (DLNR).

HAWAIIAN RECORDS: *Micropterus dolomieu* was first introduced to Hawai'i Island in 1897, to O'ahu in 1908, and to Kaua'i in 1911. More were imported to O'ahu and Kaua'i in 1953 and especially in 1956. Smallmouth bass are established in freshwater streams of O'ahu and Kaua'i, and in Ho'omaluhia Reservoir on windward O'ahu (Brock, 1960; Maciolek, 1984; Devick, 1991; Fuller *et al.*, 1999; Yamamoto & Tagawa, 2000; Englund & Eldredge, 2001).

GENERAL RANGE: Indigenous to central-eastern North America from southeastern Canada to Alabama and Oklahoma. Widely introduced in temperate areas worldwide and implicated as a threat to indigenous biodiversity. Engybenthic in shallow, clear, flowing freshwaters (Scott & Crossman, 1973; Lee in Lee *et al.*, 1980; Fuller *et al.*, 1999).

### *Micropterus salmoides salmoides* (Lacépède)

*Labrus salmoides* Lacépède, 1802, p. 716, 717, Pl. 5 (fig. 2), Carolinas, U.S.A.

*Micropterus salmoides* Lacépède, 1802: Brock (1960), Scott & Crossman (1973), Lee in Lee *et al.* (1980), Maciolek (1984), Devick (1991), Fuller *et al.* (1999), Yamamoto & Tagawa (2000).

TAXONOMY: Scott & Crossman (1973), Fuller *et al.* (1999).

COMMON NAMES: Largemouth bass (AFS), Black bass (Yamamoto & Tagawa, 2000), Largemouth black bass (DLNR).

HAWAIIAN RECORDS: Largemouth bass were first brought to Hilo, Hawai'i Island, in 1856 but that introduction failed. They were successfully introduced to O'ahu in 1953, to Kaua'i in 1956, and to

Hawai'i Island in 1958. Largemouth bass are established in freshwater reservoirs and ponds on Hawai'i Island, Maui, O'ahu, and Kaua'i (Brock, 1960; Maciolek, 1984; Devick, 1991; Fuller *et al.*, 1999; Yamamoto & Tagawa, 2000).

GENERAL RANGE: Indigenous to eastern and central North America, except the northeastern seaboard, from southeastern Canada through northern Mexico. Widely introduced in temperate and subtropical areas worldwide and implicated as a threat to indigenous biodiversity. Engybenthic in shallow, still freshwaters (Scott & Crossman, 1973; Lee *in Lee et al.*, 1980; Fuller *et al.*, 1999).

### Priacanthidae — Bigeyes, Catalufas

#### *Cookeolus japonicus* (Cuvier)

*Priacanthus japonicus* Cuvier *in* Cuvier & Valenciennes, 1829a, p. 106, Pl. 50, Japan.

*Priacanthus boops* non (Forster *in* Bloch & Schneider, 1801) [a junior synonym of *Heteropriacanthus cruentatus* (Lacépède, 1801), a species that also occurs in the Hawaiian Islands]: Fowler (1923, 1928, 1931), Gosline & Brock (1960), Tinker (1982).

*Cookeolus boops* non (Forster, 1801): Fowler (1949), Clarke (1972), Randall *et al.* (1985a), Borets (1986), Uchida & Uchiyama (1986).

*Cookeola boops* non (Forster, 1801) [a *lapsus* in the spelling of the genus]: Humphreys *et al.* (1984).

*Cookeolus japonicus* (Cuvier, 1829): Starnes (1988), Chave & Mundy (1994), Allen & Robertson (1994).

TAXONOMY: Starnes (1988).

COMMON NAMES: Bulleye (AFS; Randall *et al.*, 1997a), Long-finned bulleye (FAO).

HAWAIIAN RECORDS: Johnston Atoll and O'ahu to the Hancock Seamounts at 55–311 m (Fowler, 1923; Clarke, 1972; Randall *et al.*, 1985b; Borets, 1986; Uchida & Uchiyama, 1986; Humphreys *et al.*, 1984; Chave & Mundy, 1994).

GENERAL RANGE: Circumglobal in the tropical and subtropical Atlantic, Indian, and Pacific oceans between 45°N–40°S. Benthopelagic over hard substrates with holes at 55–>400 m, most abundant at 165–260 m (Borets, 1986; Starnes, 1988; Chave & Mundy, 1994; Allen & Robertson, 1994).

#### *Heteropriacanthus cruentatus* (Lacépède)

*Labrus cruentatus* Lacépède, 1801, p. 452, 522, Pl. 2 (fig. 3), Scotts Head, Dominica, Caribbean Sea.

*Priacanthus carolinus* Cuvier *in* Cuvier & Valenciennes, 1829: Streets (1877).

*Priacanthus cruentatus* (Lacépède, 1801): Jenkins (1903), Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Hobson (1974), Tinker (1982), Randall *et al.* (1985a).

*Heteropriacanthus cruentatus* (Lacépède, 1801): Randall (1985a, 1996a), Starnes (1988), Myers (1989), Hoover (1993, 2003), Randall *et al.* (1993b), Allen & Robertson (1994).

TAXONOMY: Starnes (1988).

COMMON NAMES: 'Āweoweo (Hoover, 1993, 2003; Randall, 1996a), Alalaua, Glasseye snapper (AFS), Glasseye (FAO; Hoover, 1993, 2003; Randall, 1996a), Goggle-eye (Hoover, 1993, 2003), Bigeye (Hoover, 1993, 2003), Red bigeye (DLNR).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at 2–9 m (Streets, 1877a; Gosline & Brock, 1960; Hobson, 1974; Randall *et al.*, 1985b, 1993b; Hoover, 1993).

GENERAL RANGE: Circumglobal in the tropical and subtropical Gulf of Mexico, Atlantic, Indian, and Pacific oceans between 40°N–30°S. Engybenthic in or near holes in hard substrates during day and benthopelagic at night at 2–20 m (Hobson, 1974; Starnes, 1988; Allen & Robertson, 1994).

#### *Priacanthus alalaua* Jordan & Evermann

*Priacanthus alalaua* Jordan & Evermann, 1903a, p. 181, Honolulu, O'ahu, Hawaiian Islands.

*Priacanthus ulalaua* Jordan & Evermann, 1903a [apparently a typographic error in the species name]: Jordan *et al.* (1927).

*Priacanthus hamrur* non (Forsskål, 1775) [a valid species that does not occur in Hawai'i]: Fowler (1928, 1931, 1934, 1949, in part), Tinker (1982).

*Priacanthus cruentatus* non (Lacépède, 1801) [a valid *Heteropriacanthus* species also found in the Hawaiian Islands]: Iwai (1976), Uchida & Uchiyama (1986, *vide* R. Moffitt, pers. comm., Dec. 1993).

*Priacanthus alalaua* Jordan & Evermann, 1903a: Jordan & Evermann (1903a, 1905), Snyder (1904), Gosline & Brock (1960), Clarke (1972), Struhsaker (1973a), Uchida & Uchiyama (1986), Starnes (1988), Chave & Mundy (1994), Allen & Robertson (1994), Myers & Donaldson (1997).

TAXONOMY: Starnes (1988).

COMMON NAMES: 'Āweoweo, Alalauwa, Alalaua (FAO), 'Alalaua (Gosline & Brock, 1960), Hawaiian bigeye.

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 16–296 m, usually at >100 m (Jordan & Evermann, 1903a; Clarke, 1972; Struhsaker, 1973a; Iwai, 1976; Uchida & Uchiyama, 1986; Starnes, 1988; Chave & Mundy, 1994).

GENERAL RANGE: Trans-Pacific endemic, known from Guam, Johnston Atoll, the Hawaiian Islands, the Revillagigedos Islands, and Baja California. Engyebenthic near or in holes of hard substrates at 8–296 m (Uchida & Uchiyama, 1986; Starnes, 1988; Chave & Mundy, 1994; Allen & Robertson, 1994; Myers & Donaldson, 1997).

### *Priacanthus meeki* Jenkins

*Priacanthus meeki* Jenkins, 1903, p. 450, Fig. 20 (2nd of 2 Fig. 20's), Honolulu, O'ahu, Hawaiian Islands.

*Priacanthus hamrur* non (Forsskål, 1775) [a valid species that does not occur in the Hawaiian Islands]: Steindachner (1900).

*Priacanthus helvolus* Jordan, Evermann & Tanaka, 1927: Jordan *et al.* (1927).

*Priacanthus macracanthus* non Cuvier in Cuvier & Valenciennes, 1829 [a valid species that does not occur in the Hawaiian Islands]: Fowler (1928, 1931, 1934, 1949, in part).

*Priacanthus meeki* Jenkins, 1903: Jenkins (1903), Jordan & Evermann (1905), Jordan *et al.* (1927), Gosline & Brock (1960), Clarke (1972), Struhsaker (1973a), Tinker (1982), Humphreys *et al.* (1984), Okamoto & Kanenaka (1984), Randall (1985a, 1996a), Uchida & Uchiyama (1986), Starnes (1988), Kosaki *et al.* (1991), Randall *et al.* (1993b), Hoover (1993, 2003), Chave & Mundy (1994).

TAXONOMY: Starnes (1988).

COMMON NAMES: 'Āweoweo (Hoover, 1993, 2003; Randall, 1996a), Ula lau au, Hawaiian bigeye (Hoover, 1993, 2003; Randall, 1996a), Red bigeye (DLNR).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll and Bank 11 at 3–272 m (Steindachner, 1900; Jenkins, 1903; Jordan & Evermann, 1905; Clarke, 1972; Struhsaker, 1973a; Okamoto & Kanenaka, 1984; Uchida & Uchiyama, 1986; Kosaki *et al.*, 1991; Randall *et al.*, 1993b).

GENERAL RANGE: Probably a Hawaiian Islands endemic. A single juvenile only tentatively identified suggests that it may also occur in the Galapagos Islands but this may have been a waif. Engyebenthic at 3–272 m (Struhsaker, 1973a; Starnes, 1988; Chave & Mundy, 1994).

## Apogonidae — Cardinalfishes

### *Apogon deetsie* Randall

*Apogon deetsie* Randall, 1998b, p. 30, Fig. 4, Kāne'ohe Bay, O'ahu, Hawaiian Islands.

*Apogon* species: Struhsaker (1973a), Madden (1973).

*Apogon deetsie* Randall, 1998b: Randall (1998b).

TAXONOMY: Randall (1998b).

COMMON NAMES: Deetsie's cardinalfish.

HAWAIIAN RECORDS: O'ahu and Maui at 25–84 m (Struhsaker, 1973a; Madden, 1973; Randall, 1998b).

GENERAL RANGE: Pacific Plate endemic known only from the Hawaiian Islands and the Tuamotu Archipelago. Engyebenthic in crevices and caves of reef drop-offs at 25–84 m (Randall, 1998b).

### *Apogon erythrinus* Snyder

*Apogon erythrinus* Snyder, 1904, p. 526, Pl. 9 (fig. 17), Puako Bay, Hawai'i Island.

*Amia erythrina* (Snyder, 1904): Jordan & Evermann (1905), Fowler (1928).

*Apogon coccineus* non Rüppell, 1838 [a valid species not found in the Hawaiian Islands]: Randall *et al.* (1985a), Uchida & Uchiyama (1986), Hoover (1993).

*Apogon erythrinus* Snyder, 1904: Snyder (1904), Fowler (1949), Gosline & Brock (1960), Chave (1978), Hobson (1974), Tinker (1982), Randall (1996a, 1998b), Greenfield (2001a), Hoover (2003).

TAXONOMY: Randall (1998b), Greenfield (2001a).

COMMON NAMES: 'Upāpalu (Randall, 1996a), Hawaiian ruby cardinalfish (Randall, 1996a), Ruby cardinalfish (Hoover, 2003), Cryptic cardinalfish.

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at 1–48 m (Snyder, 1904; Chave, 1978; Hobson, 1974; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Randall, 1996a, 1998b). Johnston Atoll specimens have a minor but consistent difference in second dorsal-fin spine length from Hawaiian Island specimens, suggesting a low level of genetic differentiation in the populations at these two areas (Greenfield, 2001a).

GENERAL RANGE: Hawaiian Islands and Johnston Atoll endemic. Randall (1998b) commented that reports of this species from the Ryukyu and Philippine Islands by Hayashi & Kishimoto (1983) need confirmation but Greenfield (2001a) considered those reports to likely be of *A. susanae* Greenfield, 2001. Engyobenthic in or near holes in reefs at 1–48 m (Hobson, 1974; Uchida & Uchiyama, 1986; Randall, 1996a, 1998b; Greenfield, 2001a).

### *Apogon evermanni* Jordan & Snyder

*Apogon evermanni* Jordan & Snyder, 1904c, p. 123, Honolulu market, O'ahu, Hawaiian Islands.

*Amia evermanni* (Jordan & Snyder, 1904c): Jordan & Evermann (1905), Fowler (1928).

*Apogon evermanni* Jordan & Snyder, 1904c: Jordan & Snyder (1904b), Fowler (1949), Gosline & Brock (1960), Randall & Böhlke (1981), Tinker (1982), Myers (1989), Winterbottom *et al.* (1989), Paxton *et al.* (1989), Allen & Smith-Vaniz (1994), Randall (1996a, 1998b), Myers & Donaldson (1997).

TAXONOMY: Randall & Böhlke (1981), Randall (1998b).

COMMON NAMES: 'Upāpalu (Randall, 1996a), Oddscale cardinalfish (Randall, 1996a), Evermann's cardinalfish (Myers, 1999).

HAWAIIAN RECORDS: Hawai'i Island to O'ahu at 9–31 m (Jordan & Snyder, 1904c; Randall & Böhlke, 1981).

GENERAL RANGE: Circumtropical and subtropical in the Atlantic, Indian, and Pacific oceans. Known from the Mexican Caribbean, Curaçao, and the Bahamas to Mauritius, the Chagos and Maldivé Archipelagos, the Cocos-Keeling Islands, Indonesia, Australia, the Marianas, the Marshall Islands, the Hawaiian Islands, and the Marquesas. Engyobenthic in caves and crevices of reefs at 3–69 m, usually >25 m (Randall & Böhlke, 1981; Myers, 1989; Winterbottom *et al.*, 1989; Paxton *et al.*, 1989; Allen & Smith-Vaniz, 1994; Myers & Donaldson, 1997; Randall, 1998b).

### *Apogon kallopterus* Bleeker

*Apogon kallopterus* Bleeker, 1856b, p. 33, Manado, Sulawesi, Indonesia.

*Apogon frenatus* non Valenciennes, 1832 [*lapsus* for *fraenatus*; a valid species not found in the Hawaiian Islands]: Günther (1873–1910, in part), Steindachner (1900), Fowler (1949, in part).

*Apogon snyderi* Jordan & Evermann, 1903: Jordan & Evermann (1903a), Jenkins (1903), Snyder (1904), Gosline & Brock (1960), Chave (1978), Tinker (1982).

*Amia snyderi* (Jordan & Evermann, 1903): Jordan & Evermann (1905).

*Apogon frenata* non Valenciennes, 1832: Fowler (1928, 1931, 1934, in part).

*Apogon kallopterus* Bleeker, 1856: Chave (1978), Okamoto & Kanenaka (1984), Randall (1985a, 1996a, 1998b), Randall *et al.* (1985a, 1993b, 1997a), Fraser & Lachner (1985), Uchida & Uchiyama (1986), Myers (1989), Hoover (1993, 2003), Chave & Mundy (1994).

TAXONOMY: Fraser & Lachner (1985), Randall (1998b).

COMMON NAMES: 'Upāpalu (Hoover, 1993, 2003; Randall, 1996a), Iridescent cardinalfish (Hoover, 1993, 2003; Randall, 1996a), Cardinal fish (DLNR).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 1–158 m (Günther, 1873–1910; Jordan & Evermann, 1905; Chave, 1978; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Hoover, 1993; Chave & Mundy, 1994; Randall, 1998b).

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to Indonesia, Taiwan, northern Australia, the Ogasawara Islands, Micronesia, the Hawaiian Islands, the Marquesas, and the Pitcairn Group. Engyobenthic at 1–158 m (Chave, 1978; Fraser & Lachner, 1985; Myers, 1989; Chave & Mundy, 1994; Randall *et al.*, 1997b; Randall, 1998b).

### *Apogon maculiferus* Garrett

*Apogon maculiferus* Garrett, 1864, p. 105, "Hawaiian Islands".

*Amia maculifera* (Garrett, 1864): Gilbert (1905), Jordan & Evermann (1905), Fowler (1928, 1931).

*Apogon maculifera* Garrett, 1864: Tinker (1982).

*Apogon maculiferus* Garrett, 1864: Garrett (1864), Günther (1873–1910), Steindachner (1900), Jenkins (1903), Snyder (1904), Fowler (1949), Gosline & Brock (1960), Clarke (1972), Struhsaker (1973a), Chave (1978), Randall (1985a, 1996a, 1998b), Uchida & Uchiyama (1986), Hoover (1993, 2003), Randall *et al.* (1993b), Chave & Mundy (1994).

TAXONOMY: Randall (1985a, 1998b).

COMMON NAMES: ‘Upāpalu (Hoover, 1993, 2003; Randall, 1996a), Spotted cardinalfish (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Hawai‘i Island to Kure Atoll at 1–153 m (Garrett, 1864; Gilbert, 1905; Struhsaker, 1973a; Chave, 1978; Randall, 1985a, 1998b; Uchida & Uchiyama, 1986; Randall *et al.*, 1993b; Chave & Mundy, 1994).

GENERAL RANGE: Hawaiian Islands endemic. Engyobenthic at 1–153 m (Chave, 1978; Randall, 1985a, 1998b; Chave & Mundy, 1994).

### *Apogon taeniopterus* Bennett

*Apogon taeniopterus* Bennett, 1836, p. 206, Mauritius, western Indian Ocean.

*Apogon menesemus* Jenkins, 1903: Jenkins (1903), Snyder (1904), Gosline & Brock (1960), Hobson (1974), Chave (1978), Tinker (1982), Okamoto & Kanenaka (1984), Fraser & Lachner (1985), Randall (1996a).

*Amia menesema* (Jenkins, 1903): Jordan & Evermann (1905).

*Apogon frenata* non Valenciennes, 1832 [a *lapsus* in spelling for *A. fraenatus*, a valid species not found in the Hawaiian Islands]: Fowler (1928, 1931, 1934).

*Apogon frenatus* non Valenciennes, 1832: Fowler (1949).

*Apogon taeniopterus* Bennett, 1836: Randall (1985a, 1998b), Randall *et al.* (1985a, 1993b), Uchida & Uchiyama (1986), Hoover (1993, 2003).

TAXONOMY: Randall (1998b). Fraser & Lachner (1985) considered the Hawaiian Islands population of this species to be an endemic species, *A. menesemus* Jenkins, but Randall (1998b) gave evidence that no differences exist between the populations in the Hawaiian Islands and elsewhere in the Indo-Pacific.

COMMON NAMES: ‘Upāpalu (Hoover, 1993, 2003; Randall, 1996a), Bandfin cardinalfish (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to Kure Atoll at 1–40 m (Jenkins, 1903; Hobson, 1974; Chave, 1978; Okamoto & Kanenaka, 1984; Fraser & Lachner, 1985; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Randall, 1998b).

GENERAL RANGE: Indo-Pacific with a disjunct distribution from Mauritius, St. Brandon’s Shoals, Christmas Island, and the Cocos-Keeling Islands in the Indian Ocean and the Marianas, New Caledonia, the Line and Hawaiian Islands, and the Marquesas in the Pacific. Engyobenthic in or near holes in reefs at 1–42 m (Hobson, 1974; Chave, 1978; Fraser & Lachner, 1985; Uchida & Uchiyama, 1986; Randall *et al.*, 1993b; Randall, 1996a, 1998b).

### *Apogonichthys perdx* Bleeker

*Apogonichthys perdx* Bleeker, 1854a, p. 321, Larantuka, Flores Island, Lesser Sunda Islands, Indonesia.

*Apogonichthys waikiki* Jordan & Evermann, 1903: Jordan & Evermann (1903a), Snyder (1904), Chave (1978).

*Mionurus waikiki* (Jordan & Evermann, 1903): Gilbert (1905), Jordan & Evermann (1905), Fowler (1928, 1931).

*Apogon waikiki* (Jordan & Evermann, 1903): Fowler (1949), Gosline & Brock (1960), Tinker (1982).

*Apogon perdx* (Bleeker, 1854): Fowler (1949).

*Apogonichthys perdx* Bleeker, 1854: Fowler (1928, 1931), Randall (1985a, 1998b), Randall *et al.* (1985a, 1990b), Gon *in* Smith & Heemstra (1986), Myers (1989), Paxton *et al.* (1989).

TAXONOMY: Randall (1985a, 1998b), Gon *in* Smith & Heemstra (1986).

COMMON NAMES: ‘Upāpalu, Waikiki cardinalfish (Randall, 1985), Perdx cardinalfish (Myers, 1999).

HAWAIIAN RECORDS: Johnston Atoll and Maui to Ni‘ihau at 1–79 m (Jordan & Evermann, 1903a; Gilbert, 1905; Jordan & Evermann, 1905; Chave, 1978; Randall *et al.*, 1985b).

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to southern Japan, Australia, Micronesia, the Hawaiian Islands, and Rapa. Benthic and engyobenthic in or near holes of rubble and reef, usually in shallow, sheltered habitats such as bays, at 1–79 m (Chave, 1978; Gon *in* Smith & Heemstra, 1986; Myers, 1989; Paxton *et al.*, 1989; Randall *et al.*, 1990b; Randall, 1998b).

***Foa brachygramma*** (Jenkins)

*Fowleria brachygrammus* Jenkins, 1903, p. 447, Fig. 20 (error for Fig. 18?), Honolulu, O‘ahu, Hawaiian Islands.  
*Apogon auritus* non Valenciennes in Cuvier & Valenciennes, 1831 [a valid *Fowleria* species not found in the Hawaiian Islands]: Streets (1877).

*Fowleria brachygrammus* Jenkins, 1903; Jenkins (1903), Snyder (1904).

*Amia brachygramma* (Jenkins, 1903): Fowler (1928).

*Apogonichthys brachygrammus* (Jenkins, 1903): Fowler (1931).

*Apogon brachygrammus* (Jenkins, 1903): Fowler (1949), Gosline & Brock (1960), Tinker (1982).

*Foa brachygramma* (Jenkins, 1903): Gilbert (1905), Jordan & Evermann (1905), Chave (1978), Randall (1985a, 1996a, 1998b), Gon *in* Smith & Heemstra (1986), Myers (1989), Paxton *et al.* (1989), Randall *et al.* (1990a, 1993b), Myers & Donaldson (1997).

TAXONOMY: Randall (1985a, 1998b), Gon *in* Smith & Heemstra (1986).

COMMON NAMES: ‘Upāpalu (Randall, 1996a), Weed cardinalfish (Randall *et al.*, 1997a), Bay cardinalfish (Randall, 1996a).

HAWAIIAN RECORDS: Hawai‘i Island to Midway at 1–134 m (Streets, 1877a; Gilbert, 1905; Jordan & Evermann, 1905; Chave, 1978; Randall, 1985a; Randall *et al.*, 1993b).

GENERAL RANGE: Indo-Pacific from South Africa to southern Japan, the Philippines, Australia, Micronesia, and the Hawaiian Islands. Randall (1998b) suggested that many of these records need reexamination and that a revision of *Foa* is needed. Benthic and engyenthic under or near rocks, algae, dead coral, and sponges, usually in habitats protected from wave action and sometimes in estuaries, at <1–134 m (Randall, 1985a, 1998a; Gon *in* Smith & Heemstra, 1986; Myers, 1989; Paxton *et al.*, 1989; Randall *et al.*, 1990a; Myers & Donaldson, 1997).

***Lachneratus phasmaticus*** Fraser & Struhsaker

*Lachneratus phasmaticus* Fraser & Struhsaker, 1991, p. 719, Figs. 1–2, Ka‘u Loa Point, Kona coast, Hawai‘i Island.

*Quinca* species: Struhsaker (1973a).

*Lachneratus phasmaticus* Fraser & Struhsaker, 1991; Fraser & Struhsaker (1991), Randall (1996a, 1998b).

TAXONOMY: Fraser & Struhsaker (1991), Randall (1998b).

HAWAIIAN RECORDS: Hawai‘i Island to O‘ahu at 3–104 m (Struhsaker 1973a, Fraser & Struhsaker, 1991; Randall, 1998b).

GENERAL RANGE: Indo-Pacific but known only from Mauritius, the Comoro Islands, Fiji, and the Hawaiian Islands. Engyenthic within or near caves and crevices at 1–104 m (Fraser & Struhsaker, 1991; Randall, 1998b).

***Pseudamiops diaphanes*** Randall

*Pseudamiops diaphanes* Randall, 1998b, p. 27, Figs. 1–2, Kepuhi Point, Makaha, O‘ahu, Hawaiian Islands.

*Pseudamiops gracilicauda* non (Lachner *in* Schultz *et al.*, 1953) [a valid species not found in the Hawaiian Islands]: Gosline & Brock (1960), Hobson (1974), Tinker (1982), Randall *et al.* (1985a, 1985b), Randall (1993b).

*Pseudamiops diaphanes* Randall, 1998b: Randall (1998b).

TAXONOMY: Randall *et al.* (1998b).

COMMON NAMES: Transparent cardinalfish.

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to Midway at 3–25 m (Gosline & Brock, 1960; Hobson, 1974; Randall *et al.*, 1985b, 1993b; Randall, 1998b).

GENERAL RANGE: Hawaiian Islands and Johnston Atoll endemic. Engyenthic in or near holes, crevices, and caves of reefs at 3–25 m (Randall *et al.*, 1993b).

**Epigonidae — Deepwater cardinalfishes*****Epigonus atherinoides*** (Gilbert)

*Hynnodus atherinoides* Gilbert, 1905, p. 618, Pl. 79, Pailolo Channel between Maui and Moloka‘i, Hawaiian Islands.

*Hynnodus atherinoides* Gilbert, 1905: Gilbert (1905), Fowler (1928, 1934, *in part*), Struhsaker (1973a).

*Epigonus occidentalis* non Goode & Bean, 1896 [a valid Atlantic Ocean species]: Novikov *et al.* (1981), Gon (1985), Borets (1986).

*Epigonus atherinoides* (Gilbert, 1905): Fowler (1949), Gosline & Brock (1960, in part), Tinker (1982), Mochizuki *in Okamura et al.* (1982), Mochizuki & Shirakihara (1983), Humphreys *et al.* (1984), Uchida & Uchiyama (1986), Abramov (1992), Chave & Mundy (1994).

TAXONOMY: Mochizuki & Shirakihara (1983), Abramov (1992).

COMMON NAMES: Slender deepwater cardinalfish (FAO).

HAWAIIAN RECORDS: Hawai'i Island to Koko Seamount at 66–735 m (Gilbert, 1905; Struhsaker, 1973a; Humphreys *et al.*, 1984; Borets, 1986; Uchida & Uchiyama, 1986; Chave & Mundy, 1994).

GENERAL RANGE: Pacific endemic known from the Kyushu-Palau Ridge, the Philippines, the Hawaiian Islands, and the Sala-y-Gomez Ridge in the southeastern Pacific. Benthopelagic at 66–735 m (Mochizuki *in Okamura et al.*, 1982; Borets, 1986; Uchida & Uchiyama, 1986; Abramov, 1992; Chave & Mundy, 1994).

[*Epigonus denticulatus* Dieuzeide]

*Epigonus denticulatus* Dieuzeide, 1950, p. 89, Figs. 1–11, Mediterranean Sea and off Algeria.

*Epigonus denticulatus* Dieuzeide, 1950: Mayer (1974), Novikov *et al.* (1981), Mochizuki *in Okamura et al.* (1982), Mochizuki & Shirakihara (1983), Machida *in Okamura* (1985), Kamysheva (1985), Borets (1986), Paxton *et al.* (1989), Abramov (1992).

TAXONOMY: Mayer (1974), Mochizuki & Shirakihara (1983), Abramov (1992).

HAWAIIAN RECORDS: None but records from Milwaukee and Koko seamounts at 200–830 m indicate that this species could occur at the Hancock Seamounts (Novikov *et al.*, 1981; Kamysheva, 1985; Borets, 1986). Abramov (1992) did not show Hawaiian Islands records on his distribution map, but mentioned Hawaiian Ridge specimens in his text.

GENERAL RANGE: Nearly circumglobal in the tropical through warm-temperate Gulf of Mexico, Mediterranean Sea, Atlantic, western Indian, and western-central Pacific oceans. In the Pacific from southern Japan, the Okinawa Trough, the Kyushu-Palau Ridge, and southern Australia to the Emperor Seamounts and the southwestern Pacific at ca. 40°S, 160°E. Benthopelagic at 100–830 m (Mayer, 1974; Mochizuki *in Okamura et al.*, 1982; Machida *in Okamura et al.*, 1985; Kamysheva, 1985; Paxton *et al.*, 1989; Abramov, 1992).

*Epigonus devaneyi* Gon

*Epigonus devaneyi* Gon, 1985, p. 225, Fig. 3, Necker Island, Northwestern Hawaiian Islands.

Apogonid species A: Struhsaker (1973a) in part?

*Epigonus* species: Randall *et al.* (1985a) in part?, Uchida & Uchiyama (1986).

*Epigonus devaneyi* Gon, 1985: Gon (1985), Abramov (1992).

TAXONOMY: Abramov (1992).

HAWAIIAN RECORDS: Necker to Maro Reef at 113–347 m (Uchida & Uchiyama, 1986; Gon, 1985).

GENERAL RANGE: Hawaiian Islands endemic. Benthopelagic at 113–347 m (Uchida & Uchiyama, 1986; Gon, 1985; Abramov, 1992).

*Epigonus fragilis* (Jordan & Jordan)

*Scepterias fragilis* Jordan & Jordan, 1922, p. 45, Pl. 2 (fig. 2), Honolulu market, O'ahu, Hawaiian Islands.

*Scepterias fragilis* Jordan & Jordan, 1922: Jordan & Jordan (1922).

*Hymnodus fragilis* (Jordan & Jordan, 1922): Fowler (1928, 1934, in part).

*Epigonus atherinoides* non (Gilbert, 1905) [a valid species that also occurs in the Hawaiian Islands]: Gosline & Brock (1960, in part).

*Epigonus fragilis* (Jordan & Jordan, 1922): Mayer (1974), Novikov *et al.* (1981), Randall *et al.* (1985a), Gon (1985), Uchida & Uchiyama (1986), Borets (1986), Abramov (1992), Chave & Mundy (1994).

TAXONOMY: Mayer (1974), Abramov (1992).

HAWAIIAN RECORDS: Johnston Atoll and O'ahu to Milwaukee Seamount at 66–494 m (Jordan & Jordan, 1922; Mayer, 1974; Novikov *et al.*, 1981; Randall *et al.*, 1985b; Uchida & Uchiyama, 1986; Borets, 1986).



GENERAL RANGE: Johnston Atoll, Hawaiian Islands, and Emperor Seamounts endemic. Benthopelagic at 66–494 m (Mayer, 1974; Uchida & Uchiyama, 1986; Borets, 1986; Abramov, 1992; Chave & Mundy, 1994).

***Epigonus glossodontus* Gon**

*Epigonus glossodontus* Gon, 1985, p. 222, Figs. 1–2, Mamala Bay off Pearl Harbor, O‘ahu, Hawaiian Islands.

Apogonid species A: Struhsaker (1973a) in part?

*Epigonus* species: Randall *et al.* (1985a) in part?

*Epigonus glossodontus* Gon, 1985: Gon (1985), Grigg *et al.* (1987), Abramov (1992), Chave & Mundy (1994).

TAXONOMY: Abramov (1992).

HAWAIIAN RECORDS: Cross Seamount and Hawai‘i Island to O‘ahu at 366–520 m (Gon 1985, Grigg *et al.*, 1987; Chave & Mundy, 1994).

GENERAL RANGE: Hawaiian Islands endemic. Benthopelagic at 366–520 m (Gon, 1985; Abramov, 1992; Chave & Mundy, 1994).

[*Epigonus pectinifer* Mayer]

*Epigonus pectinifer* Mayer, 1974, p. 186, Fig. 19, off Grenada, western North Atlantic, at 12°01'N, 61°53'30"W.

*Epigonus pectinifer* Mayer, 1974: Mayer (1974), Mochizuki & Shirakihara (1983), Machida *in* Okamura (1985), Parin & Abramov (1986), Abramov (1992).

TAXONOMY: The disjunct populations of *E. pectinifer* may actually be two or more distinct species (Mochizuki & Shirakihara, 1983; Abramov, 1992).

HAWAIIAN RECORDS: None but records from the vicinity of the Milwaukee and Koko seamounts at 420–600 m (Parin & Abramov, 1986; Abramov, 1992) suggest that *E. pectinifer* could occur at the Hancock Seamounts.

GENERAL RANGE: Known only from the Gulf of Mexico, Caribbean Sea, southern Japan, the Tasmanian Sea, and the Emperor Seamounts. Benthopelagic at 280–750 m (Mayer, 1974; Machida *in* Okamura *et al.*, 1985; Abramov, 1992).

## Malacanthidae — Tilefishes<sup>51</sup>

***Malacanthus brevisrostris* Guichenot**

*Malacanthus brevisrostris* Guichenot, 1848, p. 14, Madagascar.

*Malacanthus parvipinnis* Vaillant & Sauvage, 1875: Vaillant & Sauvage (1875), Jenkins (1903), Snyder (1904), Jordan & Evermann (1905).

*Malacanthus hoedtii* Bleeker, 1859: Günther (1876), Steindachner (1900), Fowler (1928, 1949), Gosline & Brock (1960), Tinker (1982), Okamoto & Kanenaka (1984).

*Malacanthus brevisrostris* Guichenot, 1848: Hobson (1974), Dooley (1978), Randall *et al.* (1985a, 1993b, 1997a), Hoover (1993, 2003), Chave & Mundy (1994), Allen & Robertson (1994), Randall (1996a), Robertson & Allen (2002).

TAXONOMY: Dooley (1978).

COMMON NAMES: Maka-‘ā (Hoover, 1993, 2003; Randall, 1996a), Quakerfish (FAO; Hoover, 2003), Flagtail tilefish (Hoover, 1993, 2003; Randall, 1996a), Striped blanquillo (Hoover, 1993, 2003).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to Kure Atoll at 6–61 m (Vaillant & Sauvage, 1875; Okamoto & Kanenaka, 1984; Hobson, 1974; Randall *et al.*, 1985b, 1993b; Hoover, 1993; Chave & Mundy, 1994).

GENERAL RANGE: Indo-transpacific from South Africa and the Red Sea to Indonesia, southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, the Marquesas, the Galapagos, Cocos, and Malpelo Islands, and Costa Rica to Ecuador. Benthic and enybenthic in or near burrows in sand adjacent to rocks or reef at 5–61 m (Dooley, 1978; Myers, 1989; Chave & Mundy, 1994; Allen & Robertson, 1994; Randall *et al.*, 1997b; Robertson & Allen, 2002).

[*Malacanthus latovittatus* (Lacépède)]

*Labrus latovittatus* Lacépède, 1801, p. 455, 526, Pl. 28 (fig. 2), “Great Equatorial Ocean” [= Indo-Pacific].

*Malacanthus latovittatus* Lacépède, 1801: Fowler (1928, 1931, 1934, 1949), Dooley (1978), Tinker (1982), Randall (1985a), Myers (1989), Paxton *et al.* (1989).

TAXONOMY: Dooley (1978).

COMMON NAMES: Blue tilefish (FAO), Blue blanquillo (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: A record from an unspecified location in the Hawaiian Islands (Fowler, 1934a) is probably false (Tinker, 1982; Randall, 1985a).

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to Indonesia, southern Japan, Australia, New Caledonia, Samoa, Micronesia, and the Line Islands. Benthic and epibenthic in or near burrows in sand adjacent to rocks or reef at 6–10 m (Dooley, 1978; Myers, 1989; Paxton *et al.*, 1989).

### Echeneididae — Remoras, Sharksuckers

#### *Echeneis naucrates* Linnaeus

*Echeneis naucrates* Linnaeus, 1758, p. 261, “Habitat in Pelago Indico” [the original spelling of the species name is regarded as a misprint and the correction has been placed on the ICZN Official List, Opinion 242 (see Eschmeyer, 1998)].

*Leptecheneis naucrates* (Linnaeus, 1758): Fowler (1928, 1934).

*Echeneis naucrates* Linnaeus, 1758: Fowler (1949), Strasburg (1964a), Tinker (1982), Springer (1982), Lachner *in* Whitehead *et al.* (1984), Heemstra *in* Smith & Heemstra (1986), Robins *et al.* (1986), Myers (1989), Lachner & Post *in* Quéro *et al.* (1990), Allen & Robertson (1994), Randall (1996a).

TAXONOMY: Heemstra *in* Smith & Heemstra (1986), Robins *et al.* (1986).

COMMON NAMES: Leleiona (Randall, 1996a), Sharksucker (AFS; FAO; Randall, 1996a), Slender shark-sucker (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Recorded only from O‘ahu (Strasburg, 1964a) but likely to be found throughout the archipelago.

GENERAL RANGE: Circumglobal in the tropical and subtropical Gulf of Mexico, Mediterranean Sea, Atlantic, Indian, and Pacific oceans. Epipelagic, often attached to other fishes including reef fishes but most often sharks; sometimes free-living (Strasburg, 1964a; Springer, 1982; Lachner *in* Whitehead *et al.*, 1984; Robins *et al.*, 1986; Myers, 1989; Lachner & Post *in* Quéro *et al.*, 1990; Allen & Robertson, 1994).

#### *Phtheichthys lineatus* (Menzies)

*Echeneis lineata* Menzies, 1791, p. 187, Pl. 17 (fig. 1), “Pacific”.

*Phtheichthys multiradiatus* Schultz, 1943: Fowler (1949).

*Phtheichthys lineatus* (Menzies, 1791): Fowler (1928, 1931, 1938, 1949), Strasburg (1959, 1964a), Tinker (1982), Lachner *in* Whitehead *et al.* (1984), Heemstra *in* Smith & Heemstra (1986), Robins *et al.* (1986), Lachner & Post *in* Quéro *et al.* (1990), Morota & Fujita (1995).

TAXONOMY: Strasburg (1964a), Heemstra *in* Smith & Heemstra (1986), Robins *et al.* (1986).

COMMON NAMES: Slender suckerfish (AFS), Lousefish.

HAWAIIAN RECORDS: Southwest of Hawai‘i Island to O‘ahu at 0–1 m (Strasburg, 1959; Morota & Fujita, 1995).

GENERAL RANGE: Circumglobal in the tropical and subtropical Atlantic, Indian, and Pacific oceans. Epipelagic, often attached to barracuda and sea turtles or free-living (Strasburg, 1964a; Lachner *in* Whitehead *et al.*, 1984; Robins *et al.*, 1986; Lachner & Post *in* Quéro *et al.*, 1990).

#### [*Remora australis* (Bennett)]

*Echeneis australis* Bennett, 1840, p. 273, no type locality given.

*Remilegia australis* (Bennett, 1840): Follett & Dempster (1960).

*Remora australis* (Bennett, 1840): Tinker (1982), Lachner *in* Whitehead *et al.* (1984), Heemstra *in* Smith & Heemstra (1986), Robins *et al.* (1986), Lachner & Post *in* Quéro *et al.* (1990), Robertson & Allen (2002).

TAXONOMY: Heemstra *in* Smith & Heemstra (1986), Robins *et al.* (1986).

COMMON NAMES: Whalesucker (AFS).

HAWAIIAN RECORDS: Tinker (1982) included this species on the basis of its distribution of “world-wide in warm water.” In the absence of documented records from the Hawaiian Islands (Follett & Dempster, 1960; Strasburg, 1959b, 1964a) the occurrence of this species in the archipelago is considered unconfirmed.

GENERAL RANGE: Circumglobal in the tropical through temperate Atlantic, Indian, and Pacific oceans; in the Pacific from Japan, New Guinea, the Society Islands, and off British Columbia, California and Baja California to Peru. Springer's (1982) statement that it is absent from the Indo-Pacific is in error. Epipelagic, usually attached to cetaceans (Follett & Dempster, 1960; Lachner *in Whitehead et al.*, 1984; Robins *et al.*, 1986; Lachner & Post *in Quéro et al.*, 1990; Robertson & Allen, 2002).

***Remora brachyptera* (Lowe)**

*Echeneis brachyptera* Lowe, 1839, p. 89, off Madeira, eastern North Atlantic.

*Remoropsis brachyptera* (Lowe, 1839): Fowler (1923), Strasburg (1964c).

*Remoropsis brachypterus* (Lowe, 1839): Fowler (1949), Strasburg (1964a, 1964c).

*Remoropsis pallidus* (Temminck & Schlegel, 1850): Fowler (1941, 1949), Strasburg (1964a, 1964c).

*Remora brachyptera* (Lowe, 1839): Fowler (1928), Tinker (1982), Lachner *in Whitehead et al.* (1984), Heemstra *in Smith & Heemstra* (1986), Robins *et al.* (1986), Lachner & Post *in Quéro et al.* (1990), Morota & Fujita (1995).

TAXONOMY: Heemstra *in Smith & Heemstra* (1986), Robins *et al.* (1986).

COMMON NAMES: Spearfish remora (AFS).

HAWAIIAN RECORDS: Southwest of Hawai'i Island to O'ahu (Fowler, 1923, 1928; Strasburg, 1964c; Morota & Fujita, 1995).

GENERAL RANGE: Circumglobal in the tropical and subtropical Mediterranean Sea, Atlantic, Indian, and Pacific oceans. Epipelagic, usually attached to istiophorids, xiphiids, and molids, or less often to sharks (Strasburg, 1964a, c; Lachner *in Whitehead et al.*, 1984; Robins *et al.*, 1986; Lachner & Post *in Quéro et al.*, 1990).

***Remora osteochir* (Cuvier)**

*Echeneis osteochir* Cuvier, 1829, p. 348, Martinique Island, western North Atlantic.

*Rhombochirus osteochir* (Cuvier, 1829): Fowler (1941, 1949), Strasburg (1964a, 1964c).

*Remora osteochir* (Cuvier, 1829): Hubbs *et al.* (1979), Tinker (1982), Lachner *in Whitehead et al.* (1984), Robins *et al.* (1986), Lachner & Post *in Quéro et al.* (1990), Morota & Fujita (1995).

TAXONOMY: Hubbs *et al.* (1979), Robins *et al.* (1986).

COMMON NAMES: Marlinsucker (AFS).

HAWAIIAN RECORDS: Southwest of Hawai'i Island to Kaua'i (Fowler, 1941, 1949; Strasburg, 1964c; Morota & Fujita, 1995).

GENERAL RANGE: Circumglobal in the tropical and subtropical Mediterranean Sea, Atlantic, Indian, and Pacific oceans. Epipelagic, usually attached to istiophorids or less often to large scombrids (Strasburg, 1964a; Hubbs *et al.*, 1979; Lachner *in Whitehead et al.*, 1984; Robins *et al.*, 1986; Lachner & Post *in Quéro et al.*, 1990).

***Remora remora* (Linnaeus)**

*Echeneis remora* Linnaeus, 1758, p. 260, "Habitat in Pelago Indico".

*Echeneis remora* Linnaeus, 1758: Günther (1889), Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1931, 1934).

*Remora remora* (Linnaeus, 1758): Jordan & Snyder (1904a), Fowler (1949), Strasburg (1959, 1964a), Gosline & Brock (1960, in part), Tinker (1982), Lachner *in Whitehead et al.* (1984), Randall *et al.* (1985a, 1993b), Heemstra *in Smith & Heemstra* (1986), Robins *et al.* (1986), Myers (1989), Lachner & Post *in Quéro et al.* (1990), Allen & Robertson (1994), Morota & Fujita (1995), Randall (1996a).

TAXONOMY: Heemstra *in Smith & Heemstra* (1986), Robins *et al.* (1986).

COMMON NAMES: Remora (AFS; Myers, 1999), Common remora.

HAWAIIAN RECORDS: Johnston Atoll and southwest of Hawai'i Island to Midway (Günther, 1889; Jordan & Evermann, 1905; Strasburg, 1959; Randall *et al.*, 1985b, 1993b; Morota & Fujita, 1995).

GENERAL RANGE: Circumglobal in the tropical through warm-temperate Gulf of Mexico, Mediterranean Sea, Atlantic, Indian, and Pacific oceans. Epipelagic, usually attached to large sharks (Strasburg, 1964a; Lachner *in Whitehead et al.*, 1984; Robins *et al.*, 1986; Lachner & Post *in Quéro et al.*, 1990; Allen & Robertson, 1994).

***Remorina albescens*** (Temminck & Schlegel)

*Echeneis albescens* Temminck & Schlegel, 1850, Pl. 20 (fig. 3), Japan.

*Remora albescens* (Temminck & Schlegel, 1845): Fowler (1900).

*Echeneis albescens* Temminck & Schlegel, 1845: Jordan & Evermann (1905), Fowler (1928, 1934).

*Remora remora* non (Linnaeus, 1758) [a valid species also found in the Hawaiian Islands]: Gosline & Brock (1960, in part).

*Remorina albescens* (Temminck & Schlegel, 1845): Fowler (1949), Tinker (1982), Lachner *in* Whitehead *et al.* (1984), Heemstra *in* Smith & Heemstra (1986), Robins *et al.* (1986), Lachner & Post *in* Whitehead *et al.* (1990), Randall (1996a).

TAXONOMY: Heemstra *in* Smith & Heemstra (1986), Robins *et al.* (1986).

COMMON NAMES: White suckerfish (AFS), Mantasucker.

HAWAIIAN RECORDS: O'ahu (Fowler, 1900).

GENERAL RANGE: Circumglobal in the tropical and subtropical Atlantic, Indian, and Pacific oceans. Epipelagic, usually attached to manta rays, sharks, and black marlin (Lachner *in* Whitehead *et al.*, 1984; Robins *et al.*, 1986; Lachner & Post *in* Whitehead *et al.*, 1990).

**Coryphaenidae — Dolphins, Dolphinfishes*****Coryphaena equiselis*** Linnaeus

*Coryphaena equiselis* Linnaeus, 1758, p. 261, type locality given only as "Habitat in alto Pelago".

*Coryphaena socialis* Bennett, 1840: Bennett (1840).

*Coryphaena equisetis* Osbeck, 1765: Jordan & Evermann (1905), Gosline & Brock (1960), Tinker (1982).

*Coryphaena* sp. (prob. *equiselis* Linnaeus, 1758): Loeb (1979)?

*Coryphaena equiselis* Linnaeus, 1758: Fowler (1928, 1949), Palko *et al.* (1982), Aoki & Ueyanagi (1989), Boehlert & Mundy (1992), Randall *et al.* (1993b).

TAXONOMY: Palko *et al.* (1982).

COMMON NAMES: Pompano dolphin (AFS), Pompano dolphinfish (FAO), Little mahimahi (Gosline & Brock, 1960).

HAWAIIAN RECORDS: Hawai'i Island to Midway and the Hancock Seamounts (Bennett, 1840; Fowler, 1928; Palko *et al.*, 1982; Aoki & Ueyanagi, 1989; Boehlert & Mundy, 1992; Randall *et al.*, 1993b).

GENERAL RANGE: Circumglobal in the tropical and subtropical Gulf of Mexico, Atlantic, Indian, and Pacific oceans between 40°N–20°S. Epipelagic, often associated with floating objects (Palko *et al.*, 1982).

***Coryphaena hippurus*** Linnaeus

*Coryphaena hippurus* Linnaeus, 1758, p. 261, type locality given only as "Habitat in Pelago".

*Coryphaena hippurus* Linnaeus, 1758: Jenkins (1903), Jordan & Evermann (1905), Fowler (1928, 1931, 1949), Gosline & Brock (1960), Tinker (1982), Palko *et al.* (1982), Randall *et al.* (1985a, 1993b), Uchida & Uchiyama (1986), Boehlert & Mundy (1992), Allen & Robertson (1994).

TAXONOMY: Palko *et al.* (1982).

COMMON NAMES: Mahimahi (DLNR), Dolphin (AFS), Common dolphinfish (FAO; Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway and Bank 11 at 1–2 m (Jenkins, 1903; Jordan & Evermann, 1905; Palko *et al.*, 1982; Randall *et al.*, 1985b; Uchida & Uchiyama, 1986; Boehlert *et al.*, 1992).

GENERAL RANGE: Circumglobal in the tropical through warm-temperate Gulf of Mexico, Mediterranean Sea, Atlantic, Indian, and Pacific oceans between 55°N–32°S but rare north of 41°N. Epipelagic, often associated with floating objects (Palko *et al.*, 1982).

**Carangidae — Jacks, Pompanos*****Alectis ciliaris*** (Bloch)

*Zeus ciliaris* Bloch, 1787, p. 36, Pl. 191, Surate, India.

*Caranx gallus* (Lacépède, 1802): Günther (1876).

*Caranx ciliaris* (Bloch, 1787): Günther (1876).

*Carangoides ajax* Snyder, 1904: Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1949), Gosline & Brock (1960).

*Blepharis ciliaris* (Bloch, 1787): Fowler (1928, 1931, 1949).

*Carangoides* species [*C. ajax* (Bloch, 1787) in text]: Tinker (1982).

*Alectis ciliaris* (Bloch, 1787): Jenkins (1903), Jordan & Snyder (1904a), Snyder (1904), Jordan & Evermann (1905), Gosline & Brock (1960), Tinker (1982), Gushiken (1983), Smith-Vaniz in Smith & Heemstra (1986), Myers (1989), Gunn (1990), Randall *et al.* (1993b, 1997a), Kuitert (1993), Allen & Robertson (1994), Randall (1996a), Robertson & Allen (2002).

TAXONOMY: Gushiken (1983), Gunn (1990).

COMMON NAMES: Ulua kihikihi (Randall, 1996a), African pompano (AFS; FAO; Randall, 1996a), Kagami Ulua (Gosline & Brock, 1960), Threadfin pompano, Pennant fish, Kagami (DLNR).

HAWAIIAN RECORDS: O'ahu to Midway (Günther, 1876; Jordan & Evermann, 1905; Randall *et al.*, 1993b).

GENERAL RANGE: Circumglobal in the tropical Atlantic, Indian, and Pacific oceans; in the Pacific from southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, the offshore eastern tropical Pacific islands except Clipperton, and the mouth of the Gulf of California to northern Peru. Pelagic at 1–100 m (Gushiken, 1983; Smith-Vaniz in Smith & Heemstra, 1986; Myers, 1989; Gunn, 1990; Kuitert, 1993; Allen & Robertson, 1994; Randall *et al.*, 1997b; Robertson & Allen, 2002).

#### [*Alectis indica* (Rüppell)]

*Scyris indicus* Rüppell, 1830, p. 128, Pl. 33 (fig. 1), Jidda, Saudi Arabia, Red Sea.

*Caranx gallus* non (Linnaeus, 1758) [a valid *Selene* species not found in the Hawaiian Islands]: Günther (1876).

*Scyris indica* Rüppell, 1830: Fowler (1928, 1931).

*Alectis indica* (Rüppell, 1830): Gosline & Brock (1960), Tinker (1982), Gushiken (1983), Smith-Vaniz in Fischer & Bianchi (1984), Smith-Vaniz in Smith & Heemstra (1986), Myers (1989), Randall *et al.* (1990a), Gunn (1990), Kuitert (1993), Randall (1996a).

TAXONOMY: Gushiken (1983), Gunn (1990).

COMMON NAMES: Indian threadfish (AFS; FAO), Diamond trevally (Randall *et al.*, 1997a), Mirrorfish.

HAWAIIAN RECORDS: Records from O'ahu (Günther, 1876; Fowler, 1928) and subsequent inclusion of *A. indica* in lists of Hawaii's fishes based on those records (Fowler, 1931; Gosline & Brock, 1960; Tinker, 1982) are false (Randall, 1996a). *Alectis indica* does not occur in the region (Smith-Vaniz in Fischer & Bianchi, 1984).

GENERAL RANGE: Indo-west-Pacific from South Africa and the Red Sea to the Ryukyus, Papua New Guinea, Australia, and Micronesia. Pelagic, occasionally near reefs and juveniles often in estuaries (Smith-Vaniz in Fischer & Bianchi, 1984; Smith-Vaniz in Smith & Heemstra, 1986; Myers, 1989; Randall *et al.*, 1990a; Gunn, 1990; Kuitert, 1993).

#### *Atule mate* (Cuvier)

*Caranx mate* Cuvier in Cuvier & Valenciennes, 1833, p. 54, several type localities including Pondichery (India), the Seychelles, New Guinea, and the Anjer Strait.

*Caranx affinis* Rüppell, 1836: Steindachner (1900).

*Carangus affinis* (Rüppell, 1836): Jenkins (1903), Snyder (1904), Jordan & Evermann (1905).

*Carangus politus* Jenkins, 1903: Jenkins (1903), Jordan & Evermann (1905).

*Caranx mate* Cuvier, 1833: Fowler (1928, 1931, 1934), Gosline & Brock (1960), Tinker (1982).

*Alepes mate* (Cuvier, 1833): Fowler (1949).

*Atule mate* (Cuvier, 1833): Gushiken (1983), Myers (1989), Randall *et al.* (1990a, 1993b), Gunn (1990).

TAXONOMY: Gushiken (1983), Gunn (1990).

COMMON NAMES: 'Omaka (Gosline & Brock, 1960), Maka, Maka'a, 'Amuka, Pūakahala, Yellowtail scad (AFS; FAO; Randall *et al.*, 1997a).

HAWAIIAN RECORDS: O'ahu to Midway (Steindachner, 1900; Jordan & Evermann, 1905; Randall *et al.*, 1993b).

GENERAL RANGE: Indo-Pacific from East Africa and the Red Sea to southern Japan, Australia, Micronesia, the Hawaiian Islands, and Samoa. Pelagic, usually in estuaries, at 1–80 m (Gushiken, 1983; Myers, 1989; Randall *et al.*, 1990a; Gunn, 1990).

***Carangoides equula*** (Temminck & Schlegel)

*Caranx equula* Temminck & Schlegel, 1844, p. 111, Pl. 60 (fig. 1), Nagasaki, Japan.

*Caranx dasson* Jordan & Snyder, 1907: Jordan & Snyder (1907), Fowler (1928), Randall (1995c).

*Pseudocaranx dentex* non (Bloch & Schneider, 1801) [a valid species also found in the Hawaiian Islands]: Fowler (1934, in part).

*Caranx* species: Struhsaker (1973a)?

*Kaiwarinus equula* (Temminck & Schlegel, 1844): Gushiken (1983).

*Carangoides equula* (Temminck & Schlegel, 1844): Fowler (1934, 1949), Gosline & Brock (1960), Randall (1981a, 1995c), Tinker (1982), Smith-Vaniz in Fischer & Bianchi (1984), Randall *et al.* (1985a, 1990a, 1997a), Smith-Vaniz in Smith & Heemstra (1986), Gunn (1990).

**TAXONOMY:** Smith-Vaniz in Smith & Heemstra (1986), Gunn (1990). This species has been confused with *Pseudocaranx dentex* (Bloch & Schneider, 1801) in older literature (i.e., Fowler 1934) and references to *Carangoides equula* (Temminck & Schlegel) or *C. dasson* (Jordan & Snyder) in Hawai'i may also refer to *P. dentex* or *Carangoides orthogrammus* (Jordan & Gilbert) (see Randall *et al.*, 1985b). According to Randall (1995c), *C. dasson* is a valid endemic Pacific Plate species and *C. equula* does not occur in the Hawaiian Islands. Smith-Vaniz (in Fischer & Bianchi, 1984) had previously considered this question and decided that the differences between the two nominal species (body depth and eye diameter) did not justify their identification as distinct species. J.E. Randall (pers. comm., Mar. 2005) will recognize the Hawaiian and Easter Island populations as *C. dasson*. A better-documented analysis of this taxonomic problem is needed.

**COMMON NAMES:** Ulua, Whitefin trevally (AFS; FAO; Randall *et al.*, 1997a).

**HAWAIIAN RECORDS:** Hawai'i Island to Pearl and Hermes Reef at 64–226 m (Jordan & Snyder, 1907; Fowler, 1928, 1934a; Struhsaker, 1973a). Randall *et al.* (1985b) commented that early records of *C. equula* from Johnston Atoll (Fowler & Ball, 1924; Fowler, 1928) are questionable.

**GENERAL RANGE:** Indo-Pacific, perhaps antitropical, from South Africa to Australia and Easter Island in the south and the Gulf of Oman to southern Japan and the Ogasawara and Hawaiian Islands in the north. If *C. dasson* is a valid species, it is a Pacific Plate endemic known from the Hawaiian Islands and Easter Island (Smith-Vaniz in Fischer & Bianchi, 1984; Randall, 1996b). Benthopelagic over sand and reefs, usually on deep slopes, at 64–226 m (Struhsaker, 1973a; Randall, 1982; Smith-Vaniz in Fischer & Bianchi, 1984; Smith-Vaniz in Smith & Heemstra, 1986; Randall *et al.*, 1990a; Gunn, 1990; Randall *et al.*, 1997b).

***Carangoides ferdau*** (Forsskål)

*Scomber ferdau* Forsskål, 1775, p. 55, Jidda, Saudi Arabia, Red Sea.

*Carangoides hemigymnostethus* Bleeker, 1851: Okamoto & Kanenaka (1984).

*Carangoides ferdau* (Forsskål, 1775): Randall (1980a, 1996a), Gushiken (1983), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Smith-Vaniz in Smith & Heemstra (1986), Myers (1989), Gunn (1990), Kuitert (1993).

**TAXONOMY:** Gushiken (1983), Gunn (1990).

**COMMON NAMES:** Ulua (Randall, 1996a), Pāpio, Blue trevally (AFS; FAO; Randall *et al.*, 1997a), Barred jack (Randall, 1996a), Banded trevally.

**HAWAIIAN RECORDS:** Johnston Atoll and O'ahu to Kure Atoll at 1–8 m (Okamoto & Kanenaka, 1984; Randall, 1981a; Randall *et al.*, 1985b, 1993b; B. Mundy, pers. observ.).

**GENERAL RANGE:** Indo-Pacific from South Africa and the Red Sea to southern Japan, the Ogasawara Islands, Australia, New Caledonia, Micronesia, the Hawaiian Islands, and the Tuamotu Islands. Pelagic over sand and reefs at 1–60 m (Smith-Vaniz in Smith & Heemstra, 1986; Myers, 1989; Gunn, 1990; Randall *et al.*, 1990a, 1997b; Kuitert, 1993).

[*Carangoides gymnostethus* (Cuvier)]

*Caranx gymnostethus* Cuvier in Cuvier & Valenciennes, 1833, p. 73, Seychelles, western Indian Ocean.

*Carangoides gymnostethoides* Bleeker, 1851: Fowler (1928, 1934, 1949, in part), Gosline & Brock (1960), Tinker (1982).

*Carangoides gymnostethus* (Cuvier, 1833): Fowler (1925, 1931), Gushiken (1983), Gushiken in Masuda *et al.* (1984), Smith-Vaniz in Fischer & Bianchi (1984), Smith-Vaniz in Smith & Heemstra (1986), Randall *et al.* (1990a), Gunn (1990).

TAXONOMY: Gushiken (1983), Gunn (1990).

COMMON NAMES: Bludger (AFS; FAO), Bludger trevally (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Fowler (1925) recorded this species from O'ahu, but this and other records of this species from the Hawaiian Islands are probably based upon *C. orthogrammus* (Jordan & Gilbert) (see Gushiken, 1983).

GENERAL RANGE: Indo-West-Pacific from South Africa to the Ryukyus and Australia. Pelagic over deep, offshore reefs and sand at <40–70 m (Gushiken *in* Masuda *et al.*, 1984; Smith-Vaniz *in* Fischer & Bianchi, 1984; Smith-Vaniz *in* Smith & Heemstra, 1986; Randall *et al.*, 1990a; Gunn, 1990).

### *Carangoides orthogrammus* (Jordan & Gilbert)

*Caranx orthogrammus* Jordan & Gilbert, 1882a, p. 226, Sulphur Bay, Clarion Island, Revillagigedos Islands off Mexico, eastern Tropical Pacific.

*Caranx gymnostethoides* non (Bleeker, 1851) [a junior synonym of *C. gymnostethus* (Bleeker, 1851), a valid species probably not found in the Hawaiian Islands]: Smith & Swain (1882).

*Carangoides gymnostethoides* non Bleeker, 1851: Jordan & Evermann (1905), Fowler (1928, in part).

*Caranx ferdau* non (Forsskål, 1775) [a valid *Carangoides* species that also occurs in the Hawaiian Islands]: Steindachner (1900).

*Carangoides ferdau* non (Forsskål, 1775): Jenkins (1903), Jordan & Evermann (1905), Fowler (1928, in part, 1949), Gosline & Brock (1960), Tinker (1982).

*Carangoides gymnostethoides evermanni* Nichols, 1921: Nichols (1921).

*Carangoides jordani* Nichols, 1922: Nichols (1922).

*Ferdauia evermanni* (Nichols, 1921): Jordan *et al.* (1927).

*Ferdauia jordani* (Nichols, 1922): Jordan *et al.* (1927).

*Caranx dasson* non Jordan & Snyder, 1907 [here considered a junior synonym of *Carangoides equula*, a valid species also found in the Hawaiian Islands; some Hawaiian records of this species are referable to *C. orthogrammus* according to Randall *et al.* (1985a)].

*Caranx orthogrammus* (Jordan & Gilbert, 1882a): Robertson & Allen (2002).

*Carangoides orthogrammus* (Jordan & Gilbert, 1882a): Randall (1980a, 1996a), Gushiken (1983), Smith-Vaniz *in* Fischer & Bianchi (1984), Randall *et al.* (1985a, 1993b, 1997a), Uchida & Uchiyama (1986), Myers (1989), Gunn (1990), Hoover (1993, 2003), Kuitert (1993), Chave & Mundy (1994), Allen & Robertson (1994).

TAXONOMY: Randall (1981a), Gushiken (1983), Gunn (1990).

COMMON NAMES: Pāpio, Ulua (Hoover, 1993, 2003; Randall, 1996a), 'Omilu, Island jack (AFS; Randall, 1996a; Hoover, 2003), Island trevally (FAO), Yellowspotted jack (Hoover, 1993, 2003), Yellowspotted trevally (Myers, 1999).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 1–190 m (Smith & Swain, 1882; Steindachner, 1900; Jordan & Evermann, 1905; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Hoover, 1993; Chave & Mundy, 1994).

GENERAL RANGE: Indo-Pacific from East Africa to southern Japan, the Ogasawara Islands, Australia, Lord Howe Island, Micronesia, the Hawaiian Islands, the Austral Islands, the offshore islands of the eastern tropical Pacific, southern Baja California, and the Tres Marias Islands in the southeastern Gulf of California. Pelagic over sand and reefs at 1–190 m (Smith-Vaniz *in* Fischer & Bianchi, 1984; Myers, 1989; Gunn, 1990; Kuitert, 1993; Chave & Mundy, 1994; Allen & Robertson, 1994; Randall *et al.*, 1997b; Robertson & Allen, 2002).

### *Caranx caballus* Günther

*Caranx caballus* Günther, 1868b, p. 431, Pacific coast of Panama.

*Caranx kuhlii* non (Bleeker, 1851) [a junior synonym of *Alepes vari* (Cuvier, 1833), a valid species not found in the Hawaiian Islands]: Fowler (1928).

*Caranx kalla* non (Cuvier, 1833) [a junior synonym of *Alepes djedaba* (Forsskål, 1775), a valid species not found in the Hawaiian Islands]: Fowler (1934), Gosline & Brock (1960), Tinker (1982).

*Caranx caballus* Günther, 1868b: Humann (1993), Allen & Robertson (1994), Randall (1999a), Randall & Carlson (1999).

TAXONOMY: Randall (1999a), Randall & Carlson (1999).

COMMON NAMES: Green jack (AFS).

HAWAIIAN RECORDS: Maui to Kaua'i at the surface (Fowler, 1928; Randall, 1999c; Randall & Carlson, 1999). This species was recorded from the Hawaiian Islands as waifs in 1922 and 1998. Randall (1999a) and Randall & Carlson (1999) suggested that this species may be reproducing in the Hawaiian Islands but this remains to be confirmed. *Caranx caballus* has not been reported in the Hawaiian Islands in 1999–2004. The appearance of *C. caballus* in Hawaiian waters in two distinct decades suggests that it may be expected in future years, much like *Sectator ocyurus*.

GENERAL RANGE: Eastern tropical Pacific endemic from southern California to Ecuador and eastward to the Galapagos Islands, occasionally straying to the Hawaiian Islands. Epipelagic in surface waters over all substrates (Humann, 1993; Allen & Robertson, 1994; Randall & Carlson, 1999).

### *Caranx ignobilis* (Forsskål)

*Scomber ignobilis* Forsskål, 1775, p. 55, the Red Sea at both Jidda, Saudi Arabia, and Luhaiya, Yemen.

*Carangus hippoides* Jenkins, 1903: Jenkins (1903).

*Caranx ignobilis* (Forsskål, 1775): Jordan & Evermann (1905).

*Caranx ignobilis* (Forsskål, 1775): Steindachner (1900), Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Tinker (1982), Gushiken (1983), Humphreys *et al.* (1984), Okamoto & Kanenaka (1984), Randall *et al.* (1985a, 1990a, 1993b, 1997a, 1997a), Uchida & Uchiyama (1986), Smith-Vaniz *in* Smith & Heemstra (1986), Myers (1989), Kuitert (1993), Hoover (1993, 2003), Chave & Mundy (1994).

TAXONOMY: Gushiken (1983). See Eschmeyer (1998) for a note on a potential nomenclatural problem for this species.

COMMON NAMES: Ulua aukea (Hoover, 1993, 2003; Randall, 1996a), Pauu'u (Gosline & Brock, 1960), Giant trevally (AFS; FAO; Hoover, 1993, 2003; Randall, 1996a), White ulua (Hoover, 1993, 2003), Giant ulua (Hoover, 1993, 2003), Black ulua (used by fishermen for dark individuals, which sometimes creates confusion with *C. lugubris*, below).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 1–188 m (Steindachner, 1900; Humphreys *et al.*, 1984; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Chave & Mundy, 1994).

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to southern Japan, the Ogasawara Islands, Australia, New Zealand, Micronesia, the Hawaiian Islands, the Marquesas Islands, and Pitcairn Island. Pelagic over sand, rock, and reefs at 1–188 m, juveniles often in estuaries (Smith-Vaniz *in* Smith & Heemstra, 1986; Myers, 1989; Randall *et al.*, 1990a, 1997b; Kuitert, 1993; Chave & Mundy, 1994).

### *Caranx lugubris* Poey

*Caranx lugubris* Poey, 1860, p. 222, Cuba.

*Caranx tenebrosus* Jordan, Evermann & Wakiya *in* Jordan, Evermann & Tanaka, 1927: Jordan *et al.* (1927).

*Caranx lugubris* Poey, 1860: Fowler (1923, 1928, 1931, 1934), Gosline & Brock (1960), Tinker (1982), Gushiken (1983), Smith-Vaniz *in* Whitehead *et al.* (1984), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Uchida & Uchiyama (1986), Smith-Vaniz *in* Smith & Heemstra (1986), Myers (1989), Chave & Mundy (1994), Allen & Robertson (1994), Smith-Vaniz & Randall (1994), Randall (1996a), Robertson & Allen (2002).

TAXONOMY: Gushiken (1983). *Caranx ascensionis* Cuvier *in* Cuvier & Valenciennes, 1833, is a senior synonym of *C. lugubris* Poey, 1860, but *C. lugubris* was conserved as the valid name for this species by ICZN Opinion 1841 (Eschmeyer, 1998).

COMMON NAMES: Ulua lā'uli (Randall, 1996a), Black jack (AFS; FAO), Black trevally (Randall, 1996a), Black Ulua.

HAWAIIAN RECORDS: Johnston Atoll and Necker to Midway at 1–354 m. (Fowler, 1923, 1928; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Chave & Mundy, 1994). Recorded at O'ahu from specimens at the Honolulu fish markets, but otherwise there are no verified records of *C. lugubris* from the main Hawaiian Islands.

GENERAL RANGE: Circumglobal in the tropical through warm-temperate Atlantic, Indian, and Pacific oceans; in the Pacific from southern Japan, the Ogasawara Islands, Australia, and New Caledonia to Micronesia, the Hawaiian Islands, the offshore eastern tropical Pacific islands, and southern Baja California to Panama, but absent from French Polynesia. Pelagic in clear, offshore waters over reefs



and banks at 1–354 m (Smith-Vaniz *in* Whitehead *et al.*, 1984; Smith-Vaniz *in* Smith & Heemstra, 1986; Myers, 1989; Randall *et al.*, 1990a, 1997b; Chave & Mundy, 1994; Allen & Robertson, 1994; Robertson & Allen, 2002).

### *Caranx melampygus* Cuvier

*Caranx melampygus* Cuvier *in* Cuvier & Valenciennes, 1833, p. 116, Waigeo (Waigiou), Indonesia; Rawak Island, Bismarck Archipelago; Buru, Vanikoro; and Mauritius, western Indian Ocean.  
*Caranx stellatus* Eydoux & Souleyet, 1850: Eydoux & Souleyet (1850), Günther (1880), Fowler (1934, 1949).  
*Carangus melampygus* (Cuvier, 1833): Streets (1877), Jordan & Evermann (1905).  
*Caranx hippos* non (Linnaeus, 1766) [a valid Atlantic Ocean species]: Günther (1880).  
*Caranx latus* non Agassiz *in* Spix & Agassiz, 1831 [a valid Atlantic Ocean species]: Fowler (1900), Jenkins (1903), Snyder (1904).  
*Carangus forsteri* non Cuvier *in* Cuvier & Valenciennes, 1833 [a junior synonym of *Caranx sexfasciatus* Quoy & Gaimard, 1824, a valid species also found in the Hawaiian Islands]: Jordan & Evermann (1905).  
*Caranx ascensionis* non (Cuvier, 1833) [see *Caranx lugubris* Poey, 1860, a valid species also found in the Hawaiian Islands, of which *C. ascensionis* is a suppressed synonym]: Fowler (1928, 1931, 1949 in part).  
*Caranx melampygus* (Cuvier, 1833): Fowler (1934, 1949), Gosline & Brock (1960), Hobson (1974), Tinker (1982), Gushiken (1983), Okamoto & Kanenaka (1984), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Uchida & Uchiyama (1986), Smith-Vaniz *in* Smith & Heemstra (1986), Myers (1989), Hoover (1993, 2003), Kuitert (1993), Chave & Mundy (1994), Allen & Robertson (1994), Randall (1996a), Robertson & Allen (2002).

TAXONOMY: Gushiken (1983).

COMMON NAMES: 'Ōmilu (Hoover, 1993, 2003; Randall, 1996a), 'Ōmilumilu (Gosline & Brock, 1960), Hoshi ulua (Gosline & Brock, 1960), Pāpio (juveniles), Bluefin trevally (AFS; FAO; Hoover, 1993, 2003; Randall, 1996a), Blue crevally (Gosline & Brock, 1960, DLNR), Blue ulua (Hoover, 1993, 2003), Ulua omilu (DLNR), Hoshi (DLNR).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 1–190 m (Eydoux & Souleyet, 1850; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Chave & Mundy, 1994).

GENERAL RANGE: Indo-transpacific from South Africa and the Red Sea to the Ryukyu and Ogasawara Islands, Australia, New Caledonia, Micronesia, the Hawaiian Islands, Ducie Island, the offshore islands of the eastern tropical Pacific, and southern Baja California to Panama. Pelagic but reef-associated, often just above sand or reefs, at 1–230 m (Hobson, 1974; Smith-Vaniz *in* Smith & Heemstra, 1986; Myers, 1989; Randall *et al.*, 1990a, 1997b; Kuitert, 1993; Chave & Mundy, 1994; Allen & Robertson, 1994; Robertson & Allen, 2002).

### *Caranx sexfasciatus* Quoy & Gaimard

*Caranx sexfasciatus* Quoy & Gaimard, 1825, p. 358, Pl. 65 (fig. 4), Waigeo (Waigiou), Indonesia.  
*Carangus elacate* Jordan & Evermann, 1903: Jordan & Evermann (1903a, 1905).  
*Carangus marginatus* Gill, 1863: Jenkins (1903), Jordan & Evermann (1905).  
*Carangus rhabdotus* Jenkins, 1903: Jenkins (1903), Jordan & Evermann (1905).  
*Caranx thompsoni* Seale *in* Jordan & Evermann, 1905: Jordan & Evermann (1905 addendum).  
*Caranx elacate* (Jordan & Evermann, 1903): Fowler (1928).  
*Caranx xanthopygus* Cuvier *in* Cuvier & Valenciennes, 1833 [a nominal species of unknown status]: Fowler (1934, in part).  
*Caranx sexfasciatus* Quoy & Gaimard, 1825: Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Tinker (1982), Gushiken (1983), Okamoto & Kanenaka (1984), Smith-Vaniz *in* Fischer & Bianchi (1984), Uchida & Uchiyama (1986), Smith-Vaniz *in* Smith & Heemstra (1986), Myers (1989), Randall *et al.* (1990a, 1993b, 1997a), Kosaki *et al.* (1991), Kuitert (1993), Hoover (1993, 2003), Allen & Robertson (1994), Randall (1996a), Robertson & Allen (2002).

TAXONOMY: Gushiken (1983).

COMMON NAMES: Pake ulua (Randall, 1996a), Ulua (Hoover, 1993, 2003), Menpachi ulua (Gosline & Brock, 1960), Pāpio (juveniles) (Gosline & Brock, 1960; Hoover, 2003), Bigeye trevally (AFS; FAO; Randall, 1996a), Bigeye jack (Hoover, 1993, 2003).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 1–30 m (Jordan & Evermann,

1904a, 1905; Okamoto & Kanenaka, 1984; Uchida & Uchiyama, 1986; Kosaki *et al.*, 1991; Randall *et al.*, 1993b).

GENERAL RANGE: Indo-transpacific from South Africa and the Red Sea to southern Japan, the Ogasawara Islands, Australia, New Caledonia, Micronesia, the Hawaiian Islands, the offshore islands of the eastern tropical Pacific, and the Gulf of California to Ecuador. Pelagic, but usually near reefs, from 1–96 m (Smith-Vaniz *in* Fischer & Bianchi, 1984; Smith-Vaniz *in* Smith & Heemstra, 1986; Myers, 1989; Randall *et al.*, 1990a, 1997b; Kuitert, 1993; Allen & Robertson, 1994; Robertson & Allen, 2002).

### *Decapterus macarellus* (Cuvier)

*Caranx macarellus* Cuvier *in* Cuvier & Valenciennes, 1833, p. 40, Martinique Island, West Indies.

*Decapterus pinnulatus* (Eydoux & Souleyet, 1850): Eydoux & Souleyet (1850), Jordan & Evermann (1905), Fowler (1949), Gosline & Brock (1960), Struhsaker (1973a), Iwai (1976), Tinker (1982), Borets (1986).

*Decapterus sanctae helenae* non (Cuvier *in* Cuvier & Valenciennes, 1833) [a junior synonym of *D. punctatus* (Cuvier, 1829), a valid species not found in the Hawaiian Islands]: Steindachner (1900), Fowler (1928, 1931, 1934, in part).

*Decapterus canonoides* Jenkins, 1903: Jenkins (1903), Jordan *et al.* (1927).

*Decapterus macarellus* (Cuvier, 1833): Gushiken (1983), Smith-Vaniz *in* Whitehead *et al.* (1984), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Uchida & Uchiyama (1986), Smith-Vaniz *in* Smith & Heemstra (1986), Myers (1989), Hoover (1993, 2003), Chave & Mundy (1994), Allen & Robertson (1994), Randall (1996a).

TAXONOMY: Gushiken (1983), Smith-Vaniz *in* Smith & Heemstra (1986).

COMMON NAMES: ‘Opelu (Hoover, 1993, 2003; Randall, 1996a), Mackerel scad (AFS; FAO; Hoover, 1993, 2003; Randall, 1996).

HAWAIIAN RECORDS: Johnston Atoll and Maui to Midway and Colahan Seamount at 1–380 m (Eydoux & Souleyet, 1850; Fowler, 1949; Borets, 1986; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Chave & Mundy, 1994).

GENERAL RANGE: Circumtropical in the tropical and subtropical Atlantic, Indian, and Pacific oceans. Pelagic at 1–400 m (Borets, 1986; Gushiken, 1983; Smith-Vaniz *in* Whitehead *et al.*, 1984; Smith-Vaniz *in* Smith & Heemstra, 1986; Myers, 1989; Randall *et al.*, 1990a; Chave & Mundy, 1994; Allen & Robertson, 1994).

### *Decapterus macrosoma* Bleeker

*Decapterus macrosoma* Bleeker, 1851b, p. 358, Batavia [Jakarta], Java, Indonesia.

*Decapterus macrosoma* Bleeker, 1851: Gushiken (1983), Gushiken *in* Masuda *et al.* (1984), Smith-Vaniz *in* Fischer & Bianchi (1984), Smith-Vaniz *in* Smith & Heemstra (1986), Uchida & Uchiyama (1986), Myers (1989), Randall *et al.* (1990a), Kuitert (1993), Allen & Robertson (1994).

TAXONOMY: Gushiken (1983).

COMMON NAMES: Shortfin scad (AFS; FAO), Slender scad (Myers, 1999), Long-bodied scad (Randall *et al.*, 1997a), Opelu mama (DLNR).

HAWAIIAN RECORDS: Recorded from Maro Reef at 208–214 m (Uchida & Uchiyama, 1986) but undoubtedly more widespread in the Hawaiian Islands.

GENERAL RANGE: Indo-transpacific from East Africa and the Red Sea to Indonesia, southern Japan, Australia, Micronesia, the Hawaiian Islands, and the Gulf of California to Peru. Pelagic at 30–214 m (Gushiken *in* Masuda *et al.*, 1984; Smith-Vaniz *in* Fischer & Bianchi, 1984; Smith-Vaniz *in* Smith & Heemstra, 1986; Uchida & Uchiyama, 1986; Myers, 1989; Randall *et al.*, 1990a; Kuitert, 1993; Allen & Robertson, 1994).

### *Decapterus muroadsi* (Temminck & Schlegel)

*Caranx Muro-adsi* Temminck & Schlegel, 1844, p. 108, Pl. 58 (fig. 1), Nagasaki, Japan.

*Decapterus muroadsi* non (Temminck & Schlegel, 1843) [a valid species not found in the Hawaiian Islands]: Nichols (1922), Fowler (1928, in part), Gosline & Brock (1960), Tinker (1982), Borets (1986).

*Decapterus maru-adsi* non (Temminck & Schlegel, 1843): Fowler (1949, in part).

“*Decapterus* species (not *tabl*)”: Humphreys *et al.* (1984).

*Decapterus muroadsi* (Temminck & Schlegel, 1844): Gushiken (1983), Gushiken *in* Masuda *et al.* (1984), Uchida & Uchiyama (1986), Smith-Vaniz *et al. in* Quéro *et al.* (1990), Parin (1991), Kuitert (1993), Robertson & Allen (2002).

TAXONOMY: Gushiken (1983). Confusion has been created by the similarity of this species' name and that of *D. maruadsi* (Temminck & Schlegel, 1843), which does not occur in the Hawaiian Islands.

COMMON NAMES: Amberstripe scad (AFS; FAO).

HAWAIIAN RECORDS: O'ahu to Ladd and Colahan Seamounts at 1–320 m (Nichols, 1922; Borets, 1986; Fowler, 1928; Humphreys *et al.*, 1984; Uchida & Uchiyama, 1986).

GENERAL RANGE: Atlantic and Pacific oceans from Saint Helena Island and southern Japan, the East China Sea, and Australia to the Hawaiian Islands, Easter Island, the Nazca Ridge, the Revillagigedos and Galapagos Islands, and southern California to Ecuador. Antitropical in the western Pacific. Pelagic at 1–320 m (Gushiken *in* Masuda *et al.*, 1984; Uchida & Uchiyama, 1986; Smith-Vaniz *et al. in* Quéro *et al.*, 1990; Parin, 1991; Kuiter, 1993; Robertson & Allen, 2002).

### *Decapterus tabl* Berry

*Decapterus tabl* Berry, 1968, p. 152, Fig. 1, Caribbean coast of Colombia at 12°13'N, 72°29'W.

*Decapterus russelli* non (Rüppell, 1830) [a valid species not found in the Hawaiian Islands]: Iwai (1976)?

*Decapterus tabl* Berry, 1968: Gushiken (1983), Humphreys *et al.* (1984), Gushiken *in* Masuda *et al.* (1984), Smith-Vaniz *in* Fischer & Bianchi (1984), Uchida & Uchiyama (1986), Smith-Vaniz *in* Smith & Heemstra (1986), Smith-Vaniz *et al. in* Quéro *et al.* (1990), Randall *et al.* (1990a, 1997a), Chave & Mundy (1994).

TAXONOMY: Gushiken (1983).

COMMON NAMES: Redtail scad (AFS), Roughear scad (FAO; Randall *et al.*, 1997a).

HAWAIIAN RECORDS: O'ahu to the Hancock Seamounts at 7–416 m (Iwai, 1976?; Humphreys *et al.*, 1984; Uchida & Uchiyama, 1986; Chave & Mundy, 1994).

GENERAL RANGE: Probably circumsubtropical and tropical except for the eastern tropical Pacific. In the Pacific known from southern Japan, the Ogasawara Islands, Indonesia, Australia, and the Hawaiian Ridge. Epi- and mesopelagic at 7–530 m (Gushiken *in* Masuda *et al.*, 1984; Smith-Vaniz *in* Fischer & Bianchi, 1984; Uchida & Uchiyama, 1986; Smith-Vaniz *in* Smith & Heemstra, 1986; Smith-Vaniz *et al. in* Quéro *et al.*, 1990; Randall *et al.*, 1990a, 1997b; Chave & Mundy, 1994).

### *Elagatis bipinnulata* (Quoy & Gaimard)

*Seriola bipinnulata* Quoy & Gaimard, 1825, p. 363, pl. 61 (fig. 3), Papua, New Guinea.

*Elagatis bipinnulatus* (Quoy & Gaimard, 1825): Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Tinker (1982), Randall *et al.* (1985a, 1993b), Uchida & Uchiyama (1986), Myers (1989), Hoover (1993, 2003).

*Elagatis bipinnulata* (Quoy & Gaimard, 1825): Gushiken (1983), Gushiken *in* Masuda *et al.* (1984), Smith-Vaniz *in* Whitehead *et al.* (1984), Smith-Vaniz *in* Smith & Heemstra (1986), Randall *et al.* (1990a, 1997a), Eschmeyer (1990), Gunn (1990), Kuiter (1993), Chave & Mundy (1994), Allen & Robertson (1994), Randall (1996a), Robertson & Allen (2002).

TAXONOMY: Gushiken (1983), Eschmeyer (1990), Gunn (1990). *Elagatis bipinnulatus* Bennett, 1840, the name given by many authors in the regional synonymy above, is a junior synonym and secondary homonym of *Elagatis bipinnulatus* (Quoy & Gaimard, 1825) (see Eschmeyer, 1998).

COMMON NAMES: Kamanu (Hoover, 1993, 2003; Randall, 1996a), Rainbow runner (AFS; FAO; Hoover, 1993; Randall, 1996a), Hawaiian salmon (Hoover, 1993; DLNR).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 1–150 m (Jordan & Evermann, 1905; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Chave & Mundy, 1994).

GENERAL RANGE: Circumglobal in the tropical and subtropical Mediterranean Sea, Atlantic, Indian, and Pacific oceans; in the Pacific from southern Japan, the Ogasawara Islands and Australia to Micronesia, the Hawaiian Islands, the offshore eastern tropical Pacific islands, and the mouth of the Gulf of California to northern Peru. Epipelagic, but occasionally seen in shallow water near reefs, at 1–150 m (Myers, 1989; Gushiken *in* Masuda *et al.*, 1984; Smith-Vaniz *in* Whitehead *et al.*, 1984; Smith-Vaniz *in* Smith & Heemstra, 1986; Randall *et al.*, 1990a, 1997b; Kuiter, 1993; Chave & Mundy, 1994; Allen & Robertson, 1994; Robertson & Allen, 2002).

### *Gnathanodon speciosus* (Forsskål)

*Scomber speciosus* Forsskål, 1775, p. 54, xii, Jidda, Saudi Arabia, Red Sea [*Scomber rim* Forsskål, 1775 is regarded as a name in the synonymy of *Scomber speciosus* (see Eschmeyer, 1998)].

*Caranx speciosus* (Forsskål, 1775): Steindachner (1900), Jenkins (1903), Snyder (1904), Jordan & Evermann (1905).

*Gnathanodon speciosus* (Forsskål, 1775): Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Tinker (1982), Gushiken (1983), Smith-Vaniz in Fischer & Bianchi (1984), Uchida & Uchiyama (1986), Smith-Vaniz in Smith & Heemstra (1986), Myers (1989), Gunn (1990), Kuitert (1993), Hoover (1993, 2003), Randall *et al.* (1993b), Allen & Robertson (1994), Randall (1996a).

TAXONOMY: Gushiken (1983), Gunn (1990).

COMMON NAMES: Ulua pa'opa'ō (Hoover, 1993, 2003; Randall, 1996a), Ulua Pau'ū, Paopao (DLNR), Golden trevally (AFS; FAO; Hoover, 1993, 2003; Randall, 1996a), Yellow ulua (Hoover, 1993, 2003; DLNR).

HAWAIIAN RECORDS: O'ahu to Midway at 1–2 m (Steindachner, 1900; Jordan & Evermann, 1905; Uchida & Uchiyama, 1986).

GENERAL RANGE: Indo-transpacific from South Africa and the Red Sea to the Ryukyus, Australia, New Caledonia, Micronesia, the Hawaiian Islands, the Austral Islands, and Baja California to Peru. Epipelagic, often in estuaries when young (Smith-Vaniz in Fischer & Bianchi, 1984; Uchida & Uchiyama, 1986; Smith-Vaniz in Smith & Heemstra, 1986; Myers, 1989; Gunn, 1990; Kuitert, 1993; Allen & Robertson, 1994).

[*Megalaspis cordyla* (Linnaeus)]

*Scomber cordyla* Linnaeus, 1758, p. 298, the type locality was given as “Habitat in America” which is an error. *Megalaspis cordyla* (Linnaeus, 1758): Jordan *et al.* (1927), Gosline & Brock (1960), Tinker (1982), Springer (1982), Gushiken (1983), Gushiken in Masuda *et al.* (1984), Smith-Vaniz in Fischer & Bianchi (1984), Smith-Vaniz in Smith & Heemstra (1986), Gunn (1990), Randall *et al.* (1990a).

TAXONOMY: Gushiken (1983), Gunn (1990).

COMMON NAMES: Torpedo scad (AFS; FAO), Finny scad (Randall *et al.*, 1997a; Myers, 1999).

HAWAIIAN RECORDS: This species was originally recorded from O'ahu by Jordan *et al.* (1927) on the basis of a specimen in the Bishop Museum. Gosline & Brock (1960) and Tinker (1982) repeated their record, but Jordan *et al.* (1927) did not note if the specimen had been collected in the Hawaiian Islands. The record is probably erroneous (Springer, 1982; Smith-Vaniz in Fischer & Bianchi, 1984).

GENERAL RANGE: Indo-West-Pacific from South Africa to southern Japan and Australia. Pelagic in clear water, usually near the surface (Gushiken in Masuda *et al.*, 1984; Smith-Vaniz in Fischer & Bianchi, 1984; Smith-Vaniz in Smith & Heemstra, 1986; Gunn, 1990; Randall *et al.*, 1990a).

*Naucrates ductor* (Linnaeus)

*Gasterosteus ductor* Linnaeus, 1758, p. 295, “Habitat in Pelago” [validity of name fixed by ICZN Opinion 1799]. *Naucrates ductor* (Linnaeus, 1758): Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Novikov *et al.* (1981), Tinker (1982), Gushiken (1983), Gushiken in Masuda *et al.* (1984), Smith-Vaniz in Whitehead *et al.* (1984), Smith-Vaniz in Smith & Heemstra (1986), Myers (1989), Kuitert (1993), Allen & Robertson (1994).

TAXONOMY: Gushiken (1983).

COMMON NAMES: Pilotfish (AFS; FAO; Randall *et al.*, 1997a).

HAWAIIAN RECORDS: O'ahu to Milwaukee Seamount (Jordan & Evermann, 1905; Novikov *et al.*, 1981).

GENERAL RANGE: Circumglobal in the tropical through temperate Mediterranean Sea, Atlantic, Indian, and Pacific oceans. Pelagic, often associated with large sharks (Gushiken in Masuda *et al.*, 1984; Smith-Vaniz in Whitehead *et al.*, 1984; Smith-Vaniz in Smith & Heemstra, 1986; Myers, 1989; Kuitert, 1993; Allen & Robertson, 1994).

[*Parastromateus niger* (Bloch)]

*Stromateus niger* Bloch, 1795, p. 93, pl. 422, “Malaisch” [= Malayan?].

*Apolectus [niger]* (Bloch, 1795): Springer (1982).

*Parastromateus niger* (Bloch, 1795): Gushiken in Masuda *et al.* (1984), Smith-Vaniz (1984), Smith-Vaniz in Smith & Heemstra (1986), Paxton *et al.* (1989), Randall (1995c), Randall *et al.* (1997a, 1997a).

TAXONOMY: Smith-Vaniz (1984), Paxton *et al.* (1989).

COMMON NAMES: Black pomfret (AFS; FAO; Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Springer (1982) discussed reports of *P. niger* from the Hawaiian Islands and concluded that these were in error. The species does not occur in the central Pacific.

GENERAL RANGE: Indo-west Pacific from South Africa, Mauritius, the Seychelles and the Arabian Gulf to Japan, the Ogasawara Islands, the South China Sea and Australia. Epipelagic over mud bottoms of continental shelves at 15–40 m, often moving toward the surface at night (Gushiken *in* Masuda *et al.*, 1984; Smith-Vaniz *in* Smith & Heemstra, 1986; Paxton *et al.*, 1989; Randall, 1995c; Randall *et al.*, 1997a, 1997).

***Pseudocaranx dentex*** (Bloch & Schneider)

*Scomber dentex* Bloch & Schneider, 1801, p. 30, Brazil.

*Carangus cheilio* Snyder, 1904: Snyder (1904), Jordan & Evermann (1905).

*Caranx cheilio* (Snyder, 1904): Fowler (1928, 1931), Gosline & Brock (1960), Iwai (1976), Tinker (1982).

*Caranx delicatissimus* Döderlein *in* Steindachner & Döderlein, 1884: Humphreys *et al.* (1984).

*Caranx dasson* non Jordan & Snyder, 1907 [considered here to be a junior synonym of *Carangoides equula* (Temminck & Schlegel, 1844), a valid species also found in the Hawaiian Islands; some Hawaiian records of this species are referable to *P. dentex*, according to Randall *et al.* (1985a)].

*Pseudocaranx dentex* (Bloch & Schneider, 1801): Randall (1981a, 1996a), Gushiken (1983), Humphreys *et al.* (1984), Smith-Vaniz *in* Fischer & Bianchi (1984), Smith-Vaniz *in* Whitehead *et al.* (1984), Uchida & Uchiyama (1986), Smith-Vaniz *in* Smith & Heemstra (1986), Randall *et al.* (1990a, 1993b, 1997a), Kuitert (1993), Hoover (1993, 2003), Chave & Mundy (1994), Smith-Vaniz & Randall (1994).

TAXONOMY: Gushiken (1983), Smith-Vaniz & Randall (1994).

COMMON NAMES: Lehe, Ulua (Hoover, 1993, 2003), White trevally (AFS; FAO), Thicklipped jack (Hoover, 1993, 2003; Randall, 1996a), Butaguchi (Randall, 1996a), Buta ulua (Randall, 1996a), Pig ulua (Hoover, 1993, 2003).

HAWAIIAN RECORDS: Moloka'i to Ladd Seamount and Kure Atoll at 1–238 m, more common in the Northwestern Hawaiian Islands than in the main Hawaiian Islands (Snyder, 1904; Iwai, 1976; Humphreys *et al.*, 1984; Uchida & Uchiyama, 1986; Randall *et al.*, 1993b; Chave & Mundy, 1994).

GENERAL RANGE: Nearly circumglobal in the subtropical Mediterranean Sea, Atlantic, Indian, and Pacific oceans but antitropical and absent from the eastern Pacific. Known in the Pacific from Australia and New Zealand to Easter Island in the south, plus southern Japan and the Ogasawara Islands to the Hawaiian Islands in the north. Epi-, and meso-benthopelagic at 1–238 m (Randall, 1982; Uchida & Uchiyama, 1986; Smith-Vaniz *in* Fischer & Bianchi, 1984; Smith-Vaniz *in* Whitehead *et al.*, 1984; Smith-Vaniz *in* Smith & Heemstra, 1986; Randall *et al.*, 1990a, 1997b; Kuitert, 1993; Chave & Mundy, 1994).

***Scomberoides lysan*** (Forsskål)

*Scomber lysan* Forsskål, 1775, p. 54, xii, Saudi Arabia or Luhaiya, Yemen, Red Sea.

*Chorinemus sancti-petri* Cuvier *in* Cuvier & Valenciennes, 1832: Günther (1876), Streets (1877), Steindachner (1900).

*Scombroides sancti petri* (Cuvier, 1832): Smith & Swain (1882).

*Chorinemus moadetta* Cuvier *in* Cuvier & Valenciennes, 1832: Steindachner (1900).

*Scomberoides tala* non (Cuvier *in* Cuvier & Valenciennes, 1832) [a valid species not found in the Hawaiian Islands]: Jenkins (1903).

*Scomberoides sancti-petri* (Cuvier, 1832): Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Tinker (1982).

*Scomberoides tolooparah* (Rüppell, 1829): Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949).

*Scomberoides talah* non (Cuvier *in* Cuvier & Valenciennes, 1832) [*lapsus for tala*]: Fowler (1934, in part).

*Scomberoides lysan* (Forsskål, 1775): Fowler (1928, 1934), Gushiken (1983), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Smith-Vaniz *in* Smith & Heemstra (1986), Myers (1989), Gunn (1990), Hoover (1993, 2003), Kuitert (1993), Randall (1996a).

TAXONOMY: Gushiken (1983), Gunn (1990).

COMMON NAMES: Lai (Hoover, 1993, 2003; Randall, 1996a), Lae (Gosline & Brock, 1960; DLNR), Doublespotted queenfish (AFS; FAO; Randall *et al.*, 1997a), Leatherback (Hoover, 1993, 2003; Randall, 1996; DLNR).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at 1–10 m (Günther, 1876; Smith & Swain, 1882; Jordan & Evermann, 1905; Randall *et al.*, 1985b, 1993b; Hoover, 1993).

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, the Tuamotu Islands, and the Marquesas. Pelagic, often above reefs, from 1–100 m (Smith-Vaniz *in* Smith & Heemstra, 1986; Myers, 1989; Gunn, 1990; Randall *et al.*, 1990a, 1997b; Kuiter, 1993).

***Selar crumenophthalmus* (Bloch)**

*Scomber crumenophthalmus* Bloch, 1793, p. 77, pl. 343, Accra, Guinea, West Africa.

*Caranx crumenophthalmus* (Bloch, 1793): Günther (1876, 1880), Steindachner (1900).

*Trachurops mauritanus* (Quoy & Gaimard, 1825): Streets (1877).

*Trachurops crumenophthalmus* (Bloch, 1793): Fowler (1900), Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Gosline & Brock (1960), Struhsaker (1973a), Tinker (1982).

*Trachurus trachurus* non (Linnaeus, 1758) [a valid species not found in the Hawaiian Islands]: Fowler (1934, in part).

*Selar crumenophthalmus* (Bloch, 1793): Fowler (1928, 1931, 1934, 1949), Gushiken (1983), Randall *et al.* (1985a, 1990a), Uchida & Uchiyama (1986), Smith-Vaniz *in* Smith & Heemstra (1986), Myers (1989), Gunn (1990), Hoover (1993, 2003), Allen & Robertson (1994), Randall (1996a), Robertson & Allen (2002).

TAXONOMY: Gushiken (1983), Gunn (1990).

COMMON NAMES: Akule (adults, > 20 cm TL) (Hoover, 1993, 2003; Randall, 1996a), Halalū (juveniles, 8–20 cm TL) (Hoover, 1993, 2003), Pā‘ā‘ā (small juveniles, <8 cm TL) (Hoover, 1993, 2003), Aji (Gosline & Brock, 1960; DLNR), Bigeye scad (AFS; FAO; Hoover, 1993, 2003; Randall, 1996a; DLNR), Purse-eyed scad (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to Midway at 1–64 m (Günther, 1876; Jordan & Evermann, 1905; Struhsaker, 1973a; Randall *et al.*, 1985b; Uchida & Uchiyama, 1986; Hoover, 1993).

GENERAL RANGE: Circumglobal in the tropical and subtropical Atlantic, Indian, and Pacific oceans; in the Pacific from southern Japan, the Ogasawara Islands, Australia, and New Caledonia to Micronesia, the Hawaiian Islands, Rapa, the offshore eastern tropical Pacific islands, and the Gulf of California to northern Peru. Pelagic, with the young in shallow nearshore areas and adults in deep offshore waters, at 1–>170 m (Uchida & Uchiyama, 1986; Smith-Vaniz *in* Smith & Heemstra, 1986; Myers, 1989; Randall *et al.*, 1990a, 1997b; Allen & Robertson, 1994; Robertson & Allen, 2002).

***Seriola dumerili* (Risso)**

*Caranx dumerili* Risso, 1810, p. 175, pl. 6, Nice, France.

*Seriola dumerilii* (Risso, 1810): Günther (1876), Myers (1989).

*Seriola purpurascens* Temminck & Schlegel, 1845: Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1931).

*Seriola dumerili* (Risso, 1810): Fowler (1934, 1949), Gosline & Brock (1960), Mather (1971), Tinker (1982), Gushiken (1983), Humphreys *et al.* (1984), Okamoto & Kanenaka (1984), Gushiken *in* Masuda *et al.* (1984), Smith-Vaniz *in* Fischer & Bianchi (1984), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Uchida & Uchiyama (1986), Smith-Vaniz *in* Smith & Heemstra (1986), Hoover (1993, 2003), Kuiter (1993), Chave & Mundy (1994), Randall (1996a).

TAXONOMY: Mather (1971), Gushiken (1983).

COMMON NAMES: Kāhala (Hoover, 1993, 2003; Randall, 1996a), Kahala (Hoover, 2003), Pūakahala, Greater amberjack (AFS; FAO; Randall, 1996a), Amberjack (Hoover, 1993, 2003; Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Johnston Atoll and O‘ahu to Kure Atoll at 1–385 m (Günther, 1876; Jordan & Evermann, 1905; Humphreys *et al.*, 1984; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Chave & Mundy, 1994).

GENERAL RANGE: Nearly circumglobal, except for the eastern Pacific, in the tropical through warm-temperate Mediterranean Sea, Atlantic, Indian, and Pacific oceans. In the Pacific from southern Japan, the Ogasawara Islands and Australia to Micronesia and the Hawaiian Islands. Epi- and mesopelagic at 1–385 m (Myers, 1989; Gushiken *in* Masuda *et al.*, 1984; Smith-Vaniz *in* Fischer & Bianchi, 1984; Uchida & Uchiyama, 1986; Smith-Vaniz *in* Smith & Heemstra, 1986; Randall *et al.*, 1990a, 1997b; Kuiter, 1993; Chave & Mundy, 1994).

***Seriola lalandi*** Valenciennes

*Seriola lalandi* Valenciennes in Cuvier & Valenciennes, 1833, p. 208, Brazil.

*Seriola aureovittata* Temminck & Schlegel, 1845: Fowler (1928, in part), Gosline & Brock (1960, in part), Iwai (1976), Tinker (1982, in part), Humphreys *et al.* (1984).

*Seriola lalandi* Valenciennes, 1833: Mather (1971), Gushiken (1983), Smith-Vaniz in Fischer & Bianchi (1984), Uchida & Uchiyama (1986), Smith-Vaniz in Smith & Heemstra (1986), Randall *et al.* (1990a, 1993b), Kuiter (1993), Allen & Robertson (1994).

TAXONOMY: Mather (1971), Gushiken (1983).

COMMON NAMES: Kahala 'opio (Gosline & Brock, 1960), Yellowtail (AFS), Yellowtail amberjack (FAO), Yellowtail kingfish (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Hawai'i Island to Seamount 8, Ladd Seamount, and Kure Atoll at 1–146 m (Jordan & Evermann, 1905; Gosline & Brock, 1960; Iwai, 1976; Humphreys *et al.*, 1984; Uchida & Uchiyama, 1986). The occurrence of this species in the Hawaiian Islands seems to be related to El Niño events and other oceanographic conditions that promote its recruitment to the islands. It is likely that the specimens found at the different ends of the archipelago come from different sources, with those in the main islands arriving from the eastern tropical Pacific and those in the Northwestern Hawaiian Islands arriving from the northwestern Pacific via the Kuroshio Extension. It is doubtful that this species has permanently reproducing populations in the Hawaiian Islands.

GENERAL RANGE: Circumglobal in the subtropical Atlantic, Indian, and Pacific oceans but with a disjunct distribution. Epipelagic at 1–146 m (Smith-Vaniz in Fischer & Bianchi, 1984; Uchida & Uchiyama, 1986; Smith-Vaniz in Smith & Heemstra, 1986; Randall *et al.*, 1990a; Kuiter, 1993; Allen & Robertson, 1994).

[*Seriola quinqueradiata* Temminck & Schlegel]

*Seriola quinqueradiata* Temminck & Schlegel, 1845, p. 115, pl. 62 (fig. 2), Nagasaki, Japan.

*Seriola sparna* Jenkins, 1903: Jenkins (1903), Jordan & Evermann (1905, in part), Fowler (1928, in part).

*Seriola quinqueradiata* Temminck & Schlegel, 1845: Gushiken (1983), Masuda *et al.* (1984).

TAXONOMY: Gushiken (1983).

COMMON NAMES: Buri (AFS), Yellowtail.

HAWAIIAN RECORDS: *Seriola sparna* Jenkins, 1903, was described from a specimen collected in Honolulu in 1889 (presumably at a fish market). The type of *S. sparna* has been identified as a specimen of *S. quinqueradiata* by W. Smith-Vaniz (J.E. Randall, pers. comm., May 2002). The type of *S. sparna* constitutes the only record known of the species from the Hawaiian Archipelago. Jenkins (1903) direct statement that he collected the specimen in Honolulu refutes the hypothesis that the specimen came from elsewhere and was subsequently mislabeled. It is possible that the specimen was a waif.

GENERAL RANGE: Western Pacific endemic known only from the Ryukyu Islands, Korea, and Japan, with a possible occurrence in the Hawaiian Islands as a waif. Epipelagic at unspecified depths (Gushiken, 1983; Masuda *et al.*, 1984).

***Seriola rivoliana*** Valenciennes

*Seriola rivoliana* Valenciennes in Cuvier & Valenciennes, 1833, p. 207, "Greek Archipelago".

*Seriola rivoliana* Valenciennes, 1833: Gooding & Magnuson (1967), Mather (1971), Clarke (1972), Gushiken in Masuda *et al.* (1984), Smith-Vaniz in Whitehead *et al.* (1984), Smith-Vaniz in Smith & Heemstra (1986), Myers (1989), Randall *et al.* (1990a), Kuiter (1993), Allen & Robertson (1994).

TAXONOMY: Mather (1971), Myers (1989).

COMMON NAMES: Almaco jack (AFS; FAO; Randall *et al.*, 1997a; Myers, 1999), Highfin amberjack.

HAWAIIAN RECORDS: Hawai'i Island to O'ahu at 1–245 m (Gooding & Magnuson, 1967; Clarke, 1972).

GENERAL RANGE: Circumglobal in the tropical through warm-temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans. Pelagic and benthopelagic at 1–245 m (Clarke, 1972; Gushiken in Masuda *et al.*, 1984; Smith-Vaniz in Whitehead *et al.*, 1984; Smith-Vaniz in Smith & Heemstra, 1986; Myers, 1989; Randall *et al.*, 1990a; Kuiter, 1993; Allen & Robertson, 1994).

***Uraspis helvola*** (Forster)

*Scomber helvolus* Forster in Bloch & Schneider, 1801, p. 35, probably from the Society Islands.

*Carangus helvolus* (Forster, 1801): Snyder (1904), Jordan & Evermann (1905).

*Caranx helvolus* (Forster, 1801): Fowler (1928), Gosline & Brock (1960), Tinker (1982).

*Leucoglossa candens* Jordan, Evermann & Wakiya in Jordan, Evermann & Tanaka, 1927: Jordan *et al.* (1927), Fowler (1949).

*Uraspis helvolus* (Forster, 1801): Smith-Vaniz in Fischer & Bianchi (1984), Myers (1989).

*Uraspis helvola* (Forster, 1801): Jordan *et al.* (1927), Fowler (1949), Gushiken (1983), Gushiken in Masuda *et al.* (1984), Uchida & Uchiyama (1986), Smith-Vaniz *et al.* in Quéro *et al.* (1990), Gunn (1990), Allen & Robertson (1994), Randall *et al.* (1997a).

TAXONOMY: Gushiken (1983). Smith-Vaniz (1999) noted, “adults of *Uraspis helvola* and *U. secunda* are nearly impossible to distinguish although juvenile characters involving allometric growth patterns suggest that they are distinct species.”

COMMON NAMES: Whitemouth jack (AFS), Whitetongue jack (FAO; Myers, 1999).

HAWAIIAN RECORDS: O‘ahu to Necker at 1–77 m (Snyder, 1904; Uchida & Uchiyama, 1986; B. Mundy, pers. observ., 1986).

GENERAL RANGE: Tropical and subtropical Red Sea, Atlantic, Indian, and Pacific oceans, but only known from St. Helena and Ascension Islands in the Atlantic. Otherwise Indo-transpacific from the western Indian Ocean to southern Japan, the Ogasawara Islands, Micronesia, the Hawaiian Islands, and the eastern Pacific from southern California to Peru, but not Australia. Pelagic and benthopelagic at 1–77 m (Gushiken, 1983; Gushiken in Masuda *et al.*, 1984; Smith-Vaniz in Fischer & Bianchi, 1984; Myers, 1989; Uchida & Uchiyama, 1986; Smith-Vaniz *et al.* in Quéro *et al.*, 1990; Gunn, 1990; Allen & Robertson, 1994; Randall *et al.*, 1997b).

### *Uraspis secunda* (Poey)

*Caranx secundus* Poey, 1860, p. 223, Cuba.

*Uraspis reversa* Jordan, Evermann & Wakiya in Jordan, Evermann & Tanaka, 1927: Jordan *et al.* (1927), Fowler (1949), Gosline & Brock (1960), Tinker (1982).

*Leucoglossa albilinguis* Jordan, Evermann & Wakiya in Jordan, Evermann & Tanaka, 1927: Jordan *et al.* (1927), Fowler (1949).

*Uraspis secunda* (Poey, 1860): Smith-Vaniz in Fischer & Bianchi (1984), Smith-Vaniz in Smith & Heemstra (1986), Gunn (1990).

TAXONOMY: Smith-Vaniz in Fischer & Bianchi (1984), Gunn (1990). See comment for *U. helvola*.

COMMON NAMES: Cottonmouth jack (AFS; FAO).

HAWAIIAN RECORDS: O‘ahu (Jordan *et al.*, 1927; Fowler, 1949).

GENERAL RANGE: Circumglobal in the tropical and subtropical Atlantic, Indian, and Pacific oceans; in the Pacific from Australia and the Hawaiian Islands. Pelagic and benthopelagic, perhaps oceanic (Smith-Vaniz in Fischer & Bianchi, 1984; Smith-Vaniz in Smith & Heemstra, 1986; Gunn, 1990).

### *Uraspis uraspis* (Günther)

*Caranx uraspis* Günther, 1860, p. 444, Ambon Island, Moluccas Islands, Indonesia.

*Uraspis uraspis* (Günther, 1860): Gushiken (1983), Smith-Vaniz (1999).

TAXONOMY: Gushiken (1983), Smith-Vaniz (1999).

COMMON NAMES: Whitetongue jack (AFS), Whitemouth jack (FAO).

HAWAIIAN RECORDS: Smith-Vaniz (1999) included “Hawaii (Oahu)” in the distribution of this species. It is curious that no other records of *U. uraspis* from the Hawaiian Archipelago have been found.

GENERAL RANGE: Indo-Pacific from the Red Sea, Persian Gulf, and Sri Lanka to Indonesia, northern Australia, the Philippines, Hong Kong, Papua New Guinea, and the Hawaiian Islands. Epipelagic from the surface to 130 m (Smith-Vaniz, 1999).

## Menidae — Moonfishes

### [*Mene maculata* (Bloch & Schneider)]

*Zeus maculatus* Bloch & Schneider, 1801, p. 95, pl. 22, Tranquebar, India.

*Mene maculata* (Bloch & Schneider, 1801): Matsubara (1955), Springer (1982), Nakamura in Masuda *et al.* (1984), Smith in Smith & Heemstra (1986).

TAXONOMY: Smith in Smith & Heemstra (1986).



COMMON NAMES: Moonfish (AFS).

HAWAIIAN RECORDS: The record of this species from the Hawaiian Islands by Matsubara (1955) and subsequent Hawaiian records resulting from it (i.e., Nakamura *in* Masuda *et al.*, 1984) are erroneous (Springer, 1982).

GENERAL RANGE: Indo-West Pacific from east Africa to southern Japan, northern Australia, and Fiji. Pelagic in shallow coastal and estuarine areas (Springer, 1982; Smith *in* Smith & Heemstra, 1986).

### Bramidae — Pomfrets

#### *Brama dussumieri* Cuvier

*Brama dussumieri* Cuvier *in* Cuvier & Valenciennes, 1831, p. 294, central Atlantic near the Equator at 85°E.

*Brama dussumieri* Cuvier, 1831: Mead (1972), Pavlov (1991), Moteki *et al.* (1995).

TAXONOMY: Mead (1972), Moteki *et al.* (1995).

COMMON NAMES: Lowfin pomfret (AFS).

HAWAIIAN RECORDS: Northeast of O'ahu at unspecified depths (Mead, 1972). *Brama* larvae from Johnston Atoll (Boehlert *et al.*, 1992) and *Brama* collected from Ladd Seamount and Bank 11 at 95–172 m (Uchida & Uchiyama, 1986) were not identified to species.

GENERAL RANGE: Circumglobal between 35°N–35°S in the tropical and subtropical Gulf of Mexico, Atlantic, Indian, and Pacific oceans. Epi- and mesopelagic at 1–300 m (Mead, 1972; Pavlov, 1991).

#### *Brama japonica* Hilgendorf

*Brama japonica* Hilgendorf, 1878, p. 1, "Japanese Seas".

*Brama raii* non (Bloch, 1791) [a junior synonym of *Brama brama* (Bonnaterre, 1788), a valid species not found in the Hawaiian Islands]: Borets & Sokolovsky (1978).

*Brama japonica* Hilgendorf, 1878: Mead (1972), Borets & Sokolovsky (1978), Loeb (1979), Novikov *et al.* (1981), Akazaki *in* Okamura *et al.* (1982), Okamura *in* Okamura (1985), Boehlert & Mundy (1992), Seki & Bigelow (1993), Moteki *et al.* (1995).

TAXONOMY: Mead (1972), Moteki *et al.* (1995).

COMMON NAMES: Pacific pomfret (AFS).

HAWAIIAN RECORDS: Maro Reef to the Hancock and Koko seamounts during winter only at 1–100 m (Mead, 1972; Novikov *et al.*, 1981; Boehlert & Mundy, 1992; Seki & Bigelow, 1993).

GENERAL RANGE: North Pacific endemic from the Aleutians and the northern Gulf of Alaska to the Okinawa Trough, southern California, and ca. 28°N in the central Pacific, making annual migrations between the northern part of its range in summer and the southern part in winter. Epi- and mesopelagic at 1–620 m (Mead, 1972; Akazaki *in* Okamura *et al.*, 1982; Okamura *in* Okamura *et al.*, 1985; Seki & Bigelow, 1993).

#### *Brama myersi* Mead

*Brama myersi* Mead, 1972, p. 76, Figs. 35–36, central Pacific south of the Hawaiian Islands at 15°14'N, 159°55'E.

*Brama myersi* Mead, 1972: Mead (1972), Mochizuki *in* Masuda *et al.* (1984), Moteki *et al.* (1995).

TAXONOMY: Mead (1972), Moteki *et al.* (1995).

HAWAIIAN RECORDS: Hawai'i Island to O'ahu at 1–200 m fishing depths (Mead, 1972).

GENERAL RANGE: Indo-Pacific from east Africa to southern Japan, Micronesia, the Hawaiian Islands, the central equatorial Pacific, and the Kermadec Islands. Epi- and mesopelagic at 1–200 m fishing depths (Mead, 1972; Mochizuki *in* Masuda *et al.*, 1984).

#### *Brama orcini* Cuvier

*Brama orcini* Cuvier *in* Cuvier & Valenciennes, 1831, p. 295, central Atlantic near the Equator at 85°E.

*Collybus drachme* Snyder, 1904: Snyder (1904), Gilbert (1905), Jordan & Evermann (1905), Fowler (1928), Gosline & Brock (1960), Borets & Sokolovsky (1978), Tinker (1982).

*Taractes orcini* (Cuvier, 1831): Fowler (1928).

*Brama orcini* Cuvier, 1831: Mead (1972), Humphreys *et al.* (1984), Mochizuki *in* Masuda *et al.* (1984), Smith *in* Smith & Heemstra (1986), Moteki *et al.* (1995).

TAXONOMY: Mead (1972), Moteki *et al.* (1995).

COMMON NAMES: Bigtooth pomfret (AFS), Tropical pomfret.

HAWAIIAN RECORDS: Hawai'i Island to the Hancock Seamounts at 1 m and 982–1229 m fishing depths (Snyder, 1904; Gilbert, 1905; Jordan & Evermann, 1905; Mead, 1972; Humphreys *et al.*, 1984).

GENERAL RANGE: Indo-transpacific from South Africa and the Chagos Archipelago to southern Japan, Taiwan, New Guinea, the Hawaiian Islands, the Line Islands, Samoa, southern California, and Mexico. Epipelagic at 1–100 m and to 1229 m fishing depths (Mead, 1972; Mochizuki *in* Masuda *et al.*, 1984; Smith *in* Smith & Heemstra, 1986).

[*Brama pauciradiata* Moteki, Fujita, & Last]

*Brama pauciradiata* Moteki, Fujita & Last, 1995, p. 421, Figs. 1–2, southwest of Imperieuse Reef, Rowley Shoals, Australia, at 17°52'S, 118°16'E.

*Brama pauciradiata* Moteki, Fujita & Last, 1995: Moteki *et al.* (1995).

TAXONOMY: Moteki *et al.* (1995).

HAWAIIAN RECORDS: None, but a record from northeast of Hawai'i Island at 25°08'N, 152°45'W from 230 m (Moteki *et al.*, 1995) indicates that this species occurs in the main Hawaiian Islands.

GENERAL RANGE: Indo-Pacific but known only from the eastern Indian Ocean off NW Australia, Indonesia, the Coral Sea, and northeast of Hawai'i Island. Epi- and benthopelagic at 80–550 m (Moteki *et al.*, 1995).

*Eumegistus illustris* Jordan & Jordan

*Eumegistus illustris* Jordan & Jordan, 1922, p. 36, Pl. 2 (fig. 1), Honolulu Market, O'ahu, Hawaiian Islands.

*Brama raii* non (Bloch, 1791) [a junior synonym of *Brama brama* (Bonnaterre, 1788), a valid species not found in the Hawaiian Islands]: Fowler (1928, 1934), Borets & Sokolovsky (1978)?

*Lepidotus raii* non (Bloch, 1791): Fowler (1949).

*Eumegistus illustris* Jordan & Jordan, 1922: Jordan & Jordan (1922), Mead (1972), Tinker (1982), Akazaki *in* Okamura *et al.* (1982), Mochizuki *in* Masuda *et al.* (1984), Randall *et al.* (1985a), Prut'ko (1986), Chave & Mundy (1994, text in part but not photograph [a misidentified *Taractichthys steindachneri*]).

TAXONOMY: Mead (1972).

COMMON NAMES: Brilliant pomfret (FAO), Monchong.

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to O'ahu at 274–520 m (Jordan & Jordan, 1922; Mead, 1972; Tinker, 1982; Randall *et al.*, 1985b; Chave & Mundy, 1994).

GENERAL RANGE: Indo-Pacific from the central Indian Ocean to southern Japan, the Kyushu-Palau Ridge, New Guinea, the Loyalty Islands, the Hawaiian Islands, the Society Islands, and the Marquesas. Epi- and benthopelagic at 1–620 m fishing depths (Akazaki *in* Okamura *et al.*, 1982; Mochizuki *in* Masuda *et al.*, 1984; Prut'ko, 1986; Chave & Mundy, 1994).

*Pteraclis aesticola* (Jordan & Snyder)

*Bentenia aesticola* Jordan & Snyder, 1901a, p. 306, Pl. 16 (fig. 6), off the Kashima coast near Mito, Hitachi, Ibaraki, Prefecture, Japan.

*Pteraclis velifer* non (Pallas, 1770) [a valid species not found in the Hawaiian Islands]: Gosline & Brock (1960), Tinker (1982).

*Pteraclis aesticola* (Jordan & Snyder, 1901a): Mead (1972), Loeb (1979), Mochizuki *in* Masuda *et al.* (1984), Seki & Mundy (1991), Boehlert & Mundy (1992).

TAXONOMY: Mead (1972).

COMMON NAMES: Pacific fanfish (AFS).

HAWAIIAN RECORDS: Hawai'i Island to the Hancock Seamounts at 1–100 m (Gosline & Brock, 1960; Mead, 1972; Seki & Mundy, 1991; Boehlert & Mundy, 1992).

GENERAL RANGE: Pacific endemic from southern Japan and the Marianas to the Hawaiian Islands, Easter Island, California, and the Sala-y-Gomez Ridge. Epipelagic at 0–100 m (Mead, 1972; Mochizuki *in* Masuda *et al.*, 1984; Boehlert & Mundy, 1992).

*Pterycombus petersii* (Hilgendorf)

*Centropholis petersii* Hilgendorf, 1878, p. 2, "Japanese Seas".

*Pterycombus petersii* (Hilgendorf, 1878): Mead (1972), Paulin (1981), Akazaki in Okamura *et al.* (1982), Mochizuki in Masuda *et al.* (1984), Smith in Smith & Heemstra (1986), Gomes in Quéro *et al.* (1990), Seki & Mundy (1991), Myers & Donaldson (1996).

TAXONOMY: Mead (1972).

COMMON NAMES: Prickly pomfret (AFS), Prickly fanfish.

HAWAIIAN RECORDS: The Hancock Seamounts at 1–100 m (Seki & Mundy, 1991).

GENERAL RANGE: Southeastern Atlantic and Indo-Pacific from both coasts of South Africa and the Arabian Gulf to Indonesia, southern Japan, Taiwan, New Zealand, the Kermadec Islands, the Mariana Islands, the Emperor Seamounts, and the Line Islands. Epi- and mesopelagic at 0–340 m (Mead, 1972; Paulin, 1981; Akazaki in Okamura *et al.*, 1982; Mochizuki in Masuda *et al.*, 1984; Smith in Smith & Heemstra, 1986; Gomes in Quéro *et al.*, 1990; Seki & Mundy, 1991; Myers & Donaldson, 1996).

### ***Taractes asper* Lowe**

*Taractes asper* Lowe, 1843, p. 83, off Madeira, eastern North Atlantic.

*Taractes platycephalus* Matsubara, 1936 [*lapsus* for *platycephalus*]: Borets & Sokolovsky (1978).

*Taractes asper* Lowe, 1843: Mead (1972), Borets & Sokolovsky (1978), Paulin (1981), Mochizuki in Masuda *et al.* (1984), Smith in Smith & Heemstra (1986), Pavlov (1989), Gomes in Quéro *et al.* (1990), Seki & Mundy (1991).

TAXONOMY: Mead (1972).

COMMON NAMES: Rough pomfret (AFS).

HAWAIIAN RECORDS: The Hancock Seamounts at 119 m (Seki & Mundy, 1991).

GENERAL RANGE: Circumglobal, perhaps anti-equatorial, between 70°N–40°S in the Atlantic, Indian, and Pacific oceans. In the Pacific from Japan, Taiwan, the Philippines, New Zealand, the Gulf of Alaska, the Emperor Seamounts, California, and the southeastern Pacific. Epi- and mesopelagic at 1–140 m (Mead, 1972; Paulin, 1981; Mochizuki in Masuda *et al.*, 1984; Smith in Smith & Heemstra, 1986; Pavlov, 1989; Gomes in Quéro *et al.*, 1990; Seki & Mundy, 1991).

### ***Taractes rubescens* (Jordan & Evermann)**

*Steinegeria rubescens* Jordan & Evermann, 1887, p. 467, off Pensacola, Florida, Gulf of Mexico.

*Taractes rubescens* (Jordan & Evermann, 1887): Mead (1972), Yoshida (1973), Tinker (1982), Mochizuki in Masuda *et al.* (1984), Pavlov (1989), Gomes in Quéro *et al.* (1990), Robertson & Allen (2002).

TAXONOMY: Mead (1972).

HAWAIIAN RECORDS: Hawai'i Island to O'ahu at 18–37 m (Mead, 1972; Yoshida, 1973).

GENERAL RANGE: Circumglobal in the tropical and subtropical Gulf of Mexico, Atlantic, and Pacific oceans but unknown from the Indian Ocean. In the Pacific from southern Japan, the Hawaiian Islands, and the eastern tropical Pacific from Nicaragua to Peru. Epi- and mesopelagic at 1–300 m (Mead, 1972; Mochizuki in Masuda *et al.*, 1984; Pavlov, 1989; Gomes in Quéro *et al.*, 1990; Robertson & Allen, 2002).

### ***Taractichthys steindachneri* (Döderlein)**

*Argo steindachneri* Döderlein in Steindachner & Döderlein, 1883, p. 242, pl. 7, Tokyo, Japan [see Eschmeyer (1998) for notes on the cryptic first publication of this name].

*Taractes steindachneri* (Döderlein, 1884): Jordan *et al.* (1927), Fowler (1928), Tinker (1982).

*Taractes longipinnis* non (Lowe, 1843) [a valid Atlantic endemic species]: Gosline & Brock (1960).

*Eumegistus illustris* non Jordan & Jordan, 1922 [a valid species that occurs in the Hawaiian Islands]: Chave & Mundy (1994, photograph).

*Taractichthys steindachneri* (Döderlein, 1884): Mead (1972), Yoshida (1973), Mochizuki in Masuda *et al.* (1984), Okamura in Okamura (1985), Smith in Smith & Heemstra (1986), Myers & Donaldson (1996).

TAXONOMY: Mead (1972).

COMMON NAMES: Sickie pomfret (AFS).

HAWAIIAN RECORDS: Hawai'i Island to O'ahu at 18–37 m (Jordan *et al.*, 1927; Mead, 1972; Yoshida, 1973).

GENERAL RANGE: Indo-transpacific from South Africa and the Red Sea to Indonesia, southern Japan,

southeastern Australia, Micronesia, the Hawaiian Islands, the Society Islands, and southern California. Epi- and mesopelagic at 18–360 m (Mead, 1972; Yoshida, 1973; Mochizuki *in* Masuda *et al.*, 1984; Okamura *in* Okamura *et al.*, 1985; Smith *in* Smith & Heemstra, 1986; Myers & Donaldson, 1996).

### Caristiidae — Manefishes<sup>56</sup>

#### *Caristius macropus* (Bellotti)

*Pteraclis macropus* Bellotti, 1903, p. 137, Pl. 6, Yokohama, Japan.

*Caristius* species: Boehlert & Mundy (1992)?

*Caristius macropus* (Bellotti, 1903): Scott *et al.* (1970), Borets & Sokolovsky (1978), Novikov *et al.* (1981), Amaoka *in* Amaoka *et al.* (1983), Fujii *in* Masuda *et al.* (1984), Post *in* Quéro *et al.* (1990), Parin *et al.* (1995), Moser (1996).

TAXONOMY: Amaoka *in* Amaoka *et al.* (1983), Fujii *in* Masuda *et al.* (1984), Post *in* Quéro *et al.* (1990).  
COMMON NAMES: Manefish (AFS).

HAWAIIAN RECORDS: None but Novikov *et al.* (1981) recorded *C. macropus* larvae from Koko Seamount and Boehlert & Mundy (1992) reported unidentified *Caristius* larvae from the Hancock Seamounts. *Caristius macropus* was also listed by Borets & Sokolovsky (1978) who did not present location information for their record. If these identifications are valid, *C. macropus* could occur at the Hancock Seamounts. Of the two nominal species recorded from the region, *C. macropus* is most likely to be correctly identified, as the type specimen of this species was collected from Japan (Post *in* Quéro *et al.*, 1990). *Caristius*, not identified to species, have also been collected at O‘ahu (T. Clarke, pers. comm., Dec. 1990).

GENERAL RANGE: Atlantic and Pacific oceans. Meso- and bathypelagic at 200–1420 m (Scott *et al.*, 1970; Amaoka *in* Amaoka *et al.*, 1983; Fujii *in* Masuda *et al.*, 1984; Post *in* Quéro *et al.*, 1990; Parin *et al.*, 1995; Moser, 1996).

#### [*Caristius maderensis* Maul]

*Caristius maderensis* Maul, 1949, p. 22, Fig., off Madeira, eastern North Atlantic.

*Caristius* sp. (prob. *maderensis*): Loeb (1979)?

*Caristius maderensis* Maul, 1949: Post *in* Whitehead *et al.* (1984), Post *in* Quéro *et al.* (1990), Tolley *et al.* (1990), Moser (1996).

TAXONOMY: Post *in* Whitehead *et al.* (1984), Post *in* Quéro *et al.* (1990).

HAWAIIAN RECORDS: Moser (1996) stated that *C. maderensis* is known in the eastern Pacific from California “westward to Hawaii.” Five specimens identified as “*Caristius* sp. (prob. *maderensis*)” were collected at 28°N, 155°W (Loeb, 1979). If this suggested identification is valid, this species could occur at the Hancock Seamounts.

GENERAL RANGE: North Atlantic, and perhaps the Gulf of Mexico, and the central and eastern Pacific from the Hawaiian Islands to California. Meso- and bathypelagic at 226–2000 m (Post *in* Whitehead *et al.*, 1984; Post *in* Quéro *et al.*, 1990; Tolley *et al.*, 1990; Moser, 1996).

### Emmelichthyidae — Rovers

#### *Emmelichthys karnellai* Heemstra & Randall

*Emmelichthys karnellai* Heemstra & Randall, 1977, p. 384, Fig. 5b, off Honaunau, Kona coast of Hawai‘i Island.

*Erythrichthys schlegelii* non Günther, 1859 [considered an objective synonym of *Emmelichthys schlegelii* Richardson, 1846, a valid *Erythrocles* species not found in the Hawaiian Islands; see Eschmeyer (1998) for taxonomic notes]; Fowler (1928, in part).

*Erythrocles schlegelii* non (Richardson, 1846): Struhsaker (1973a) in part?

*Emmelichthys karnellai* Heemstra & Randall, 1977: Heemstra & Randall (1977), Tinker (1982 appendix), Myers (1989).

TAXONOMY: Heemstra & Randall (1977).

HAWAIIAN RECORDS: Hawai‘i Island to Maro Reef at 128–275 m (Fowler, 1928; Heemstra & Randall, 1977).

GENERAL RANGE: Central Pacific endemic known from the southern Marianas, the Hawaiian Islands, and Easter Island. Benthopelagic at 128–275 m (Heemstra & Randall, 1977; Myers, 1989).

***Emmelichthys struhsakeri* Heemstra & Randall**

*Emmelichthys struhsakeri* Heemstra & Randall, 1977, p. 382, Fig. 5a, Kealaikahiki Channel between Kaho'olawe and Lāna'i, Hawaiian Islands, at 20°43.3'N, 156°49.8'W.

*Erythrichthys schlegelii* non Günther, 1859 [considered an objective synonym of *Emmelichthys schlegelii* Richardson, 1846, a valid *Erythrocles* species not found in the Hawaiian Islands; see Eschmeyer (1998) for taxonomic notes]; Fowler (1928, in part).

*Erythrocles schlegelii* non (Richardson, 1846): Struhsaker (1973a) in part?

*Emmelichthys struhsakeri* Heemstra & Randall, 1977: Heemstra & Randall (1977), Randall (1981a), Tinker (1982 appendix), Humphreys *et al.* (1984), Yamakawa *in* Okamura (1985), Uchida & Uchiyama (1986), Borets (1986), Randall *et al.* (1997a).

TAXONOMY: Heemstra & Randall (1977).

HAWAIIAN RECORDS: Maui to the Hancock and Koko seamounts at 120–390 m (Fowler, 1928; Heemstra & Randall, 1977; Humphreys *et al.*, 1984; Uchida & Uchiyama, 1986; Borets, 1986).

GENERAL RANGE: Pacific endemic, perhaps anti-equatorial, known from Japan, the Okinawa Trough, the Ogasawara Islands, the Philippines, Australia, and the Hawaiian Islands. Benthopelagic at 120–390 m (Heemstra & Randall, 1977; Randall, 1982; Yamakawa *in* Okamura *et al.*, 1985; Borets, 1986; Randall *et al.*, 1997b). Specimens identified as *E. struhsakeri* from the Kyushu-Palau Ridge (Tameka *in* Okamura *et al.*, 1982) were later described as a new species, *Erythrocles microceps* Miyahara & Okamura, 1998.

***Erythrocles scintillans* (Jordan & Thompson)**

*Erythrichthys scintillans* Jordan & Thompson, 1912, p. 599, Hilo, Hawai'i Island.

*Erythrichthys schlegelii* non Günther, 1859 [considered an objective synonym of *Emmelichthys schlegelii* Richardson, 1846, a valid *Erythrocles* species not found in the Hawaiian Islands; see Eschmeyer (1998) for taxonomic notes]; Jordan & Evermann (1905).

*Erythrocles schlegelii* non (Richardson, 1846): Fowler (1931, 1934, 1949), Gosline & Brock (1960 checklist), Clarke (1972), Struhsaker (1973a) in part?, Tinker (1982).

*Erythrichthys schlegelii* non Günther, 1859: Gosline & Brock (1960 key).

*Erythrocles schlegelii* non (Richardson, 1846) [a *lapsus* in spelling of the generic name]: Gosline & Brock (1960 text).

*Erythrocles scintillans* (Jordan & Thompson, 1912): Fowler (1928, in part), Randall (1976a, 1977, 1992b), Heemstra & Randall (1987), Tinker (1982), Humphreys *et al.* (1984), Randall *et al.* (1985a, 1997a), Uchida & Uchiyama (1986), Myers (1989), Parin (1991), Randall & Rivaton (1992), Chave & Mundy (1994).

TAXONOMY: Heemstra & Randall (1977).

COMMON NAMES: Golden kali kali.

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to the Hancock Seamounts at 73–606 m (Jordan & Evermann, 1905; Clarke, 1972; Humphreys *et al.*, 1984; Randall *et al.*, 1985b; Uchida & Uchiyama, 1986; Chave & Mundy, 1994).

GENERAL RANGE: Pacific endemic from Okinawa, the Ogasawara Islands, the southern Marianas, the Hawaiian Islands, Tahiti, Easter Island, and the Nazca Ridge. Benthopelagic at 73–606 m (Heemstra & Randall, 1977; Uchida & Uchiyama, 1986; Myers, 1989; Parin, 1991; Randall, 1992b; Randall & Rivaton, 1992; Chave & Mundy, 1994; Randall *et al.*, 1997b).

## Lutjanidae — Snappers, Fusiliers

***Aphareus furca* (Lacépède)**

*Labrus furca* Lacépède, 1801, p. 429, 477, Pl. 21 (fig. 1), Mauritius, western Indian Ocean.

*Aphareus flavivultus* Jenkins, 1901: Jenkins (1901b, 1903), Snyder (1904), Jordan & Evermann (1905), Jordan *et al.* (1927).

*Aphareus furcatus* (Lacépède, 1801): Jenkins (1903), Jordan *et al.* (1927), Fowler (1928, 1931, 1934), Gosline & Brock (1960), Tinker (1982).

*Aphareus furca* (Lacépède, 1801): Fowler (1949), Hobson (1974), Randall (1985a, 1996a), Allen (1985b), Randall *et al.* (1985a, 1993b, 1997a), Uchida & Uchiyama (1986), Anderson (1987), Myers (1989), Hoover (1993, 2003), Chave & Mundy (1994), Robertson & Allen (2002).

TAXONOMY: Allen (1985b), Anderson (1987).

COMMON NAMES: Wahanui (Hoover, 1993, 2003; Randall, 1996a), Smalltooth jobfish (AFS; Randall, 1996a; Hoover, 2003), Small toothed jobfish (FAO; Myers, 1999), Forktail snapper (Hoover, 1993, 2003), Gurutsu (Gosline & Brock, 1960).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at 5–122 m (Jenkins, 1901b; Hobson, 1974; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Hoover, 1993; Chave & Mundy, 1994).

GENERAL RANGE: Indo-transpacific from east Africa, Mauritius, and the Red Sea to Indonesia, southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, the Austral Islands, and Cocos Island in the eastern Pacific. Pelagic and benthopelagic near reefs at 1–122 m (Allen, 1985b; Myers, 1989; Chave & Mundy, 1994; Randall *et al.*, 1997b; Robertson & Allen, 2002).

### *Aphareus rutilans* Cuvier

*Aphareus rutilans* Cuvier in Cuvier & Valenciennes, 1830, p. 490, Red Sea.

*Aphareus rutilans* Cuvier, 1820: Jordan *et al.* (1927).

*Aphareus thompsoni* Fowler, 1923: Fowler (1923).

*Aphareus rutilans* Cuvier, 1830: Fowler (1928, 1934, 1949), Gosline & Brock (1960), Tinker (1982), Allen (1985b), Randall *et al.* (1985a, 1997a), Anderson (1987), Myers (1989), Chave & Mundy (1994), Randall (1996a).

TAXONOMY: Allen (1985b), Anderson (1987).

COMMON NAMES: Lehi (Myers, 1999), Rusty jobfish (AFS; FAO; Randall *et al.*, 1997a), Silvermouth (Myers, 1999).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to O'ahu at 61–250 m (Jordan *et al.*, 1927; Fowler, 1928; Randall *et al.*, 1985b; Chave & Mundy, 1994).

GENERAL RANGE: Indo-Pacific from east Africa, Mauritius, and the Red Sea to Indonesia, southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, Fiji, and Samoa. Pelagic and benthopelagic near reefs and rocky areas at 61–250 m (Allen, 1985b; Myers, 1989; Chave & Mundy, 1994; Randall *et al.*, 1997b).

### *Aprion virescens* Valenciennes

*Aprion virescens* Valenciennes in Cuvier & Valenciennes, 1830, p. 544, Pl. 168, Seychelles, western Indian Ocean.

*Aprion virescens* Valenciennes, 1830: Günther (1873–1910), Steindachner (1900), Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Tinker (1982), Randall (1985a, 1996a), Allen (1985b), Uchida & Uchiyama (1986), Anderson (1987), Myers (1989), Kosaki *et al.* (1991), Hoover (1993, 2003), Randall *et al.* (1993b, 1997a), Chave & Mundy (1994).

TAXONOMY: Allen (1985b), Anderson (1987).

COMMON NAMES: Uku (Hoover, 1993, 2003; Randall, 1996a), Green jobfish (AFS; FAO; Randall, 1996a; Hoover, 2003), Gray snapper (Hoover, 1993, 2003).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at 1–120 m (Günther, 1873–1910; Uchida & Uchiyama, 1986; Kosaki *et al.*, 1991; Hoover, 1993; Randall *et al.*, 1993b; Chave & Mundy, 1994).

GENERAL RANGE: Indo-Pacific from east Africa, Mauritius, and the Red Sea to Indonesia, southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, and the Tuamotu Archipelago. Benthopelagic near reefs at 1–180 m (Allen, 1985b; Uchida & Uchiyama, 1986; Myers, 1989; Chave & Mundy, 1994; Randall *et al.*, 1997b).

### *Etelis carbunculus* Cuvier

*Etelis carbunculus* Cuvier in Cuvier & Valenciennes, 1828, p. 127, Pl. 18, Mahé, Seychelles, central Indian Ocean.

*Eteliscus marshi* Jenkins, 1903: Jenkins (1903).

*Etelis marshi* (Jenkins, 1903): Jenkins (1903), Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Struhsaker (1973a), Tinker (1982), Tameka in Okamura *et al.* (1982).

*Etelis carbunculus* Cuvier, 1828: Anderson (1981), Allen (1985b), Humphreys *et al.* (1984), Randall *et al.*

(1985a, 1993b, 1997a, 1997b), Borets (1986), Uchida & Uchiyama (1986), Anderson (1987), Winterbottom *et al.* (1989), Chave & Mundy (1994).

**TAXONOMY:** Records to this species in the Hawaiian Islands prior to Anderson (1981) refer to *E. coruscans* Valenciennes, 1862, with *E. marshi* (Jenkins, 1903) referring to the true *E. carbunculus* Cuvier, 1828 (Allen, 1985b; Anderson, 1987).

**COMMON NAMES:** ‘Ula‘ūla (Gosline & Brock, 1960), Ehu (DLNR), Ruby snapper (AFS; FAO; Randall *et al.*, 1997a), Red snapper (DLNR).

**HAWAIIAN RECORDS:** Johnston Atoll and Hawai‘i Island to the Hancock Seamounts at 48–398 m (Jenkins, 1903; Humphreys *et al.*, 1984; Randall *et al.*, 1985b; Borets, 1986; Uchida & Uchiyama, 1986; Chave & Mundy, 1994).

**GENERAL RANGE:** Indo-Pacific from east Africa and the Red Sea to Indonesia, southern Japan, the Ogasawara Islands, Australia, the Hawaiian Islands, and French Polynesia. Benthopelagic over rocky bottoms at 12–398 m (Tameka *in* Okamura *et al.*, 1982; Uchida & Uchiyama, 1986; Winterbottom *et al.*, 1989; Chave & Mundy, 1994; Randall *et al.*, 1997a, 1997b).

### *Etelis coruscans* Valenciennes

*Etelis coruscans* Valenciennes, 1862, p. 1166, Réunion Island, western Indian Ocean.

*Etelis evurus* Jordan & Evermann, 1903: Jordan & Evermann (1903a, 1905).

*Etelis carbunculus* non Cuvier, 1828 [a valid species also found in the Hawaiian Islands]: Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Clarke (1972), Struhsaker (1973a), Tinker (1982).

*Etelis coruscans* Valenciennes, 1862: Anderson (1981), Humphreys *et al.* (1984), Yamakawa *in* Okamura (1985), Allen (1985b), Randall *et al.* (1985a, 1997a, 1997b), Uchida & Uchiyama (1986), Anderson (1987), Chave & Mundy (1994).

**TAXONOMY:** Prior to Anderson (1981), most records of this species were listed under the name *E. carbunculus* (see Allen, 1985b; Anderson, 1987).

**COMMON NAMES:** Ulaūla koae (DLNR), Onaga (Gosline & Brock, 1960; DLNR), Yellowstripe snapper (AFS), Ruby snapper (FAO), Flame snapper (Randall *et al.*, 1997a), Red snapper (DLNR).

**HAWAIIAN RECORDS:** Johnston Atoll and Hawai‘i Island to Kure Atoll at 110–396 m (Jordan & Evermann, 1903a; Clarke, 1972; Struhsaker, 1973a; Humphreys *et al.*, 1984; Randall *et al.*, 1985b; Uchida & Uchiyama, 1986).

**GENERAL RANGE:** Indo-Pacific from east Africa and the Red Sea to Indonesia, southern Japan, the Ogasawara Islands, Australia, the Hawaiian Islands, and Samoa. Benthopelagic over rocky bottoms and near drop-offs at 48–396 m, usually between 100–300 m (Yamakawa *in* Okamura *et al.*, 1985; Allen, 1985b; Chave & Mundy, 1994; Randall *et al.*, 1997a, 1997b).

### [*Lutjanus bohar* (Forsskål)]

*Sciaena bohar* Forsskål, 1775, p. 46, xi, Arabia, Red Sea.

*Lutjanus bohar* (Forsskål, 1775): Tinker (1982), Allen (1985b, 1987), Allen & Talbot (1985), Winterbottom *et al.* (1989), Myers (1989), Randall *et al.* (1997a).

**TAXONOMY:** Allen (1985b, 1987), Allen & Talbot (1985).

**COMMON NAMES:** Twospot snapper (AFS), Two-spot red snapper (FAO), Red bass (Randall *et al.*, 1997a).

**HAWAIIAN RECORDS:** Tinker (1982) listed this species as if it had at least been introduced to Hawai‘i but is not mentioned in other papers on Hawaiian fishes. Tinker’s (1982) inclusion of this species was erroneous.

**GENERAL RANGE:** Indo-Pacific from South Africa and the Red Sea to Indonesia, the Ryukyu and Ogasawara Islands, Australia, Lord Howe Island, Micronesia, the Line Islands, the Tuamotu Archipelago, and the Marquesas. Engybenthic over coral reefs at 1–180 m (Allen & Talbot, 1985; Winterbottom *et al.*, 1989; Myers, 1989; Randall *et al.*, 1997b).

### *Lutjanus fulvus* (Forster)

*Holocentrus fulvus* Forster *in* Bloch & Schneider, 1801, p. 318, Tahiti, Society Islands.

*Lutjanus vaigiensis* (Quoy & Gaimard, 1824): Brock (1960), Gosline & Brock (1960 appendix), Hobson (1974).

*Lutjanus fulvus* (Forster, 1801): Tinker (1982), Maciolek (1984), Randall (1985a, 1996a, 1987a), Allen (1985b,

1987), Allen & Talbot (1985), Myers (1989), Winterbottom *et al.* (1989), Randall *et al.* (1993b, 1997a), Hoover (1993, 2003), Chave & Mundy (1994).

TAXONOMY: Allen (1985b, 1987), Allen & Talbot (1985).

COMMON NAMES: To'au (Hoover, 1993, 2003; Randall, 1996a), Blacktail snapper (AFS; FAO; Hoover, 1993, 2003; Randall, 1996a), Flametail snapper (Hoover, 2003), Yellow-margined seaperch (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Hawai'i Island to French Frigate at 3–128 m (Hobson, 1974; Randall *et al.*, 1993b; Hoover, 1993; Chave & Mundy, 1994). This species was introduced to O'ahu from the Marquesas in 1955 (Brock, 1960; Randall, 1987a).

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to Indonesia, southern Japan, the Ogasawara Islands, Australia, Micronesia, the Line Islands, the Tuamotu Archipelago, and the Marquesas. Introduced in the Hawaiian Islands. Engybenitic over coral reefs, with juveniles sometimes in mangrove swamps or estuaries at 1–128 m (Allen & Talbot, 1985; Myers, 1989; Winterbottom *et al.*, 1989; Chave & Mundy, 1994; Randall *et al.*, 1997b).

### *Lutjanus gibbus* (Forsskål)

*Sciaena gibba* Forsskål, 1775, p. 46, xi, "Red Sea".

*Lutjanus gibbus* (Forsskål, 1775): Brock (1960), Tinker (1982), Maciolek (1984), Allen (1985b, 1987), Allen & Talbot (1985), Allen *in* Smith & Heemstra (1986), Randall (1987a), Myers (1989), Winterbottom *et al.* (1989), Randall *et al.* (1993a, 1997b).

TAXONOMY: Allen (1985b, 1987), Allen & Talbot (1985).

COMMON NAMES: Humpback snapper (AFS; Myers, 1999), Humpback red snapper (FAO), Paddletail (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Hawai'i Island to Kaua'i at 15–18 m. This species was introduced to O'ahu from the Marquesas in 1958 but the introduction was considered unsuccessful (Brock, 1960; Randall, 1987a). A few specimens were captured at disjunct localities throughout the main Hawaiian Islands during the 1980s and early 1990s (Randall *et al.*, 1993a), suggesting that *L. gibbus* became established in the archipelago with a small population that remained undetected in the intervening years. The absence of records since the early 1990s casts doubt upon the current status of *L. gibbus* in the Hawaiian Islands, however.

GENERAL RANGE: Indo-Pacific from east Africa and the Red Sea to Indonesia, the Ryukyu and Ogasawara Islands, northern Australia, New Caledonia, Micronesia, the Line Islands, the Tuamotu Archipelago, and the Marquesas. Engybenitic over coral reefs at 1–150 m (Allen & Talbot, 1985; Allen *in* Smith & Heemstra, 1986; Winterbottom *et al.*, 1989; Myers, 1989; Randall *et al.*, 1997b).

### [*Lutjanus guttatus* (Steindachner)]

*Mesoprius guttatus* Steindachner, 1869, p. 149, Mazatlan, Sinaloa, Pacific coast of Mexico.

*Lutjanus guttatus* (Steindachner, 1869): Brock (1960), Tinker (1982), Maciolek (1984), Randall (1985a, 1987a), Allen (1985b, 1987), Allen & Talbot (1985), Allen & Robertson (1994).

TAXONOMY: Allen (1985b, 1987), Allen & Talbot (1985).

COMMON NAMES: Rose snapper (AFS), Spotted rose snapper (FAO).

HAWAIIAN RECORDS: This species was introduced to Moloka'i and O'ahu from Mexico in 1960 (Brock, 1960). It failed to become established (Randall, 1987a).

GENERAL RANGE: Eastern Pacific endemic from the Gulf of California and outer Baja California to Peru. Engybenitic in bays, over sand bottoms, and over reefs in shallow water (Allen, 1985b; Allen & Robertson, 1994).

### *Lutjanus kasmira* (Forsskål)

*Sciaena kasmira* Forsskål, 1775, p. 46, xi, "Red Sea".

*Lutjanus kasmira* (Forsskål, 1775): Brock (1960), Oda & Parrish (1981), Tinker (1982), Maciolek (1984), Randall (1985a, 1996a, 1987a), Allen (1985b, 1987), Allen & Talbot (1985), Uchida & Uchiyama (1986), Myers (1989), Winterbottom *et al.* (1989), Godwin & Kosaki (1989), Hoover (1993, 2003), Randall *et al.* (1993b, 1997a), Chave & Mundy (1994), Englund & Eldredge (2001).

TAXONOMY: Allen (1985b, 1987), Allen & Talbot (1985).



COMMON NAMES: Ta'ape [Polynesian name] (Hoover, 1993, 2003; Randall, 1996a), Bluestripe snapper (AFS; Hoover, 1993, 2003; Randall, 1996a; Englund & Eldredge, 2001), Common bluestripe snapper (FAO), Blue-lined snapper (Myers, 1999), Bluestripe seaperch (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Hawai'i Island to Midway at 4–200 m (Oda & Parrish, 1981; Uchida & Uchiyama, 1986; Randall, 1987a; Godwin & Kosaki, 1989; Randall *et al.*, 1993b). This species was introduced to O'ahu from the Marquesas in 1955 and 1958 (Brock, 1960). It became established and is abundant throughout the Hawaiian Islands (Randall, 1987a; Englund & Eldredge, 2001).

GENERAL RANGE: Indo-Pacific from east Africa, Mauritius, and the Red Sea to Indonesia, southern Japan, the Ogasawara Islands, Australia, Lord Howe Island, Micronesia, the Line Islands, the Tuamotu Archipelago, and the Marquesas. Introduced to the Hawaiian Islands. Engybenthic over or near reefs at 1–265 m (Allen & Talbot, 1985; Winterbottom *et al.*, 1989; Myers, 1989; Chave & Mundy, 1994; Randall *et al.*, 1997b; Englund & Eldredge, 2001).

[*Lutjanus sebae* (Cuvier)]

*Diacope sebae* Cuvier, 1816, p. 275, no type locality given, but Cuvier's specimens with non-type localities were from Waigiú & Java, Indonesia, & Pondichery, India.

*Lutjanus sebae* (Cuvier, 1816): Allen & Talbot (1985), Allen (1985b), Randall *et al.* (1997a), Huynh (2002).

TAXONOMY: Allen & Talbot (1985), Allen (1985b).

COMMON NAMES: Emperor snapper (AFS), Emperor red snapper (FAO), Red emperor (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: A single large juvenile *Lutjanus sebae* was captured with a crab trap at 45 m outside of Waimea Bay, O'ahu, in March, 2002 (K. Kawamoto, pers. comm., March, 2002; Huynh, 2002). This species is otherwise unknown from the central Pacific Ocean. The nearest locality within the natural range of *L. sebae* is southern Japan. While it is possible that the O'ahu specimen recruited naturally to the Hawaiian Islands, it most likely that the specimen was imported and released in open waters as an introduced species (Huynh, 2002).

GENERAL RANGE: Indo-West Pacific from South Africa and the Red Sea to Indonesia, southeastern Australia, the Philippines, and southern Japan. Engybenthic at 10–100 m (Allen, 1985b; Allen & Talbot, 1985; Randall *et al.*, 1997a).

[*Pristipomoides argyrogrammicus* (Valenciennes)]

*Serranus argyro-grammicus* Valenciennes in Cuvier & Valenciennes, 1832, p. 472, Mauritius, western Indian Ocean.

*Tropidinius amoenus* (Snyder, 1911): Yoshino in Masuda *et al.* (1984).

*Pristipomoides argyrogrammicus* (Valenciennes, 1832): Allen (1985b), Anderson (1987), Akazaki & Iwatsuki (1987), Randall *et al.* (1997a, 1997b).

TAXONOMY: Allen (1985b), Anderson (1987), Akazaki & Iwatsuki (1987).

COMMON NAMES: Ornate jobfish (FAO; Randall *et al.*, 1997a), Blueline gindai.

HAWAIIAN RECORDS: Yoshino in Masuda *et al.* (1984) gave the range of this species as "... the Pacific, east to the Hawaiian Islands." This comment was probably not meant to include the Hawaiian Islands, as there are no confirmed records of *P. argyrogrammicus* from the archipelago.

GENERAL RANGE: Indo-West-Pacific from Mauritius (the only known location in the Indian Ocean) to Indonesia, southern Japan, the Ogasawara Islands, the Great Barrier Reef, New Caledonia, and Samoa. Benthopelagic at 70–335 m (Allen, 1985b; Randall *et al.*, 1997a, 1997b).

***Pristipomoides auricilla*** (Jordan, Evermann, & Tanaka)

*Arnillo auricilla* Jordan, Evermann & Tanaka, 1927, p. 668, pl. 23 (fig. 3), Honolulu, O'ahu, Hawaiian Islands.

*Arnillo auricilla* Jordan, Evermann & Tanaka, 1927: Jordan *et al.* (1927).

*Pristipomoides sieboldii* non (Bleeker, 1854) [a valid species also found in the Hawaiian Islands]: Gosline & Brock (1960, in part).

*Pristipomoides auricilla* (Jordan, Evermann & Tanaka, 1927): Randall (1980a, 1981a), Randall *et al.* (1985a), Allen (1985b), Uchida & Uchiyama (1986), Anderson (1987), Akazaki & Iwatsuki (1987), Winterbottom *et al.* (1989), Chave & Mundy (1994), Randall *et al.* (1997a, 1997b).

TAXONOMY: Allen (1985b), Anderson (1987), Akazaki & Iwatsuki (1987).

COMMON NAMES: Kali kali, Goldflag jobfish (FAO; Randall *et al.*, 1997a), Yellowtail kali kali.

HAWAIIAN RECORDS: Johnston Atoll and Moloka'i to Laysan at 160–352 m (Jordan *et al.*, 1927; Randall, 1981a; Randall *et al.*, 1985b; Uchida & Uchiyama, 1986; Chave & Mundy, 1994).

GENERAL RANGE: Indo-Pacific, perhaps anti-equatorial, from the Chagos Archipelago and Indonesia to southern Japan, the Ryukyu and Ogasawara Islands, Guam, the Hawaiian Islands, the Great Barrier Reef, New Caledonia, and Samoa. Benthopelagic at 25–360 m, usually at 181–270 m (Randall, 1981a, 1982; Allen, 1985b; Winterbottom *et al.*, 1989; Chave & Mundy, 1994; Randall *et al.*, 1997a, 1997b).

***Pristipomoides filamentosus*** (Valenciennes)

*Serranus filamentosus* Valenciennes in Cuvier & Valenciennes, 1830, p. 508, St. Denis, Réunion, western Indian Ocean.

*Aprion microdon* Steindachner, 1876: Steindachner (1876).

*Aprion microlepis* (Bleeker, 1868): Fowler (1900).

*Apsilus microdon* (Steindachner, 1876): Jenkins (1903), Jordan & Evermann (1905).

*Bowersia violescens* Jordan & Evermann, 1903: Jordan & Evermann (1903a, 1905).

*Platyinius microdon* (Steindachner, 1876): Snyder (1904).

*Pristipomoides microlepis* (Bleeker, 1868): Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Struhsaker (1973a), Tinker (1982).

*Pristipomoides microdon* (Steindachner, 1876): Fowler (1931, 1934, 1949).

*Pristipomoides filamentosus* (Valenciennes, 1830): Fowler (1934, 1949), Humphreys *et al.* (1984), Randall *et al.* (1985a, 1997a, 1997b), Allen (1985b), Uchida & Uchiyama (1986), Anderson (1987), Akazaki & Iwatsuki (1987), Winterbottom *et al.* (1989), Chave & Mundy (1994).

TAXONOMY: Allen (1985b), Anderson (1987), Akazaki & Iwatsuki (1987).

COMMON NAMES: Opakapaka (Gosline & Brock, 1960), Crimson jobfish (FAO; Randall *et al.*, 1997a), Pink snapper (DLNR).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Pearl and Hermes Reef and Nero Seamount at 27–343 m (Steindachner, 1876; Humphreys *et al.*, 1984; Randall *et al.*, 1985b; Uchida & Uchiyama, 1986; Chave & Mundy, 1994).

GENERAL RANGE: Indo-Pacific from east Africa and the Red Sea to Indonesia, southern Japan, the Ogasawara Islands, the Great Barrier Reef, New Guinea, the Hawaiian Islands, and French Polynesia. Benthopelagic at 24–360 m (Allen, 1985b; Uchida & Uchiyama, 1986; Winterbottom *et al.*, 1989; Chave & Mundy, 1994; Randall *et al.*, 1997a, 1997b).

***Pristipomoides sieboldii*** (Bleeker)

*Chaetopterus sieboldii* Bleeker, 1854d, p. 20, "Japan".

*Bowersia ulaula* Jordan & Evermann, 1903: Jordan & Evermann (1903a, 1905).

*Pristipomoides sieboldii* (Bleeker, 1854): Fowler (1928, 1931), Gosline & Brock (1960), Clarke (1972), Struhsaker (1973a), Tinker (1982), Humphreys *et al.* (1984), Yamakawa *in* Okamura (1985), Allen (1985b), Uchida & Uchiyama (1986), Anderson (1987), Akazaki & Iwatsuki (1987), Randall *et al.* (1997a, 1997b).

TAXONOMY: Allen (1985b), Anderson (1987), Akazaki & Iwatsuki (1987).

COMMON NAMES: Kalikali (Gosline & Brock, 1960), Ulaula, Koā'e, Lavender jobfish (FAO; Randall *et al.*, 1997a), Pink snapper (DLNR).

HAWAIIAN RECORDS: Hawai'i Island to Kure Atoll at 91–223 m (Jordan & Evermann, 1903a, 1905; Clarke, 1972; Struhsaker, 1973a; Humphreys *et al.*, 1984; Uchida & Uchiyama, 1986).

GENERAL RANGE: Southeastern Atlantic and Indo-Pacific from the Vema Seamount, South Africa, Mauritius, and the Red Sea to Indonesia, southern Japan, the Ogasawara Islands, the Great Barrier Reef, New Guinea, the Hawaiian Islands, and French Polynesia. Benthopelagic at 91–360 m (Yamakawa *in* Okamura 1985; Allen, 1985b; Uchida & Uchiyama, 1986; Anderson, 1987; Randall *et al.*, 1997a, 1997b).

***Pristipomoides zonatus*** (Valenciennes)

*Serranus zonatus* Valenciennes in Cuvier & Valenciennes, 1830, p. 509, Mauritius, western Indian Ocean.

*Serranus brighami* Seale, 1901: Seale (1901).

*Apsilus brighami* (Seale, 1901): Jenkins (1903), Jordan & Evermann (1905).

*Apsilus zonatus* (Valenciennes, 1830): Fowler (1928, 1931).

*Tropidinius zonatus* (Valenciennes, 1830): Fowler (1934, 1949).

*Rooseveltia brighami* (Seale, 1901): Gosline & Brock (1960), Tinker (1982).

*Pristipomoides zonatus* (Valenciennes, 1830): Humphreys *et al.* (1984), Randall *et al.* (1985a, 1997a, 1997b), Allen (1985b), Uchida & Uchiyama (1986), Anderson (1987), Akazaki & Iwatsuki (1987), Chave & Mundy (1994).

TAXONOMY: Allen (1985b), Anderson (1987), Akazaki & Iwatsuki (1987).

COMMON NAMES: Ukikiki (DLNR), Gindai (DLNR), Oblique-banded snapper (FAO; Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Pearl and Hermes Reef at 102–352 m (Seale, 1901; Humphreys *et al.*, 1984; Randall *et al.*, 1985b; Uchida & Uchiyama, 1986; Chave & Mundy, 1994).

GENERAL RANGE: Indo-Pacific from east Africa, Mauritius, and the Arabian Gulf to Indonesia, southern Japan, the Ogasawara Islands, the Great Barrier Reef, New Guinea, New Caledonia, the Hawaiian Islands, and the Society Islands. Engyobenthic at 70–352 m, usually at 100–200 m (Allen, 1985b; Chave & Mundy, 1994; Randall *et al.*, 1997a, 1997b).

### *Randallichthys filamentosus* (Fourmanoir)

*Etelis filamentosus* Fourmanoir, 1970, p. 28, Fig. 6, off New Caledonia, western South Pacific, at 22°52'S, 162°20'E.

*Randallichthys filamentosus* (Fourmanoir, 1970): Anderson *et al.* (1977), Randall (1981a), Allen (1985b), Anderson (1987), Myers (1989), Chave & Mundy (1994), Randall *et al.* (1997a).

TAXONOMY: Allen (1985b), Anderson (1987).

COMMON NAMES: Randall's snapper (FAO).

HAWAIIAN RECORDS: Hawai'i Island to O'ahu at 152–380 m (Anderson *et al.*, 1977; Chave & Mundy, 1994).

GENERAL RANGE: Pacific endemic, perhaps anti-equatorial, from Okinawa, the Ogasawara Islands, Micronesia, the Hawaiian Islands, and New Caledonia. Benthopelagic over rocky bottoms at 150–380 m (Anderson *et al.*, 1977; Randall, 1982; Allen, 1985b; Myers, 1989; Chave & Mundy, 1994; Randall *et al.*, 1997b).

## Lobotidae — Tripletails

### *Lobotes surinamensis* (Bloch)

*Holocentrus surinamensis* Bloch, 1790, p. 98, pl. 243, Suriname.

*Lobotes surinamensis* (Bloch, 1790): Gosline & Brock (1960), Tinker (1982), Springer (1982), Heemstra *in* Smith & Heemstra (1986), Randall *et al.* (1990a, 1997a), Kuitert (1993), Allen & Robertson (1994), Myers & Donaldson (1996), Schmid & Randall (1997), Robertson & Allen (2002).

*Lobotes pacificus* Gilbert, 1898: Robertson & Allen (2002).

TAXONOMY: Heemstra *in* Smith & Heemstra (1986), Schmid & Randall (1997). The taxonomy of this genus needs review. There are indications that the single species currently recognized consists of more than one species, with the eastern Pacific populations comprising an endemic species there, *Lobotes pacificus* Gilbert, 1898 (see Robertson & Allen, 2002).

COMMON NAMES: Tripletail (AFS; Randall *et al.*, 1997a; Myers, 1999).

HAWAIIAN RECORDS: *Lobotes surinamensis* or *L. pacificus* appeared at O'ahu and Kaua'i during 1957 to at least 1960, at unrecorded depths (Gosline & Brock, 1960). It does not seem to be a permanent component of the Hawaiian fish fauna and may be an example of natural, but unsuccessful, recruitment of a fish species to the archipelago via juveniles associated with drifting objects. Gosline & Brock (1960) suggested that the Hawaiian specimens were waifs from the eastern Pacific but Springer (1982) argued that they originated from Japan along the Kuroshio Extension. These alternative hypotheses could be tested if the Hawaiian specimens can be found and if the western and eastern Pacific populations are indeed distinguishable species.

GENERAL RANGE: Usually considered to be circumglobal in the tropical through warm-temperate Mediterranean, Gulf of Mexico, Atlantic, Indian, and Pacific oceans. In the Pacific known from southern Japan and Australia to the Ogasawara Islands, the Marianas, Fiji, and the eastern tropical

Pacific, although eastern Pacific populations may be another species, *L. pacificus*. Specimens recorded from Tahiti and the Hawaiian Islands may have been waifs of *L. pacificus*. Benthopelagic, often associated with drifting objects (Springer, 1982; Heemstra in Smith & Heemstra, 1986; Randall *et al.*, 1990a, 1997b; Kuitert, 1993, Allen & Robertson, 1994; Myers & Donaldson, 1996; Schmid & Randall, 1997).

### Lethrinidae — Emperors, Emperor Breams

[*Lethrinus* sp.]

*Lethrinus* species [possibly *variegatus* (Valenciennes (ex Ehrenberg) in Cuvier & Valenciennes, 1830): Randall & Kanayama (1972).

*Lethrinus*, questionably *miniatus* (Forster in Bloch & Schneider, 1801): Tinker (1982).

*Lethrinus* species: Randall (1987a, 1996a).

TAXONOMY: Taxonomy unverifiable.

COMMON NAMES: Emperor.

HAWAIIAN RECORDS: A *Lethrinus* sp. was introduced to Kāneʻohe Bay, Oʻahu, from the Marquesas Islands in 1958 (Randall & Kanayama, 1972). The species did not become established in Hawaiʻi and its specific identity cannot be determined (Randall, 1987a).

GENERAL RANGE: Unknown.

*Monotaxis grandoculis* (Forsskål)

*Sciaena grandoculis* Forsskål, 1775, p. 53, xii, Jidda, Saudi Arabia, Red Sea.

*Sphaerodon grandoculis* (Forsskål, 1775): Günther (1874b), Steindachner (1900).

*Sparosomus unicolor* non (Quoy & Gaimard, 1824) [a junior synonym of *Chrysophrys auratus* (Forster, 1801), a valid species not found in the Hawaiian Islands]: Fowler (1900).

*Monotaxis grandoculis* (Forsskål, 1775): Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Hobson (1974), Tinker (1982), Okamoto & Kanenaka (1984), Randall (1985a, 1996a), Myers (1989), Carpenter & Allen (1989), Hoover (1993, 2003), Randall *et al.* (1997a).

TAXONOMY: Carpenter & Allen (1989).

COMMON NAMES: Mū (Hoover, 1993, 2003; Randall, 1996a), Mamāmu (Gosline & Brock, 1960), Bigeye barenose (AFS), Humpnose big-eye bream (FAO), Bigeye emperor (Hoover, 1993, 2003; Randall, 1996a), Bigeye bream (Randall *et al.*, 1997a), Porgy (DLNR).

HAWAIIAN RECORDS: Hawaiʻi Island to Pearl and Hermes Reef at unrecorded depths (Günther, 1874; Jordan & Evermann, 1905; Hobson, 1974; Okamoto & Kanenaka, 1984; Hoover, 1993).

GENERAL RANGE: Indo-Pacific from South Africa, Mauritius, and the Red Sea to Indonesia, southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, the Marquesas, and Pitcairn Island. Benthopelagic over coral reefs at 1–101 m (Hobson, 1974; Randall, 1985a; Myers, 1989; Carpenter & Allen, 1989; Randall *et al.*, 1997b).

### Nemipteridae — Threadfin breams

[*Scolopsis* sp.]

*Scolopsis* sp. [unidentified]: Springer (1982).

TAXONOMY: Not determinable.

HAWAIIAN RECORDS: Springer (1982) noted that, in 1830, Cuvier & Valenciennes reported a *Scolopsis* species from the Hawaiian Islands. Springer stated that the absence of other records raised doubts about the occurrence of this genus in the islands. There have been no other records of nemipterids from the Hawaiian Islands; the family does not occur in the archipelago (Russell, 1990).

GENERAL RANGE: Unknown.

**Polynemidae — Threadfins***[Polydactylus plebeius* (Broussonet)]

*Polynemus plebeius* Broussonet, 1782, p. [35] unnumbered, pl. [8] unnumbered, Tahiti, Society Islands.  
*Polydactylus plebeius* (Broussonet, 1782): Motomura *et al.* (2001b).

TAXONOMY: Motomura *et al.* (2001b).

HAWAIIAN RECORDS: Motomura *et al.* (2001b) identified a specimen of *P. plebeius* (USNM 106889) recorded from the Hawaiian Islands. The data for this specimen in USNM records state that it was collected at Honolulu in Nov. 1896 during a U.S. Fish Commission *Albatross* cruise that operated primarily in Alaska but also stopped in Japan and the Hawaiian Islands (D.G. Smith, pers. comm., August 2001). The lot from which this specimen originally came (USNM 55396) also contained a gobiid identified as *Stenogobius stamineus* (Eydoux & Souyelet) [a name previously applied to the Hawaiian Islands population of *Awaous guamensis* (Valenciennes)], which suggests that the collection locality is correct. Even so, there is a possibility that this specimen came from Japan and was mixed with Hawaiian material during the cruise. A precedent exists for this in the false Hawaiian Islands record of an *Albatross* specimen in the USNM collection of the endemic Japanese parrotfish, *Calotomus japonicus* Valenciennes (see Bruce & Randall, 1985). *Polydactylus plebeius* has not otherwise been reported from the Hawaiian Islands, making its occurrence here questionable at best.

GENERAL RANGE: Indo-Pacific from South Africa and the Arabian Gulf to Indonesia, western Australia, southern Japan, New Guinea, Samoa, and the Society Islands, with a questionable record from the Hawaiian Islands. Engyobenthic over sand or mud in shallow estuarine and coastal waters (Motomura *et al.*, 2001b).

*Polydactylus sexfilis* (Valenciennes in Cuvier & Valenciennes)

*Polynemus sexfilis* Valenciennes in Cuvier & Valenciennes, 1831, p. 515, Mauritius, western Indian Ocean.  
*Polynemus plebeius* non Broussonet, 1782 [a valid species not found in the Hawaiian Islands (see above)]: Lay & Bennett (1839).

*Polynemus sexfilis* Valenciennes in Cuvier & Valenciennes, 1831: Günther (1880), Steindachner (1900), Jenkins (1903), Snyder (1904).

*Polynemus kuru* Bleeker, 1853: Smith & Swain (1882).

*Polydactylus pfeifferi* non (Bleeker, 1853) [a junior synonym of *Filimanus xanthonema* (Valenciennes, 1831), a species not found in the Hawaiian Islands]: Fowler (1900).

*Polydactylus sexfilis* (Valenciennes in Cuvier & Valenciennes, 1831): Jordan & Evermann (1905), Fowler (1928, 1931, 1949), Gosline & Brock (1960), Struhsaker (1973a), Tinker (1982), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Uchida & Uchiyama (1986), Myers (1989), Hoover (1993, 2003), Feltes (1993), Randall (1996a), Motomura *et al.* (2001a).

TAXONOMY: Motomura *et al.* (2001a).

COMMON NAMES: Moi (Hoover, 1993, 2003; Randall, 1996), Moi-li'i (juveniles) (Gosline & Brock, 1960), Threadfin (Hoover, 1993; DLNR), Six-feeler threadfin (Hoover, 1993), Six-fingered threadfin (Randall *et al.*, 1997a; Randall, 1996a), Kingfish (Hoover, 2003).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at 1–99 m (Lay & Bennett, 1839; Smith & Swain, 1882; Jordan & Evermann, 1905; Struhsaker, 1973a; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Hoover, 1993).

GENERAL RANGE: Indo-Pacific from Mauritius and the Seychelles to Indonesia, southern Japan, Micronesia, the Hawaiian Islands, the Tuamotu Archipelago, and the Marquesas. Engyobenthic at 1–99 m (Struhsaker, 1973a; Uchida & Uchiyama, 1986; Myers, 1989; Randall *et al.*, 1990a, 1997b; Motomura *et al.*, 2001a).

**Mullidae — Goatfishes***[Mulloidichthys bilineatus* (Valenciennes)]

*Upeneus bilineatus* Valenciennes in Cuvier & Valenciennes, 1831, p. 525, Ambon Island, Moluccas, Indonesia.  
*Upeneus bilineatus* non Valenciennes, 1831: Fowler (1928).  
*Mulloidichthys bilineatus* (Valenciennes, 1831): Randall & Guézé (1980).

TAXONOMY: Randall & Guézé (1980).

HAWAIIAN RECORDS: The identity of Fowler's (1928) Hawaiian specimens cannot be determined. This is a nominal species of uncertain status (Randall & Guézé, 1980).

GENERAL RANGE: Unknown.

***Mulloidichthys flavolineatus* (Lacépède)**

*Mullus flavolineatus* Lacépède, 1801, p. 384, 406, no type locality given.

*Upeneus preorbitalis* Swain & Swain, 1882: Swain & Swain (1882).

*Mulloides samoensis* Günther, 1874: Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Fowler (1928, in part).

*Pseudupeneus preorbitalis* (Swain & Swain, 1882): Jordan & Evermann (1905).

*Mulloidichthys samoensis* (Günther, 1874): Fowler (1928, in part, 1931, 1934, 1949), Gosline & Brock (1960), Hobson (1974), Tinker (1982).

*Mulloides flavolineatus* (Lacépède, 1801): Masuda *et al.* (1984), Randall (1985a), Randall *et al.* (1985a, 1990a), Uchida & Uchiyama (1986), Ben-Tuvia *in* Smith & Heemstra (1986), Ben-Tuvia & Kissil (1988), Myers (1989).

*Mulloidichthys flavolineatus* (Lacépède, 1801): Tinker (1982), Randall *et al.* (1993b, 1997a), Hoover (1993, 2003), Randall (1996a).

TAXONOMY: Ben-Tuvia & Kissil (1988), Eschmeyer (1990) for genus.

COMMON NAMES: Weke'ā (Hoover, 1993, 2003; Randall, 1996a), Weke (Randall, 1985), Weke 'ā'ā (Gosline & Brock, 1960), Yellowstripe goatfish (AFS; Randall, 1996a), White goatfish (Hoover, 1993, 2003).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 1–97 m (Swain & Swain, 1882; Jenkins, 1903; Hobson, 1974; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Hoover, 1993).

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to the Ryukyu and Ogasawara Islands, Australia, Lord Howe Island, Micronesia, the Hawaiian Islands, the Marquesas, and Ducie Island. Engybenitic over coral and sand at 1–97 m (Masuda *et al.*, 1984; Uchida & Uchiyama, 1986; Ben-Tuvia *in* Smith & Heemstra, 1986; Myers, 1989; Randall *et al.*, 1990a, 1997b).

***Mulloidichthys pfluegeri* (Steindachner)**

*Mulloides pfluegeri* Steindachner, 1900a, p. 174, Honolulu, O'ahu, Hawaiian Islands.

*Mulloides pflügeri* Steindachner, 1900a: Steindachner (1900a).

*Mulloides pfluegeri* Steindachner, 1900a: Jordan & Evermann (1905), Randall (1985a), Uchida & Uchiyama (1986), Myers (1989).

*Mulloides flammeus* Jordan & Evermann, 1903: Jordan & Evermann (1903a, 1905), Snyder (1904).

*Mulloides samoensis* non Günther, 1874 [a junior synonym of *Mulloidichthys flavolineatus* (Lacépède, 1801), a valid species also found in the Hawaiian Islands]: Fowler (1928, in part).

*Mulloidichthys pfluegeri* (Steindachner, 1900a): Fowler (1934, 1949), Gosline & Brock (1960), Clarke (1972), Struhsaker (1973a), Iwai (1976), Tinker (1982), Masuda *et al.* (1984), Randall (1986, 1996a), Randall *et al.* (1993b, 1997b), Hoover (1993, 2003).

TAXONOMY: Randall (1985a), Eschmeyer (1990) for genus.

COMMON NAMES: Weke-'ula (Hoover, 1993, 2003), Weke nono (Randall, 1996a), Weke ula ula, Moelua (DLNR), Weke, Rosy goatfish (AFS), Orange goatfish (Hoover, 1993, 2003; Myers, 1999), Pflueger's goatfish (Randall, 1996a), Red goat fish (DLNR).

HAWAIIAN RECORDS: Hawai'i Island to Midway at 12–170 m (Steindachner, 1900a; Jordan & Evermann, 1905; Clarke, 1972; Iwai, 1976; Uchida & Uchiyama, 1986; Randall *et al.*, 1993b; Hoover, 1993).

GENERAL RANGE: Indo-Pacific from Réunion to Okinawa, the Ogasawara Islands, Micronesia, the Hawaiian Islands, Tonga, the Society Islands, and the Marquesas. Engybenitic over sand at 12–170 m (Clarke, 1972; Iwai, 1976; Masuda *et al.*, 1984; Uchida & Uchiyama, 1986; Randall, 1986; Myers, 1989; Randall *et al.*, 1993b, 1997b; Hoover, 1993).

***Mulloidichthys vanicolensis* (Valenciennes)**

*Upeneus vanicolensis* Valenciennes *in* Cuvier & Valenciennes, 1831, p. 521, Vanikoro Island, Santa Cruz Islands, western South Pacific.

*Upeneus vanicolensis* Valenciennes, 1831: Smith & Swain (1882).

*Mulloidichthys auriflamma* non (Forsskål, 1775) [a name suppressed by ICZN Opinion 846; a junior synonym of *Parupeneus forsskali* (Fourmanoir & Guézé, 1976), a valid species not found in the Hawaiian Islands]: Steindachner (1900), Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Fowler (1928).

*Mulloidichthys erythrinus* Klunzinger, 1884: Steindachner (1900), Jordan & Evermann (1905), Fowler (1928).

*Mulloidichthys vanicolensis* (Valenciennes, 1831): Jordan & Evermann (1905), Fowler (1928), Randall (1985a), Randall *et al.* (1985a, 1990a), Uchida & Uchiyama (1986), Ben-Tuvia *in* Smith & Heemstra (1986), Myers (1989), Chave & Mundy (1994).

*Mulloidichthys auriflamma* non (Forsskål, 1775): Fowler (1931, 1934, 1949), Gosline & Brock (1960), Struhsaker (1973a), Hobson (1974), Tinker (1982).

*Mulloidichthys erythrinus* (Klunzinger, 1884): Fowler (1931, 1934).

*Mulloidichthys vanicolensis* (Valenciennes, 1831): Fowler (1931, 1934, 1949), Tinker (1982), Masuda *et al.* (1984), Hoover (1993, 2003), Randall *et al.* (1993b, 1997a), Stepien *et al.* (1994), Randall (1996a), Robertson & Allen (2002).

TAXONOMY: Stepien *et al.* (1994).

COMMON NAMES: Weke-‘ula (Hoover, 1993, 2003; Randall, 1996a), Weke, Yellowfin goatfish (AFS; Hoover, 1993, 2003; Randall, 1996a), Red goatfish (DLNR).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to Kure Atoll at 1–116 m (Smith & Swain, 1882; Steindachner, 1900; Hobson, 1974; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Chave & Mundy, 1994; Hoover, 1993).

GENERAL RANGE: Indo-transpacific from South Africa and the Red Sea to southern Japan, the Ogasawara Islands, Australia, Lord Howe Island, Micronesia, the Hawaiian Islands, the Tuamotu Archipelago, the Marquesas, Easter Island, Clipperton Island, and Baja California to Panama [the eastern Pacific records confirm the rare presence of this species there in addition to the very similar endemic *M. dentatus* (Gill, 1863); R. Robertson, pers. comm., June 2002]. Engyebenthic over reefs and sand at 1–116 m (Ben-Tuvia *in* Smith & Heemstra, 1986; Myers, 1989; Randall *et al.*, 1990a, 1997b; Chave & Mundy, 1994; Masuda *et al.*, 1984; Stepien *et al.*, 1994; Robertson & Allen, 2002).

[*Parupeneus barberinus* (Lacépède)]

*Mullus barberinus* Lacépède, 1801, p. 383, 406, Pl. 13 (fig. 3), near the Moluccas Islands, Indonesia.

*Upeneus barberinus* non (Lacépède, 1801) [a valid *Parupeneus* species not found in the Hawaiian Islands]: Fowler & Ball (1925), Fowler (1928, 1934, 1949, in part).

*Parupeneus barberinus* (Lacépède, 1801): Randall (2004b), Masuda *et al.* (1984), Randall *et al.* (1985a, 1990a), Ben-Tuvia *in* Smith & Heemstra (1986).

TAXONOMY: Randall *et al.* (1985b), Randall (2004b).

COMMON NAMES: Dash-dot goatfish (Randall *et al.*, 1997a; Myers, 1999).

HAWAIIAN RECORDS: Randall *et al.* (1985b) suggested that the record of this species from Johnston Atoll by Fowler & Ball (1925) was probably a locality error. The Hawaiian records of Fowler (1928, 1934a, 1949) and Thomas (1969) may refer to *P. chrysonemus*, the Hawaiian species most similar in color pattern to *P. barberinus* [see color photographs in Randall *et al.* (1993b) and Randall *et al.* (1990a) respectively].

GENERAL RANGE: Indo-Pacific from South Africa to southern Japan, Australia, Micronesia, the Line Islands, the Tuamotu Islands, and the Marquesas. Engyebenthic over sand, rubble, or reefs at 1–100 m (Masuda *et al.*, 1984; Ben-Tuvia *in* Smith & Heemstra, 1986; Randall *et al.*, 1990a; Randall, 2004b).

***Parupeneus chrysonemus*** (Jordan & Evermann)

*Pseudupeneus chrysonemus* Jordan & Evermann, 1903a, p. 186, Hilo, Hawai‘i Island.

*Pseudupeneus chrysonemus* Jordan & Evermann, 1903a: Jordan & Evermann (1903a, 1905), Jenkins (1903), Fowler (1934, 1949).

*Upeneus barberinus* non (Lacépède, 1801) [a valid *Parupeneus* species not known from the Hawaiian Islands]: Fowler & Ball (1925)?, Fowler (1928, 1934, 1949) in part?

*Upeneus taeniatus* Kner, 1865: Fowler (1928, in part).

*Upeneus macronemus* non (Lacépède, 1801) [a valid *Parupeneus* species not known from the Hawaiian Islands]: Fowler (1928, 1931) in part?

*Pseudupeneus macronemus* non (Lacépède, 1801): Fowler (1934, 1949) in part?

*Parupeneus macronema* non (Lacépède, 1801): Thomas (1969) in part?

*Upeneus chrysonemus* (Jordan & Evermann, 1903): Fowler (1931).

*Parupeneus barberinus* non (Lacépède, 1801): Thomas (1969) in part?

*Parupeneus chrysonemus* (Jordan & Evermann, 1903): Gosline & Brock (1960), Struhsaker (1973a), Iwai (1976), Tinker (1982), Randall (1985a, 1996a, 2004b), Uchida & Uchiyama (1986), Randall *et al.* (1993b), Randall & Myers (1993), Chave & Mundy (1994).

TAXONOMY: Randall (1985a, 2004b), Randall & Myers (1993).

COMMON NAMES: Weke nono, Yellowbarbel goatfish (Randall, 1996a), Gold-thread goatfish.

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 20–183 m, occurring in more shallow water in the Northwestern Hawaiian Islands than in main Hawaiian Islands (Jordan & Evermann, 1903a; Iwai, 1976; Uchida & Uchiyama, 1986; Randall *et al.*, 1993b; Chave & Mundy, 1994; Randall, 2004b). A *Pseudupeneus* (= *Parupeneus*) sp. recorded from Seamount 8 was not identified to species (Humphreys *et al.*, 1984).

GENERAL RANGE: Johnston Atoll and Hawaiian Islands endemic. Eurybenthic over sand at 20–183 m (Randall & Myers, 1993; Chave & Mundy, 1994; Randall, 2004b).

### *Parupeneus cyclostomus* (Lacépède)

*Mullus cyclostomus* Lacépède, 1801, p. 383, 404, Pl. 14 (fig. 3), Mauritius, western Indian Ocean.

*Upeneus chryserydros* (Lacépède, 1801): Cuvier & Valenciennes (1829a), Fowler (1928, 1931).

*Pseudupeneus chryserydros* (Lacépède, 1801): Jenkins (1903), Snyder (1904), Jordan & Evermann (1905).

*Pseudupeneus cyclostomus* (Lacépède, 1801): Fowler (1934, 1949).

*Parupeneus chryserydros* (Lacépède, 1801): Gosline & Brock (1960), Hobson (1974), Tinker (1982).

*Parupeneus cyclostomus* (Lacépède, 1801): Steindachner (1900), Okamoto & Kanenaka (1984), Masuda *et al.* (1984), Maugé & Guézé (1984), Randall (1985a, 1996a, 2004b), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Uchida & Uchiyama (1986), Ben-Tuvia *in* Smith & Heemstra (1986), Ben-Tuvia & Kissel (1988), Myers (1989), Hoover (1993, 2003), Chave & Mundy (1994).

TAXONOMY: Maugé & Guézé (1984), Ben-Tuvia & Kissel (1988), Randall (2004b).

COMMON NAMES: Moano kea (Randall, 1996a), Moano ukali-ulua (Hoover, 1993, 2003), Moano hulu, Blue goatfish (AFS; Hoover, 1993, 2003; Randall, 1996a), Goldsaddle goatfish (Randall *et al.*, 1997a), Yellowsaddle goatfish (Hoover, 1993, 2003).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 1–113 m (Cuvier & Valenciennes, 1829a; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Chave & Mundy, 1994).

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to the Ryukyu and Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, the Tuamotu Islands, the Marquesas, and Ducie Island. Eurybenthic over reefs, rock, rubble, and sand at 1–125 m, perhaps to 300 m (Masuda *et al.*, 1984; Uchida & Uchiyama, 1986; Ben-Tuvia *in* Smith & Heemstra, 1986; Ben-Tuvia & Kissel, 1988; Myers, 1989; Randall *et al.*, 1990a, 1997b; Chave & Mundy, 1994; Randall 2004b).

### *Parupeneus insularis* Randall & Myers

*Parupeneus insularis* Randall & Myers, 2002, p. 433, Figs. 5–8, Moku Manu, O'ahu, Hawaiian Islands.

*Mullus bifasciatus* non Lacépède, 1801 [a junior synonym of *Parupeneus trifasciatus* (Lacépède, 1801), a valid species not found in the Hawaiian Islands]: Cuvier & Valenciennes (1829a).

*Upeneus tri-fasciatus* non (Lacépède, 1801): Lay & Bennett (1839).

*Upeneus bifasciatus* non (Lacépède, 1801): Fowler (1928, 1931).

*Upeneus crassilabris* non (Valenciennes, 1831) [a valid *Parupeneus* species not found in the Hawaiian Islands]: Smith & Swain (1882), Fowler (1928, 1931).

*Pseudupeneus bifasciatus* non (Lacépède, 1801): Jenkins (1903), Jordan & Evermann (1905), Fowler (1934, 1949).

*Pseudupeneus crassilabris* non (Valenciennes *in* Cuvier & Valenciennes, 1831): Jordan & Evermann (1905), Fowler (1934, 1949).

*Parupeneus bifasciatus* non (Lacépède, 1801): Gosline & Brock (1960), Hobson (1974), Tinker (1982), Masuda *et al.* (1984), Randall (1985a, 1996a), Randall *et al.* (1985a, 1990a, 1993b, 1997b), Uchida & Uchiyama (1986), Ben-Tuvia *in* Smith & Heemstra (1986), Myers (1989), Hoover (1993, 2003), Chave & Mundy (1994).

*Parupeneus insularis* Randall & Myers, 2002: Randall & Myers (2002), Randall (2004b).

TAXONOMY: Randall & Myers (2002), Randall (2004b).



COMMON NAMES: Munu (Hoover, 1993, 2003; Randall, 1996a), Doublebar goatfish (AFS; Hoover, 1993, 2003; Randall, 1996a), Twosaddle goatfish, Two-barred goatfish.

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at 9–83 m (Cuvier & Valenciennes, 1829a; Smith & Swain, 1882; Hobson, 1974; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Hoover, 1993; Chave & Mundy, 1994).

GENERAL RANGE: Central Pacific endemic from the Ogasawara Islands, the Marianas, Minami Tori-Shima, the Marshalls, Samoa, the Hawaiian Islands, the Line Islands, the Cook Islands, and French Polynesia to Ducie Island. Engyebenthic over sand, reef, or rock at 1–83 m, but generally at <30 m (Myers, 1989; Chave & Mundy, 1994; Randall & Myers, 2002; Randall, 2004b).

[*Parupeneus macronemus* (Lacépède)]

*Mullus macronemus* Lacépède, 1801, p. 383, 404, pl. 13 (fig. 2), no type locality given.

*Upeneus macronemus* non (Lacépède, 1801) [a valid species not found in the Hawaiian Islands]: Fowler (1928, 1931) in part?

*Pseudupeneus macronemus* non (Lacépède, 1801): Fowler (1934, 1949) in part?

*Parupeneus macronema* non (Lacépède, 1801): Thomas (1969, in part).

*Parupeneus macronemus* (Lacépède, 1801): Gosline & Brock (1960), Randall (1985a, 2004b), Ben-Tuvia *in* Smith & Heemstra (1986), Ben-Tuvia & Kissel (1988), Winterbottom *et al.* (1989).

TAXONOMY: Randall (2004b).

COMMON NAMES: Longbarbled goatfish (AFS).

HAWAIIAN RECORDS: Fowler (1928, 1931, 1934a, 1949) and Thomas (1969) recorded this species from the Hawaiian Islands but apparently it does not occur in the region (Gosline & Brock, 1960; Randall, 1985a). *Parupeneus chrysonemus* is a Hawaiian Islands species that can be somewhat similar to *P. macronemus* in color pattern and may account for the Hawaiian Islands records of the latter species.

GENERAL RANGE: Indian Ocean, Red Sea, and western Pacific endemic known from east Africa and the Red Sea to India, Indonesia, and the Philippines. Engyebenthic at 1–40 m (Thomas, 1969; Ben-Tuvia *in* Smith & Heemstra, 1986; Ben-Tuvia & Kissel, 1988; Winterbottom *et al.*, 1989; Randall, 2004b).

*Parupeneus multifasciatus* (Quoy & Gaimard)

*Mullus multifasciatus* Quoy & Gaimard, 1825, p. 330, pl. 59 (fig. 2), Hawai'i Island.

*Mullus multifasciatus* Quoy & Gaimard, 1825: Quoy & Gaimard (1825).

*Mullus trifasciatus* non Lacépède, 1801 [valid *Parupeneus* species not found in the Hawaiian Islands]: Cuvier & Valenciennes (1829a).

*Upeneus trifasciatus* non (Lacépède, 1801): Streets (1877), Günther (1880), Fowler (1931).

*Upeneus velifer* Smith & Swain, 1882: Smith & Swain (1882).

*Parupeneus trifasciatus* non (Lacépède, 1801): Steindachner (1900).

*Pseudupeneus multifasciatus* (Quoy & Gaimard, 1825): Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Fowler (1934, 1949).

*Upeneus multifasciatus* (Quoy & Gaimard, 1825): Fowler (1928, 1931).

*Parupeneus moana* (Jordan & Seale, 1906): Randall (1986) in text.

*Parupeneus multifasciatus* (Quoy & Gaimard, 1825): Gosline & Brock (1960), Struhsaker (1973a), Hobson (1974), Tinker (1982), Randall (1985a, 1986, 1996a, 2004b), Randall *et al.* (1985a, 1990a, 1990b, 1993b, 1997a), Uchida & Uchiyama (1986), Myers (1989), Hoover (1993, 2003), Chave & Mundy (1994).

TAXONOMY: Randall (2004b).

COMMON NAMES: Moano (Hoover, 1993, 2003; Randall, 1996a), Manybar goatfish (AFS; Hoover, 1993, 2003; Randall, 1996a), Multibarred goatfish (Myers, 1999).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 1–161 m (Quoy & Gaimard, 1824; Smith & Swain, 1882; Hobson, 1974; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Chave & Mundy, 1994; Randall, 2004b).

GENERAL RANGE: Eastern Indian Ocean and Pacific from Cocos-Keeling Island, Christmas Island, western Australia (Indian Ocean) and Indonesia to southern Japan, the Ogasawara Islands, Australia, Lord Howe Island, Micronesia, the Hawaiian Islands, the Tuamotu Archipelago, the Marquesas and Ducie. Engyebenthic over sand, rock, and reef at 1–161 m (Myers, 1989; Randall *et al.*, 1990a, 1997b; Chave & Mundy, 1994; Randall 2004b).

***Parupeneus pleurostigma* (Bennett)**

*Upeneus pleurostigma* Bennett, 1831, p. 59, Mauritius, western Indian Ocean.

*Pseudupeneus pleurostigma* (Bennett, 1831): Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Fowler (1934, 1949).

*Upeneus pleurostigma* Bennett, 1831: Fowler (1928, 1931).

*Parupeneus pleurostigma* (Bennett, 1831): Steindachner (1900), Gosline & Brock (1960), Struhsaker (1973a), Hobson (1974), Tinker (1982), Masuda *et al.* (1984), Randall (1985a, 1996a, 2004b), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Uchida & Uchiyama (1986), Ben-Tuvia *in* Smith & Heemstra (1986), Myers (1989), Hoover (1993, 2003), Chave & Mundy (1994).

TAXONOMY: Randall (1985a, 2004b).

COMMON NAMES: Malu (Randall, 1996a), Moano (Hoover, 1993, 2003), Sidespot goatfish (AFS; Hoover, 1993, 2003; Randall, 1996a), Blackspot goatfish.

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 5–120 m (Steindachner, 1900; Hobson, 1974; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Hoover, 1993; Chave & Mundy, 1994; Randall, 2004b).

GENERAL RANGE: Indo-Pacific from South Africa and East Africa to the Ryukyu and Ogasawara Islands, Australia, Lord Howe Island, Micronesia, the Hawaiian Islands, the Tuamotu Archipelago, the Marquesas, and the Pitcairn Islands. Engyberthentic over sand, rock, and reef at 1–120 m (Masuda *et al.*, 1984; Ben-Tuvia *in* Smith & Heemstra, 1986; Myers, 1989; Randall *et al.*, 1990a, 1997b; Chave & Mundy, 1994; Randall, 2004b).

***Parupeneus porphyreus* (Jenkins)**

*Pseudupeneus porphyreus* Jenkins, 1903, p. 454, Fig. 22, Honolulu, O'ahu, Hawaiian Islands.

*Parupeneus dispilurus* non (Playfair *in* Playfair & Günther, 1867) [a junior synonym of *Parupeneus rubescens* (Lacépède, 1801), a valid Indian Ocean species]: Steindachner (1900).

*Parupeneus fraterculus* non (Valenciennes *in* Cuvier & Valenciennes, 1831) [a junior synonym of *P. ciliatus* (Lacépède, 1802), a valid species not found in the Hawaiian Islands]: Fowler (1928, 1931, 1949, in part).

*Pseudupeneus porphyreus* Jenkins, 1903: Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Fowler (1934).

*Pseudupeneus fraterculus* non (Valenciennes, 1831): Jordan & Evermann (1905), Fowler (1934, in part).

*Upeneus porphyreus* (Jenkins, 1903): Fowler (1928, 1931).

*Parupeneus pleurotaenia* non (Playfair *in* Playfair & Günther, 1867) [a junior synonym of *P. ciliatus* (Lacépède, 1802), a valid species not found in the Hawaiian Islands]: Thomas (1969, in part).

*Parupeneus porphyreus* (Jenkins, 1903): Gosline & Brock (1960), Struhsaker (1973a), Hobson (1974), Tinker (1982), Okamoto & Kanenaka (1984), Randall (1985a, 1996a, 2004b), Uchida & Uchiyama (1986), Hoover (1993, 2003), Randall *et al.* (1993b), Chave & Mundy (1994).

TAXONOMY: Randall (1985a, 2004b).

COMMON NAMES: Kūmū (Hoover, 1993, 2003; Randall, 1996a), Whitesaddle goatfish (AFS; Hoover, 1993, 2003; Randall, 1996a), Red goat fish (DLNR).

HAWAIIAN RECORDS: Hawai'i Island to Kure Atoll at 2–140 m (Steindachner, 1900; Jenkins, 1903; Hobson, 1974; Okamoto & Kanenaka, 1984; Uchida & Uchiyama, 1986; Randall *et al.*, 1993b; Chave & Mundy, 1994; Randall 2004b).

GENERAL RANGE: Hawaiian Islands endemic. Reports of this species from the Seychelles (Thomas, 1969) and the Ogasawara Islands (corrected in Randall *et al.*, 1997b) are in error. Engyberthentic over sand, rock, and reef at 2–140 m (Randall, 1985a, 2004b; Hoover, 1993; Chave & Mundy, 1994).

***Upeneus arge* Jordan & Evermann**

*Upeneus arge* Jordan & Evermann, 1903a, p. 187, Honolulu, O'ahu, Hawaiian Islands.

*Upeneoides vittatus* non (Forsskål, 1775) [a valid species that has been introduced in the Hawaiian Islands]: Streets (1877).

*Upeneoides arge* (Jordan & Evermann, 1903a): Jordan *et al.* (1927), Fowler (1928, 1931).

*Upeneoides taeniopterus* non (Cuvier *in* Cuvier & Valenciennes, 1829): Steindachner (1900), Fowler (1928).

*Upeneus* species: Humphreys *et al.* (1984)?

*Upeneus faeniopterus* non Cuvier, 1829 [*lapsus* for *taeniopterus*]: Uchida & Uchiyama (1986).

*Upeneus taeniopterus* non Cuvier, 1829: Jordan & Evermann (1905), Fowler (1934), Randall (1980a, 1985a), Tinker (1982 appendix), Randall (1985a), Myers (1989), Hoover (1993, 2003).

*Upeneus arge* Jordan & Evermann, 1903: Jordan & Evermann (1903a, 1905), Jenkins (1903), Snyder (1904), Fowler (1934, 1949), Gosline & Brock (1960), Tinker (1982 text), Masuda *et al.* (1984), Randall (1996a).

TAXONOMY: Randall (1996a). The relegation of *U. arge* Jordan & Evermann, 1903, to the status of a junior synonym of *U. taeniopterus* Cuvier, 1829, between 1980 and 1996 was not justifiable. The description of *U. taeniopterus* indicates that it is not the same species as the species now identified as *U. arge* (J.E. Randall, pers. comm., Sept. 2001).

COMMON NAMES: Weke pueo (Hoover, 1993, 2003; Randall, 1996a), Weke-pahulu (Hoover, 1993, 2003), Bandtail goatfish (Hoover, 1993, 2003; Randall, 1996a), Nightmare weke (Hoover, 1993, 2003).

HAWAIIAN RECORDS: Hawai'i Island to Lisianski and Ladd Seamount at 2–31 m (Streets, 1877a; Jordan & Evermann, 1905; Humphreys *et al.*, 1984; Uchida & Uchiyama, 1986; Hoover, 1993).

GENERAL RANGE: Indo-Pacific from east Africa to southern Japan, Micronesia, the Hawaiian Islands, and the Tuamotu Archipelago. Engy-benthic over sand or mud at 1–31 m (Masuda *et al.*, 1984; Uchida & Uchiyama, 1986; Myers, 1989).

### *Upeneus vittatus* (Forsskål)

*Mullus vittatus* Forsskål, 1775, p. 31, x, Jidda, Saudi Arabia, Red Sea.

*Upeneoides vittatus* (Forsskål, 1775): Fowler (1928, 1931).

*Upeneus vittatus* (Forsskål, 1775): Fowler (1934, 1949), Randall (1980a, 1987a, 1996a), Tinker (1982), Springer (1982), Masuda *et al.* (1984), Ben-Tuvia *in* Smith & Heemstra (1986), Ben-Tuvia & Kissel (1988), Myers (1989), Hoover (2003).

TAXONOMY: Ben-Tuvia & Kissel (1988).

COMMON NAMES: Bandedtail goatfish (AFS), Yellowbanded goatfish (Myers, 1999; Hoover, 2003).

HAWAIIAN RECORDS: O'ahu at 7 m. Randall (1981a) recorded *U. vittatus* from Kāne'ohe Bay, suggesting that it had been introduced from the Marquesan Islands as early as 1955. Springer (1982) proposed an alternate hypothesis that the species could have recruited to the Hawaiian Islands by dispersal from Japanese waters.

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to southern Japan, New Caledonia, Micronesia, the Society Islands, and the Marquesas. Introduced in the Hawaiian Islands. Engy-benthic over sand and mud at 1–100 m (Randall, 1981a; Masuda *et al.*, 1984; Ben-Tuvia *in* Smith & Heemstra, 1986; Myers, 1989).

## Chaetodontidae — Butterflyfishes

### *Chaetodon auriga* Forsskål

*Chaetodon auriga* Forsskål, 1775, p. 60, xiii, Red Sea at Jidda, Saudi Arabia, or Luhaiya, Yemen.

*Chaetodon setifer* Bloch, 1795: Günther (1874a), Smith & Swain (1882), Fowler (1900), Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1934).

*Chaetodon auriga* Forsskål, 1775: Steindachner (1900), Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Hobson (1974), Steene (1985), Burgess (1978), Allen (1985a), Tinker (1982), Okamoto & Kanenaka (1984), Randall (1985a, 1996a), Randall *et al.* (1985a, 1993b, 1997a), Blum (1988), Myers (1989), Hoover (1993, 2003), Chave & Mundy (1994), Allen *et al.* (1998).

TAXONOMY: Burgess (1978), Blum (1988), Allen *et al.* (1998).

COMMON NAMES: Kīkākāpu (Randall, 1996a), Threadfin butterflyfish (AFS; Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 9–61 m (Günther, 1874; Smith & Swain, 1882; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Hoover, 1993; Chave & Mundy, 1994).

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, the Tuamotu Archipelago, the Marquesas, and Rapa. Waifs have been seen at the Galapagos Islands. Engy-benthic over reefs, rubble, and sand at 1–61 m (Steene, 1985; Burgess, 1978; Allen, 1985a; Myers, 1989; Chave & Mundy, 1994; Randall *et al.*, 1997b; Allen *et al.*, 1998).

***Chaetodon citrinellus* Cuvier**

*Chaetodon citrinellus* Cuvier in Cuvier & Valenciennes, 1831, p. 27, Guam, Mariana Islands.

*Chaetodon citrinellus* Cuvier, 1831: Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Hobson (1974), Steene (1985), Burgess (1978), Allen (1985a), Tinker (1982), Okamoto & Kanenaka (1984), Matsuura in Okamura (1985), Randall (1985a, 1996a), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Blum (1988), Myers (1989), Hoover (1993, 2003), Allen *et al.* (1998).

TAXONOMY: Burgess (1978), Blum (1988), Allen *et al.* (1998).

COMMON NAMES: Lauhau (Randall, 1996a), Speckled butterflyfish (AFS; Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Pearl and Hermes Reef at 5 m (Fowler, 1928, 1931; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b; Hoover, 1993).

GENERAL RANGE: Indo-Pacific from East Africa and the Chagos Archipelago to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, the Society Islands, the Tuamotu Archipelago, and the Marquesas. Engyobenthic over reefs, rubble, and sand at 1–130 m (Steene, 1985; Burgess, 1978; Allen, 1985a; Matsuura in Okamura *et al.*, 1985; Randall *et al.*, 1990a, 1993b, 1997b; Hoover, 1993; Allen *et al.*, 1998).

***Chaetodon ephippium* Cuvier**

*Chaetodon ephippium* Cuvier in Cuvier & Valenciennes, 1831, p. 80, pl. 174, Society Islands.

*Chaetodon ephippium* Cuvier, 1831: Jordan & Dickerson (1908), Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Hobson (1974), Steene (1985), Burgess (1978), Allen (1985a), Tinker (1982), Okamoto & Kanenaka (1984), Randall (1985a, 1996a), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Blum (1988), Myers (1989), Hoover (1993, 2003), Allen *et al.* (1998).

TAXONOMY: Burgess (1978), Blum (1988), Allen *et al.* (1998).

COMMON NAMES: Kīkākāpu (Randall, 1996), Saddle butterflyfish (AFS; Randall *et al.*, 1997a; Myers, 1999), Saddleback butterflyfish (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at 1–6 m (Jordan & Dickerson, 1908; Fowler, 1928; Gosline & Brock, 1960; Hobson, 1974; Okamoto & Kanemoto, 1984; Randall *et al.*, 1985b; Hoover, 1993).

GENERAL RANGE: Eastern Indian Ocean and Pacific from Cocos-Keeling Island, Thailand, and Indonesia to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, the Tuamotu Archipelago, the Marquesas, and Rapa. Engyobenthic over or near reefs at 1–30 m (Steene, 1985; Burgess, 1978; Allen, 1985a; Myers, 1989; Randall *et al.*, 1990a, 1997b; Hoover, 1993; Allen *et al.*, 1998).

***Chaetodon fremblii* Bennett**

*Chaetodon fremblii* Bennett, 1828, p. 42, "Hawaiian Islands".

*Chaetodon frembeii* Bennett, 1828 [*lapsus* for *fremblii*]: Wetmore (1890).

*Chaetodon fremblii* Bennett, 1828: Bennett (1828), Steindachner (1900), Jenkins (1903), Jordan & Snyder (1904a), Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Struhsaker (1973a), Hobson (1974), Burgess (1978), Allen (1985a), Tinker (1982), Humphreys *et al.* (1984), Randall (1985a, 1996a), Uchida & Uchiyama (1986), Blum (1988), Hoover (1993, 2003), Randall *et al.* (1993b), Chave & Mundy (1994), Allen *et al.* (1998).

TAXONOMY: Burgess (1978), Blum (1988), Allen *et al.* (1998).

COMMON NAMES: Kīkākāpu (Hoover, 1993, 2003; Randall, 1996a), Bluestriped butterflyfish (AFS; Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Hawai'i Island to Kure Atoll at 1–183 m (Bennett, 1828; Hobson, 1974; Burgess, 1978; Allen, 1985a; Humphreys *et al.*, 1984; Uchida & Uchiyama, 1986; Randall *et al.*, 1993b; Hoover, 1993; Chave & Mundy, 1994).

GENERAL RANGE: Hawaiian Islands endemic. Engyobenthic over reefs, rubble, and rock at 1–183 m (Burgess, 1978; Allen, 1985a; Chave & Mundy, 1994; Allen *et al.*, 1998).

**[*Chaetodon humeralis* Günther]**

*Chaetodon humeralis* Günther, 1860, p. 19, "Sandwich Islands" [a false type locality].

*Chaetodon humeralis* Günther, 1860: Günther (1860), Jordan & Evermann (1905, footnote on p. 374), Allen & Robertson (1994).

TAXONOMY: Allen & Robertson (1994).

COMMON NAMES: Threeband butterflyfish (AFS).

HAWAIIAN RECORDS: Günther (1860) gave the type locality for this species as the “Sandwich Islands” [= Hawaiian Islands] but this was a false collection locality (Jordan & Evermann, 1905; Eschmeyer, 1998). Günther had several eastern tropical Pacific specimens from “the Haslar collection” that had collection localities mislabeled as “the Sandwich Islands (e.g., *Arius dasycephalus*, *Fodiator acutus rostratus*, *Hypsoblennius brevipinnis*).

GENERAL RANGE: Gulf of California, with a record of a waif from southern California, U.S.A., to Peru. Engybenitic at 3–55 m (Allen & Robertson, 1994).

### *Chaetodon kleinii* Bloch

*Chaetodon kleinii* Bloch, 1790, p. 7, pl. 218, “East Indies”.

*Chaetodon corallicola* Snyder, 1904: Snyder (1904), Gilbert (1905), Jordan & Evermann (1905), Fowler (1928, 1931), Gosline & Brock (1960), Struhsaker (1973a), Hobson (1974).

*Chaetodon kleinii* Bloch, 1790: Fowler (1928, 1931, 1934, 1949), Burgess (1978), Allen (1985a), Tinker (1982), Randall (1985a, 1996a), Uchida & Uchiyama (1986), Blum (1988), Myers (1989), Randall *et al.* (1990a, 1993b, 1997a), Hoover (1993, 2003), Chave & Mundy (1994), Allen *et al.* (1998).

TAXONOMY: Burgess (1978), Blum (1988), Allen *et al.* (1998).

COMMON NAMES: Lauhau (Randall, 1996a), Sunburst butterflyfish (AFS), Bluehead butterflyfish (Hoover, 1993, 2003), Blacklip butterflyfish (Hoover, 1993, 2003; Randall, 1996a), Klein’s butterflyfish (Hoover, 1993, 2003; Randall *et al.*, 1996a).

HAWAIIAN RECORDS: Hawai‘i Island to Midway at 18–122 m (Snyder, 1904; Gilbert, 1905; Hobson, 1974; Uchida & Uchiyama, 1986; Randall *et al.*, 1993b; Hoover, 1993; Chave & Mundy, 1994).

GENERAL RANGE: Indo-Pacific from South Africa and the Arabian Gulf to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, and Samoa. A waif has been seen at the Galapagos Islands. Engybenitic over reefs and rock at 4–122 m (Burgess, 1978; Allen, 1985a; Myers, 1989; Randall *et al.*, 1990a, 1997b; Chave & Mundy, 1994; Allen *et al.*, 1998).

### *Chaetodon lineolatus* Cuvier

*Chaetodon lineolatus* Cuvier in Cuvier & Valenciennes, 1831, p. 40, Mauritius, western Indian Ocean.

*Chaetodon lineolatus* Cuvier, 1831: Günther (1874a), Steindachner (1900), Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1931, 1934), Gosline & Brock (1960), Hobson (1974), Burgess (1978), Allen (1985a), Tinker (1982), Randall (1985a, 1996a), Randall *et al.* (1985a, 1990a, 1997a), Blum (1988), Myers (1989), Hoover (1993, 2003), Allen *et al.* (1998).

TAXONOMY: Burgess (1978), Blum (1988), Allen *et al.* (1998).

COMMON NAMES: Kīkākapu (Hoover, 1993, 2003; Randall, 1996a), Lined butterflyfish (AFS; Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to O‘ahu at 12–171 m (Günther, 1874; Jordan & Evermann, 1905; Hobson, 1974; Randall, 1985a; Randall *et al.*, 1985b; Hoover, 1993).

GENERAL RANGE: Indo-Pacific from east Africa and the Red Sea to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, the Tuamotu Archipelago, and Ducie. Engybenitic over or near reefs at 2–171 m (Burgess, 1978; Allen, 1985a; Randall *et al.*, 1985b, 1990a, 1997b; Myers, 1989; Hoover, 1993; Allen *et al.*, 1998).

### *Chaetodon lunula* (Lacépède)

*Pomacentrus lunula* Lacépède, 1802, p. 507, 511, “Sea of Indies”.

*Chaetodon biocellatus* Cuvier in Cuvier & Valenciennes, 1831: Fowler (1900).

*Chaetodon lunula* (Lacépède, 1802): Wetmore (1890), Steindachner (1900), Jenkins (1903), Snyder (1904), Jordan & Evermann (1905) [although their inclusions of *C. lunulatus* Quoy & Gaimard, 1825, and *C. taunigrum* Cuvier, 1831, in the synonymy of this species were mistaken], Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Hobson (1974), Burgess (1978), Allen (1985a), Tinker (1982), Okamoto & Kanenaka (1984), Randall (1985a, 1996a), Blum (1988), Myers (1989), Kosaki *et al.* (1991), Hoover (1993, 2003), Chave & Mundy (1994), Randall *et al.* (1997a), Allen *et al.* (1998).

TAXONOMY: Burgess (1978), Blum (1988), Allen *et al.* (1998).

COMMON NAMES: Kikākapu (Hoover, 1993, 2003; Randall, 1996a), Raccoon butterflyfish (AFS; Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Lisianski at 1–70 m (Wetmore, 1890; Steindachner, 1900; Jordan & Evermann, 1905; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall, 1985a; Kosaki *et al.*, 1991; Chave & Mundy, 1994).

GENERAL RANGE: Indo-Pacific from South Africa and the Chagos Archipelago to Indonesia, southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, the Tuamotu Archipelago, the Marquesas, Rapa, and Ducie. Waifs have been seen at Cocos and the Galapagos Islands. Engyberthentic over reefs and rock at 1–158 m (Burgess, 1978; Allen, 1985a; Myers, 1989; Chave & Mundy, 1994; Randall *et al.*, 1997b; Allen *et al.*, 1998).

### *Chaetodon lunulatus* Quoy & Gaimard

*Chaetodon lunulatus* Quoy & Gaimard, 1825, p. 381, Hawaiian Islands or possibly Guam.

*Chaetodon tau-nigrum* Cuvier & Valenciennes, 1831: Fowler (1900)?

*Chaetodon trifasciatus* non Park, 1797 [a valid species not found in Hawaiian Islands]: Jenkins (1903), Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Hobson (1974), Burgess (1978), Allen (1985a), Tinker (1982), Okamoto & Kanenaka (1984), Randall (1985a), Blum (1988), Myers (1989), Randall *et al.* (1990a, 1993b), Hoover (1993).

*Chaetodon lunulatus* Quoy & Gaimard, 1825: Quoy & Gaimard (1825), Randall (1996a, 1998c), Randall *et al.* (1997a), Allen *et al.* (1998), Hoover (2003).

TAXONOMY: According to Randall (1996a, 1998c) and Allen *et al.* (1998), *Chaetodon trifasciatus* Park, 1797, is an endemic Indian Ocean species and *C. lunulatus* Quoy & Gaimard, 1825, is the valid name for the Pacific populations previously called *C. trifasciatus*.

COMMON NAMES: Kapuhili (Randall, 1996a), Melon butterflyfish (AFS; Hoover, 2003), Oval butterflyfish (Hoover, 1993, 2003; Randall, 1996a), Redfin butterflyfish (Hoover, 1993, 2003; Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 3 m (Quoy & Gaimard, 1825; Jenkins, 1903; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Hoover, 1993).

GENERAL RANGE: Eastern Indian Ocean and Pacific from Indonesia and western Australia to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, the Society Islands, and Rapa. Engyberthentic over coral reefs at 3–20 m (Burgess, 1978; Allen, 1985a; Myers, 1989; Randall *et al.*, 1990a, 1997b; Hoover, 1993; Allen *et al.*, 1998).

### *Chaetodon miliaris* Quoy & Gaimard

*Chaetodon miliaris* Quoy & Gaimard, 1825, p. 380, pl. 62, "Hawaiian Islands".

*Chaetodon mantelliger* Jenkins, 1901: Jenkins (1901a).

*Chaetodon miliaris* Quoy & Gaimard, 1825: Quoy & Gaimard (1825), Eydoux & Souleyet (1850), Wetmore (1890), Steindachner (1900), Fowler (1900, 1928, 1931, 1934, 1949), Jenkins (1903), Jordan & Snyder (1904a), Snyder (1904), Jordan & Evermann (1905), Gosline & Brock (1960), Struhsaker (1973a), Hobson (1974), Burgess (1978), Allen (1985a), Tinker (1982), Humphreys *et al.* (1984), Randall (1985a, 1996a), Randall *et al.* (1985a, 1993b), Uchida & Uchiyama (1986), Blum (1988), Hoover (1993, 2003), Chave & Mundy (1994), Allen *et al.* (1998).

TAXONOMY: Burgess (1978), Blum (1988), Allen *et al.* (1998).

COMMON NAMES: Lau-wiliwili (Hoover, 1993, 2003; Randall, 1996a), Millet butterflyfish (AFS), Milletseed butterflyfish (Hoover, 1993, 2003; Randall, 1996a), Lemon butterflyfish (Hoover, 1993, 2003).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 1–250 m (Quoy & Gaimard, 1825; Struhsaker, 1973a; Hobson, 1974; Allen, 1985a; Humphreys *et al.*, 1984; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Chave & Mundy, 1994).

GENERAL RANGE: Johnston Atoll and Hawaiian Islands endemic. Engyberthentic at 1–250 m (Burgess, 1978; Allen, 1985a; Chave & Mundy, 1994; Allen *et al.*, 1998).

***Chaetodon multicinctus*** Garrett

*Chaetodon multicinctus* Garrett, 1863, p. 65, Honolulu market, O'ahu, Hawaiian Islands.

*Chaetodon punctatofasciatus* non Cuvier in Cuvier & Valenciennes, 1831 [a valid species not found in the Hawaiian Islands]: Jordan & Evermann (1905).

*Chaetodon punctato-fasciatus* non Cuvier, 1831: Fowler (1928, 1931, 1934, 1949, in part).

*Chaetodon multicinctus* Garrett, 1863: Garrett (1863), Jenkins (1903), Snyder (1904), Gosline & Brock (1960), Hobson (1974), Burgess (1978), Allen (1985a), Tinker (1982), Okamoto & Kanenaka (1984), Randall (1985a, 1996a), Randall *et al.* (1985a, 1993b), Uchida & Uchiyama (1986), Blum (1988), Hoover (1993, 2003), Chave & Mundy (1994), Allen *et al.* (1998).

TAXONOMY: Burgess (1978), Blum (1988), Allen *et al.* (1998).

COMMON NAMES: Kikākapu (Randall, 1996a), Pebbled butterflyfish (AFS; Hoover, 1993, 2003), Multiband butterflyfish (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 5–114 m (Garrett, 1863; Hobson, 1974; Allen, 1985a; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Hoover, 1993).

GENERAL RANGE: Johnston Atoll and Hawaiian Islands endemic. Northwestern Hawaiian Islands populations differ in color pattern from main Hawaiian Island populations. Engybenthic over reefs and rock at 5–114 m (Burgess, 1978; Allen, 1985a; Randall *et al.*, 1993b; Chave & Mundy, 1994; Allen *et al.*, 1998).

***Chaetodon ornatissimus*** Cuvier

*Chaetodon ornatissimus* Cuvier in Cuvier & Valenciennes, 1831, p. 22, Tahiti, Society Islands.

*Chaetodon ornatus* Gray, 1831: Gray (1831).

*Chaetodon ornatissimus* Cuvier, 1831: Günther (1860, 1874a), Wetmore (1890), Fowler (1900, 1928, 1931, 1934, 1949), Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Gosline & Brock (1960), Hobson (1974), Burgess (1978), Allen (1985a), Tinker (1982), Okamoto & Kanenaka (1984), Randall (1985a, 1996a), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Blum (1988), Myers (1989), Godwin & Kosaki (1989), Hoover (1993, 2003), Allen *et al.* (1998).

TAXONOMY: Burgess (1978), Blum (1988), Allen *et al.* (1998).

COMMON NAMES: Kikākapu (Hoover, 1993, 2003; Randall, 1996a), Ornate butterflyfish (AFS; Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 5–18 m (Gray, 1831; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Godwin & Kosaki, 1989; Hoover, 1993).

GENERAL RANGE: Central Indian Ocean and Pacific from the Maldives, Sri Lanka, Cocos-Keeling Island, and Indonesia to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, the Tuamotu Archipelago, the Marquesas, and Rapa. Engybenthic over coral reefs at 1–36 m (Burgess, 1978; Allen, 1985a; Godwin & Kosaki, 1989; Myers, 1989; Randall *et al.*, 1990a, 1997b; Hoover, 1993; Allen *et al.*, 1998).

***Chaetodon quadrimaculatus*** Gray

*Chaetodon 4-maculatus* Gray, 1831, p. 33, "Hawaiian Islands".

*Chaetodon quadrimaculatus* Gray, 1831: Gray (1831), Steindachner (1900), Fowler (1900, 1928, 1931, 1949), Jenkins (1903), Jordan & Snyder (1904a), Snyder (1904), Jordan & Evermann (1905), Gosline & Brock (1960), Hobson (1974), Burgess (1978), Allen (1985a), Tinker (1982), Springer (1982), Okamoto & Kanenaka (1984), Randall (1985a, 1996a), Randall *et al.* (1985a, 1997a), Blum (1988), Myers (1989), Godwin & Kosaki (1989), Hoover (1993, 2003), Chave & Mundy (1994), Allen *et al.* (1998).

TAXONOMY: Burgess (1978), Blum (1988), Allen *et al.* (1998).

COMMON NAMES: Lau-hau (Hoover, 1993, 2003; Randall, 1996a), Fourspot butterflyfish (AFS; Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Lisianski at 5–43 m (Gray, 1831; Jordan & Evermann, 1905; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b; Godwin & Kosaki, 1989; Hoover, 1993; Chave & Mundy, 1994).

GENERAL RANGE: Pacific endemic from southern Japan, the Ogasawara Islands, Johnston, the Hawaiian

Islands, the Line Islands, Micronesia, Samoa, the Society Islands, the Tuamotu Archipelago, and Pitcairn. Engy-benthic over reefs and rock at 2–43 m (Burgess, 1978; Allen, 1985a; Springer, 1982; Myers, 1989; Chave & Mundy, 1994; Randall *et al.*, 1997b; Allen *et al.*, 1998).

### *Chaetodon reticulatus* Cuvier

*Chaetodon reticulatus* Cuvier in Cuvier & Valenciennes, 1831, p. 32, pl. 171, Tahiti, Society Islands, and Ulea, Caroline Islands.

*Chaetodon collaris* non Bloch, 1787 [a valid species not found in the Hawaiian Islands]: Fowler (1923).

*Chaetodon reticulatus* Cuvier, 1831: Fowler (1928, 1934, 1949), Gosline & Brock (1960), Hobson (1974), Steene (1985), Burgess (1978), Allen (1985a), Tinker (1982), Randall (1985a, 1996a), Randall *et al.* (1985a, 1990a, 1997a), Blum (1988), Myers (1989), Hoover (1993, 2003), Allen *et al.* (1998).

TAXONOMY: Burgess (1978), Blum (1988), Allen *et al.* (1998).

COMMON NAMES: Mailed butterflyfish (AFS), Reticulated butterflyfish (Hoover, 1993, 2003; Randall, 1996a), Black butterflyfish.

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to O'ahu at 5 m (Fowler, 1923, 1928; Gosline & Brock, 1960; Hobson, 1974; Randall *et al.*, 1985b; Hoover, 1993).

GENERAL RANGE: Eastern Indian Ocean and Pacific from Indonesia, southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, the Society Islands, Ducie, and Pitcairn. Engy-benthic over coral reefs at 1–30 m (Steene, 1985; Burgess, 1978; Allen, 1985a; Myers, 1989; Randall *et al.*, 1990a, 1997b; Hoover, 1993; Allen *et al.*, 1998).

### [*Chaetodon semeion* Bleeker]

*Chaetodon semeion* Bleeker, 1855b, p. 450, Cocos-Keeling Island, eastern Indian Ocean.

*Chaetodon semeion* Bleeker, 1855b: E.K. Jordan (1925)?, Steene (1985), Burgess (1978), Allen (1985a), Masuda *et al.* (1984), Blum (1988), Myers (1989), Randall *et al.* (1990a), Allen *et al.* (1998).

TAXONOMY: Burgess (1978), Blum (1988), Allen *et al.* (1998).

COMMON NAMES: Dotted butterflyfish (AFS; Randall *et al.*, 1997a; Myers, 1999).

HAWAIIAN RECORDS: Although this species was recorded from the Hawaiian Islands by E.K. Jordan (1925), records from the region are questionable (Burgess, 1978; Allen, 1985a). Jordan's (1925) record was based on a cast in the Bishop Museum, and it is not clear that the fish from which the cast was made came from the Hawaiian Islands.

GENERAL RANGE: Indo-Pacific from the Maldives and Sri Lanka to Indonesia, southern Japan, Australia, Wake, Micronesia, the Society Islands, the Tuamotu Islands, and perhaps the Hawaiian Islands. Engy-benthic over reefs at 5–25 m (Steene, 1985; Burgess, 1978; Allen, 1985a; Myers, 1989; Randall *et al.*, 1990a; Allen *et al.*, 1998).

### *Chaetodon tinkeri* Schultz

*Chaetodon tinkeri* Schultz, 1951, p. 485, pl. 15, off Nanakuli, O'ahu, Hawaiian Islands.

*Chaetodon tinkeri* Schultz, 1951: Schultz (1951), Gosline & Brock (1960), Burgess (1978), Allen (1985a), Tinker (1982), Springer (1982), Randall (1985a, 1996a, 1992b), Randall *et al.* (1985a), Blum (1988), Myers (1989), Severns & Fiene-Severns (1993), Hoover (1993, 2003), Chave & Mundy (1994), Allen *et al.* (1998).

TAXONOMY: Burgess (1978), Blum (1988), Allen *et al.* (1998).

COMMON NAMES: Hawaiian butterflyfish (AFS), Tinker's butterflyfish (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to O'ahu at 27–183 m (Schultz, 1951; Burgess, 1978; Randall *et al.*, 1985b; Severns & Fiene-Severns, 1993; Hoover, 1993; Chave & Mundy, 1994).

GENERAL RANGE: Central Pacific endemic from the Hawaiian and Marshall Islands. Engy-benthic over reefs and rock at 27–183 m, usually below 40 m (Allen, 1985a; Springer, 1982; Randall, 1985a, 1992; Myers, 1989; Hoover, 1993; Chave & Mundy, 1994; Allen *et al.*, 1998).

### *Chaetodon trifascialis* Quoy & Gaimard

*Chaetodon trifascialis* Quoy & Gaimard, 1825, p. 379, P. 62, Guam, Mariana Islands, western Pacific.



*Megaprotodon strigangulus* (Cuvier in Cuvier & Valenciennes, 1831): Fowler (1928).

*Megaprotodon trifascialis* (Quoy & Gaimard, 1825): Axelrod & Emmons (1969), Randall (1976a), Randall *et al.* (1985a).

*Chaetodon trifascialis* Quoy & Gaimard, 1825: Fowler (1931, 1934, 1949), Steene (1985), Burgess (1978), Allen (1985a), Myers (1989), Okamoto & Kanenaka (1984), Randall (1985a, 1996a), Blum (1988), Randall *et al.* (1990a, 1997a), Severns & Fiene-Severns (1993), Allen *et al.* (1998).

TAXONOMY: Burgess (1978), Blum (1988), Allen *et al.* (1998).

COMMON NAMES: Chevron butterflyfish (AFS; Randall *et al.*, 1997a; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Maro Reef. In the Hawaiian Islands, most common in the central Northwestern Hawaiian Islands (i.e., French Frigate), where *Acropora* corals exist, occurring only as waifs in the main Hawaiian Islands (Axelrod & Emmons, 1969 [as cited in Randall, 1976a]; Randall *et al.*, 1985b; Burgess, 1978; Okamoto & Kanenaka, 1984; Severns & Fiene-Severns, 1993).

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to Indonesia, southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, the Society Islands, and Rapa. Engyobenthic, usually associated with *Acropora* corals, at 2–30 m (Steene, 1985; Burgess, 1978; Allen, 1985a; Myers, 1989; Randall *et al.*, 1990a, 1997b; Allen *et al.*, 1998).

### *Chaetodon ulietensis* Cuvier

*Chaetodon ulietensis* Cuvier in Cuvier & Valenciennes, 1831, p. 39, "Ulietea Island" (Raiatea), Society Islands.

*Chaetodon falcula* non Bloch, 1795 [a valid Indian Ocean species]: Günther (1874a)?

*Chaetodon ulietensis* Cuvier, 1831: Steene (1985), Burgess (1978), Allen (1985a), Masuda *et al.* (1984), Blum (1988), Myers (1989), Anonymous (1989), Randall (1996a), Randall *et al.* (1990a, 1993a, 1997a), Allen *et al.* (1998).

TAXONOMY: Burgess (1978), Blum (1988), Allen *et al.* (1998).

COMMON NAMES: Pacific double-saddle butterflyfish (Randall *et al.*, 1997a; Myers, 1999).

HAWAIIAN RECORDS: Waifs recorded from Hawai'i Island and O'ahu at 12 m (Günther, 1874; Anonymous, 1989; Randall *et al.*, 1993a). Early records of *C. ulietensis* from the Hawaiian Islands were considered unauthenticated (Burgess, 1978; Allen, 1985a) but recent records confirm its occasional occurrence here, opening the possibility that the first records were valid.

GENERAL RANGE: Eastern Indian Ocean and Pacific from Cocos-Keeling Island and Indonesia to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, the Society Islands, and the Tuamotu Archipelago. Engyobenthic over reefs at 3–30 m (Steene, 1985; Burgess, 1978; Allen, 1985a; Myers, 1989; Randall *et al.*, 1990a, 1993a, 1997b; Allen *et al.*, 1998).

### *Chaetodon unimaculatus* Bloch

*Chaetodon unimaculatus* Bloch, 1787, p. 75, pl. 201, "East Indies".

*Chaetodon sphenospilus* Jenkins, 1901: Jenkins (1901a, 1903).

*Chaetodon unimaculatus* Bloch, 1787: Fowler (1900, 1928, 1931, 1934, 1949), Snyder (1904), Jordan & Evermann (1905), Gosline & Brock (1960), Hobson (1974), Steene (1985), Burgess (1978), Allen (1985a), Tinker (1982), Okamoto & Kanenaka (1984), Randall (1985a, 1996a), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Blum (1988), Myers (1989), Hoover (1993, 2003), Allen *et al.* (1998).

TAXONOMY: Burgess (1978), Blum (1988). According to Allen *et al.* (1998), the distinctively bright-yellow Indian Ocean populations of the teardrop butterflyfish deserve recognition as an Indian Ocean endemic species, *C. interruptus* Ahl, 1923, distinct from *C. unimaculatus* Bloch, 1787.

COMMON NAMES: Kikākapu (Hoover, 1993, 2003; Randall, 1996a), Teardrop butterflyfish (AFS; Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 2–5 m (Fowler, 1900; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Hoover, 1993).

GENERAL RANGE: Eastern Indian Ocean and Pacific from Christmas Island (Indian Ocean), Indonesia and northwestern Australia to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, the Society Islands, the Marquesas, and Rapa. Engyobenthic over coral reefs at 1–60

m (Steene, 1985; Burgess, 1978; Allen, 1985a; Myers, 1989; Randall *et al.*, 1990a, 1993b, 1997b; Hoover, 1993; Allen *et al.*, 1998).

[*Chaetodon vagabundus* Linnaeus]

*Chaetodon vagabundus* Linnaeus, 1758, p. 276, "Habitat in Indiis".

*Chaetodon setifer* var. *hawaiiensis* Borodin, 1930: Borodin (1930)?

*Chaetodon vagabundus* Linnaeus, 1758: Steene (1985), Burgess (1978), Allen (1985a), Blum (1988), Myers (1989), Randall *et al.* (1997a), Allen *et al.* (1998).

TAXONOMY: Burgess (1978), Blum (1988), Allen *et al.* (1998). *Chaetodon setifer* Bloch, 1795, is a junior synonym of *C. auriga* Forsskål, 1775.

COMMON NAMES: Vagabond butterflyfish (AFS; Myers, 1999; Randall *et al.*, 1997a).

HAWAIIAN RECORDS: *Chaetodon setifer* var. *hawaiiensis* Borodin, 1930, described from O'ahu, is referable to the synonymy of *C. vagabundus* but the validity of the collection location has been questioned (Burgess, 1978). Borodin (1930) recorded several other species from the Hawaiian Islands that do not otherwise occur here (see *Chaetodontoplus mesoleucas*, *Choerodon anchorago*, and *Hologymnus doliatus*); all of these are likely locality errors. There are no other records of *C. vagabundus* from the Hawaiian Islands.

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to Taiwan, the Ogasawara Islands, Australia, Micronesia, the Society Islands, and the Tuamotu Archipelago. Engy-benthic over reefs and in turbid areas at 3–30 m (Steene, 1985; Burgess, 1978; Allen, 1985a; Myers, 1989; Randall *et al.*, 1997b; Allen *et al.*, 1998).

***Forcipiger flavissimus* Jordan & McGregor**

*Forcipiger flavissimus* Jordan & McGregor in Jordan & Evermann, 1898, p. 1671, Clarion Island, Revillagigedos Islands, eastern tropical Pacific off Mexico.

*Chelmo longirostris* non (Broussonet, 1782): Günther (1874a) in part?

*Forcipiger longirostris* non (Broussonet, 1782) [a valid species also found in the Hawaiian Islands]: Fowler (1900), Jenkins (1903), Snyder (1904), Jordan & Evermann (1905, in part), Fowler (1928, 1931, 1934, 1949, in part), Gosline & Brock (1960, in part).

*Chelmon (Forcipiger) longirostris* non (Broussonet, 1782): Steindachner (1900)?

*Forcipiger flavissimus* Jordan & McGregor, 1898: Hobson (1974), Randall (1976a, 1985a, 1996a), Steene (1985), Burgess (1978), Allen (1985a), Tinker (1982), Okamoto & Kanenaka (1984), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Blum (1988), Godwin & Kosaki (1989), Myers (1989), Hoover (1993, 2003), Chave & Mundy (1994), Allen & Robertson (1994), Allen *et al.* (1998), Robertson & Allen (2002).

TAXONOMY: Burgess (1978), Blum (1988), Allen *et al.* (1998).

COMMON NAMES: Lau-wiliwili-nukunuku-oi'oi (Hoover, 1993, 2003; Randall, 1996a), Forceps fish (AFS; Randall *et al.*, 1997a; Randall, 1996a; Hoover, 2003), Common longnose butterflyfish (Hoover, 1993, 2003), Lauwiliwili (DLNR), Yellow manini (DLNR), Longnose butterfly fish (DLNR).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 9–128 m (Günther, 1874; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Godwin & Kosaki, 1989; Chave & Mundy, 1994).

GENERAL RANGE: Indo-transPacific from South Africa and the Red Sea to Indonesia, southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, Easter Island, the Galapagos Islands, the offshore eastern tropical Pacific islands, and the Gulf of California to Ecuador. Engy-benthic over reefs and rock at 1–145 m (Steene, 1985; Burgess, 1978; Allen, 1985a; Myers, 1989; Randall *et al.*, 1990a, 1997b; Chave & Mundy, 1994; Allen & Robertson, 1994; Allen *et al.*, 1998; Robertson & Allen, 2002).

***Forcipiger longirostris* (Broussonet)**

*Chaetodon longirostris* Broussonet, 1782, p. [31] unnumbered, pl. [7] unnumbered, two central Pacific type localities near the Society Islands and the Hawaiian Islands.

*Chaetodon longirostris* Broussonet, 1782: Broussonet (1782).

*Forcipiger cyrano* Randall, 1961: Randall (1961a).

*Forcipiger inornatus* Randall, 1961: Randall (1961a).

*Forcipiger longirostris* (Broussonet, 1782): Fowler (1900, 1928, 1931, 1934, 1949, in part), Steindachner (1900),

Jordan & Evermann (1905, in part), Gosline & Brock (1960, in part), Randall & Caldwell (1970), Hobson (1974), Randall (1976a, 1985a, 1996a), Steene (1985), Burgess (1978), Allen (1985a), Tinker (1982), Myers (1989), Randall *et al.* (1990a, 1997a), Hoover (1993, 2003), Chave & Mundy (1994), Allen *et al.* (1998).

TAXONOMY: Burgess (1978), Blum (1988).

COMMON NAMES: Lau-wiliwili-nukunuku-oi'oi (Hoover, 1993, 2003; Randall, 1996a), Longnose butterflyfish (AFS; Randall *et al.*, 1997a; Randall, 1996a; Hoover, 2003, DLNR), Rare longnose butterflyfish (Hoover, 1993, 2003), Big longnose butterflyfish (Hoover, 1993, 2003), Lauwiliwili (DLNR).

HAWAIIAN RECORDS: Hawai'i Island to O'ahu, with one record from Maro Reef, at 5–208 m (Brousseau, 1782; Jordan & Evermann, 1905; Randall & Caldwell, 1970; Hobson, 1974; Hoover, 1993; Chave & Mundy, 1994; E. DeMartini, pers. comm., March 2002).

GENERAL RANGE: Indo-Pacific from the Comoro Islands and the Seychelles to Indonesia, the Philippines, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, the Tuamotu Archipelago, the Marquesas, and Pitcairn. Engybenitic over reefs and rock at 2–208 m (Randall, 1961a; Steene, 1985; Burgess, 1978; Allen, 1985a; Myers, 1989; Randall *et al.*, 1990a, 1997b; Chave & Mundy, 1994; Allen *et al.*, 1998).

### *Hemitaurchthys polylepis* (Bleeker)

*Chaetodon polylepis* Bleeker, 1857a, p. 54, Ambon Island, Moluccas Islands, Indonesia.

*Hemitaurchthys zoster* non (Bennett, 1831) [a valid Indian Ocean species]: Fowler (1928, 1949, in part), Gosline & Brock (1960), Hobson (1974).

*Hemitaurchthys polylepis* (Bleeker, 1857a): Fowler (1923), Burgess (1978), Allen (1985a), Tinker (1982), Randall (1985a, 1996a), Blum (1988), Myers (1989), Randall *et al.* (1990a, 1997a), Hoover (1993, 2003), Chave & Mundy (1994), Allen *et al.* (1998).

TAXONOMY: Burgess (1978), Blum (1988), Allen *et al.* (1998).

COMMON NAMES: Pyramid butterflyfish (AFS; Hoover, 1993, 2003; Randall, 1996).

HAWAIIAN RECORDS: Hawai'i Island to O'ahu at 6–46 m (Fowler, 1923, 1928, 1949; Hobson, 1974; Randall, 1985a; Chave & Mundy, 1994).

GENERAL RANGE: Eastern Indian Ocean and Pacific from Thailand and Indonesia to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, the Society Islands, and Pitcairn. Engybenitic over rocks and reef at 3–60 m (Burgess, 1978; Allen, 1985a; Myers, 1989; Randall *et al.*, 1990a, 1997b; Chave & Mundy, 1994; Allen *et al.*, 1998).

### *Hemitaurchthys thompsoni* Fowler

*Hemitaurchthys thompsoni* Fowler, 1923, p. 384, Honolulu market, O'ahu, Hawaiian Islands.

*Hemitaurchthys thompsoni* Fowler, 1923: Fowler (1923, 1928, 1949), Gosline & Brock (1960), Hobson (1974), Burgess (1978), Allen (1985a), Tinker (1982), Springer (1982), Randall (1985a, 1996a, 1992b), Randall *et al.* (1985a, 1993b, 1997b), Blum (1988), Myers (1989), Hoover (1993, 2003), Chave & Mundy (1994), Allen *et al.* (1998).

TAXONOMY: Burgess (1978), Blum (1988), Allen *et al.* (1998).

COMMON NAMES: Thompson's butterflyfish (Hoover, 1993, 2003; Randall, 1996a), Businessman butterflyfish (Hoover, 1993, 2003).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at 6–114 m (Fowler, 1923; Hobson, 1974; Randall *et al.*, 1985b, 1993b; Hoover, 1993; Chave & Mundy, 1994).

GENERAL RANGE: Pacific endemic, perhaps antiequatorial, from the Ogasawara Islands, the Hawaiian Islands, Johnston, the Marianas, Samoa, the Tokelau Islands, and the Marquesas. Engybenitic over rocks and reefs at 4–300 m (Burgess, 1978; Allen, 1985a; Springer, 1982; Myers, 1989; Randall, 1992b, 1997b; Chave & Mundy, 1994; Allen *et al.*, 1998).

### *Heniochus diphreutes* Jordan

*Heniochus diphreutes* Jordan, 1903, p. 694, Fig. 3, Nagasaki, Japan.

*Heniochus acuminatus* non (Linnaeus, 1758) [a valid species not found in the Hawaiian Islands]: Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949, in part), Gosline & Brock (1960), Struhsaker (1973a), Tinker (1982).

*Heniochus diphreutes* Jordan, 1903: Steene (1985), Allen (1985a), Tinker (1982), Springer (1982), Randall

(1985a, 1996a), Randall *et al.* (1985a, 1993b, 1997a), Uchida & Uchiyama (1986), Myers (1989), Hoover (1993, 2003), Chave & Mundy (1994), Allen *et al.* (1998).

TAXONOMY: Steene (1985), Allen (1985a), Allen *et al.* (1998).

COMMON NAMES: Pennant butterflyfish (Hoover, 1993, 2003), Pennantfish (Hoover, 1993, 2003; Randall, 1996a), Bannerfish (Hoover, 1993, 2003), Schooling bannerfish (Randall *et al.*, 1997a), Poor man's Moorish idol (Hoover, 1993).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at 12–210 m (Jenkins, 1903; Randall, 1985a; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Hoover, 1993; Chave & Mundy, 1994).

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to southern Japan, the Ogasawara Islands, Australia, and the Hawaiian Islands. Not recorded from elsewhere on the Pacific Plate but see Myers (1989). Engybenthic and benthopelagic over reefs, rock, and sand at 3–215 m (Steene, 1985; Allen, 1985a; Springer, 1982; Chave & Mundy, 1994; Randall *et al.*, 1997b; Allen *et al.*, 1998).

### ***Prognathodes* sp.**

*Prognathodes* cf. *guezeti* non (Maugé & Bauchot, 1976) [a valid species not found in the Hawaiian Islands]: Pyle & Chave (1994).

*Prognathodes guzei* non (Maugé & Bauchot, 1976): Chave & Mundy (1994).

*Prognathodes* sp. 1 and “new species similar to *P. guzei*”: Allen *et al.* (1998).

TAXONOMY: Allen *et al.* (1998).

COMMON NAMES: Orange-margin butterflyfish.

HAWAIIAN RECORDS: Hawai'i Island to French Frigate at 106–214 m (Pyle & Chave, 1994; Chave & Mundy, 1994).

GENERAL RANGE: Hawaiian Islands endemic. Engybenthic near rocky reefs and over sand at 106–214 m (Pyle & Chave, 1994; Chave & Mundy, 1994; Allen *et al.*, 1998).

### ***Roa excelsa* (Jordan)**

*Loa excelsa* Jordan, 1921a, p. 652, Fig. 6, off a lava flow from Mauna Loa, Alike, Ka'ū District, Hawai'i Island.  
*Loa excelsa* Jordan, 1921a: Jordan (1921a).

*Chaetodon excelsa* (Jordan, 1921a): Burgess (1978), Allen *et al.* (1998).

*Heniochus permutatus* non Cuvier in Cuvier & Valenciennes, 1831 [a junior synonym of *H. monoceros* Cuvier, 1831, a valid species not found in the Hawaiian Islands]: Fowler (1928, 1949, in part).

*Heniochus monoceros* non Cuvier, 1831: Fowler (1928, 1931, 1949, in part).

*Heniochus excelsa* (Jordan, 1921a): Gosline & Brock (1960).

*Chaetodon jayakari* non Norman, 1939 [a valid *Roa* species not found in the Hawaiian Islands]: Burgess (1978).

*Chaetodon modestus* non Temminck & Schlegel, 1844 [a valid species of *Roa* not found in the Hawaiian Islands]: Clarke (1972), Burgess (1978), Allen (1985a, in part), Tinker (1982), Randall (1985a), Randall *et al.* (1985a), Myers (1989), Chave & Mundy (1994).

*Roa excelsa* (Jordan, 1921): Blum (1988), Pyle & Chave (1994).

TAXONOMY: Blum (1988), Pyle & Chave (1994).

COMMON NAMES: Hawaiian brown-banded butterflyfish.

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to O'ahu at 89–291 m (Jordan, 1921a; Clarke, 1972; Randall *et al.*, 1985b; Chave & Mundy, 1994).

GENERAL RANGE: Central Pacific endemic known only from the Hawaiian Islands and Guam. Engybenthic over rocks at 20–291 m, but usually below 89 m (Burgess, 1978; Allen, 1985a; Myers, 1989; Chave & Mundy, 1994; Allen *et al.*, 1998).

## **Pomacanthidae — Angelfishes**

### ***Apolemichthys arcuatus* (Gray)**

*Holacanthus arcuatus* Gray, 1831, p. 33, “Hawaiian Islands”.

*Holacanthus arcuatus* Gray, 1831: Gray (1831), Jordan & Evermann (1905), Fowler (1928, 1931, 1934), Gosline & Brock (1960), Clarke (1972), Hobson (1974), Tinker (1982), Heemstra (1984), Randall (1985a), Randall *et al.* (1985a), Hoover (1993), Chave & Mundy (1994).

*Chaetodontoplus arcuatus* (Gray, 1831): Jordan *et al.* (1927).

*Desmoholacanthus arcuatus* (Gray, 1831): Fowler (1949), Randall *et al.* (1993b), Randall (1996a), Hoover (2003).

*Apolemichthys arcuatus* (Gray, 1831): Allen (1985a), Allen *et al.* (1998), Chung & Woo (1998), Pyle (2003).

TAXONOMY: Chung & Woo (1998). For the taxonomic history of this species see Heemstra (1984), Randall *et al.* (1993b), Allen *et al.* (1998), and Chung and Woo (1998). Eschmeyer's (1998) listing of *Holacanthus arcuatus* Gray as having been considered a synonym of *Pomacanthus arcuatus* Linnaeus by "Robins & Ray (1986)" was a *lapsus* that was corrected in the updated website for Eschmeyer's (1998) catalog. Robins *et al.* (1986) referred to *Chaetodon arcuatus* Linnaeus, an entirely different species now placed in *Pomacanthus*.

COMMON NAMES: Bandit angelfish (AFS; Hoover, 1993; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at 12–208 m (Gray, 1831; Clarke, 1972; Hobson, 1974; Randall *et al.*, 1985b, 1993b; Chave & Mundy, 1994).

GENERAL RANGE: Johnston Atoll and Hawaiian Islands endemic. Engybenitic over reef and rock at 12–208 m (Allen, 1985a; Chave & Mundy, 1994; Allen *et al.*, 1998).

[*Apolemichthys xanthopunctatus* Burgess]

*Apolemichthys xanthopunctatus* Burgess, 1973, p. 56, unnumbered figure, Fanning Island, Line Islands, central Pacific.

*Apolemichthys xanthopunctatus* Burgess, 1973: Allen (1985a), Myers (1989), Allen *et al.* (1998).

TAXONOMY: Allen (1985a), Allen *et al.* (1998).

COMMON NAMES: Goldspotted angelfish (AFS; Myers, 1999).

HAWAIIAN RECORDS: Individuals of *A. xanthopunctatus* seen at O'ahu at 2–15 m are known to have been purposely introduced by an aquarium fish importer (J.E. Randall & C. Yoshinaga, pers. comm., Dec. 1993). This species is not thought to be established in the Hawaiian Islands.

GENERAL RANGE: Central Pacific endemic from Kapingamarangi Island, Nauru, the Phoenix, Howland, Baker, and Line Islands. Engybenitic over reefs, rock, and sand at 2–40 m (Allen, 1985a; Myers, 1989; Allen *et al.*, 1998).

[*Centropyge bicolor* (Bloch)]

*Chaetodon bicolor* Bloch, 1787, p. 94, pl. 206, "Brazil and East Indies".

*Holacanthus bicolor* (Bloch, 1787): Günther (1874a), Jordan & Evermann (1905), Fowler (1928).

*Centropyge bicolor* (Bloch, 1787): Gosline & Brock (1960), Steene (1985), Allen (1985a), Springer (1982), Myers (1989), Randall *et al.* (1990a, 1997a), Allen *et al.* (1998).

TAXONOMY: Allen (1985a), Allen *et al.* (1998).

COMMON NAMES: Bicolor angelfish (AFS; Randall *et al.*, 1997a; Myers, 1999).

HAWAIIAN RECORDS: Although this species was recorded from the Hawaiian Islands in early investigations (Günther, 1874; Jordan & Evermann, 1905; Fowler, 1928), it does not occur in the region (Gosline & Brock, 1960; Allen, 1985a). The first Hawaiian record of *C. bicolor* (Bloch, 1787) may be based on an early record from Waihee, Ceram; this locality was spelled Hawai'i in early publications. Later records were probably due to misidentifications of *C. potteri* and to locality errors for *Chaetodontoplus mesoleucus* (Bloch) (see Springer, 1982).

GENERAL RANGE: Eastern Indian Ocean and Pacific from Christmas Island (Indian Ocean) and Indonesia to southern Japan, the Ogasawara Islands, New Guinea, Australia, Micronesia, Samoa, and French Polynesia. Engybenitic in or near coral and rubble at 1–25 m (Steene, 1985; Allen, 1985a; Myers, 1989; Randall *et al.*, 1990a, 1997b; Allen *et al.*, 1998).

[*Centropyge bispinosa* (Günther)]

*Holacanthus bispinosus* Günther, 1860, p. 48, 516, Aneityum [Aneiteum] Island, Vanuatu, and Ambon Island, Moluccas Islands, Indonesia.

*Holacanthus bispinosus* non Günther, 1860: Günther (1874a, in part).

*Centropyge bispinosus* (Günther, 1860): Steene (1985), Allen (1985a), Heemstra (1984), Myers (1989), Randall *et al.* (1990a, 1997a).

*Centropyge bispinosa* (Günther, 1860): Allen *et al.* (1998).

TAXONOMY: Allen (1985a).

COMMON NAMES: Twospined angelfish (AFS; Randall *et al.*, 1997a), Dusky angelfish (Myers, 1999).

**HAWAIIAN RECORDS:** Although this species was recorded from the Hawaiian Islands in early investigations (Günther, 1874; Jordan & Evermann, 1905; Fowler, 1928), it does not occur here (Allen, 1985a). The records of *C. bispinosa* may have been based on *C. potteri* (see Fowler, 1928) or *Apolemichthys arcuatus* (see Jordan & Evermann, 1905, footnote on their p. 379).

**GENERAL RANGE:** Indo-Pacific from South Africa and the Maldives to Indonesia, southern Japan, the Ogasawara Islands, Australia, Micronesia, and French Polynesia. Engybenitic in or near coral at 5–50 m (Steene, 1985; Allen, 1985a; Heemstra, 1984; Myers, 1989; Randall *et al.*, 1990a, 1997b; Allen *et al.*, 1998).

### ***Centropyge fisheri* (Snyder)**

*Holacanthus fisheri* Snyder, 1904, p. 532, pl. 11, off Diamond Head (Leahi), O'ahu, Hawaiian Islands.

*Holacanthus fisheri* Snyder, 1904: Snyder (1904), Jordan & Evermann (1905), Gilbert (1905), Fowler (1928, 1931).

*Centropyge fisheri* (Snyder, 1904): Fowler (1934, 1949), Gosline & Brock (1960), Struhsaker (1973a), Hobson (1974), Allen (1985a), Tinker (1982), Randall (1985a, 1996a), Randall *et al.* (1985a, 1993b, 1997a), Uchida & Uchiyama (1986), Moyer (1989), Hoover (1993, 2003), Allen *et al.* (1998), Pyle (2003), Schindler & Schneidewind (2004).

**TAXONOMY:** Allen (1985a). Moyer (1989) and Randall *et al.* (1997b) suggested that this species is a variant and senior synonym of the wider ranging *C. flavicauda* Fraser-Brunner, 1933, but Allen *et al.* (1998) maintained the two forms as distinct species. Pyle (2003) and Schindler & Schneidewind (2004) synonymized *C. flavicauda* and *C. fisheri*, and the latter authors also included *C. acanthops* (Norman, 1922) of the western Indian Ocean as a junior synonym of *C. fisheri*.

**COMMON NAMES:** Orange angelfish (AFS), Fisher's angelfish (Hoover, 1993; Randall, 1996a).

**HAWAIIAN RECORDS:** Hawai'i Island to Midway and perhaps Johnston Atoll at 9–95 m (Snyder, 1904; Hobson, 1974; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Hoover, 1993).

**GENERAL RANGE:** Hawaiian Islands endemic. If *C. flavicauda* is considered a junior synonym, it is known in the Pacific and eastern Indian oceans from Indonesia and the Great Barrier Reef to the Ogasawara Islands, the Hawaiian Islands, and the Tuamotus. Inclusion of *C. acanthops* in this species extends the range to east Africa, making the species' distribution throughout the Indo-Pacific. Engybenitic in reefs at 9–95 m (Snyder, 1904; Allen, 1985a; Randall *et al.*, 1985b, 1993b, 1997b; Uchida & Uchiyama, 1986; Hoover, 1993; Randall, 1996a; Allen *et al.*, 1998; Pyle, 2003; Schindler & Schneidewind, 2004).

### ***Centropyge flavissima* (Cuvier)**

*Holacanthus flavissimus* Cuvier in Cuvier & Valenciennes, 1831, p. 197, Ulea, Caroline Islands.

*Holacanthus flavissimus* Cuvier, 1831: Fowler (1928).

*Centropyge flavissimus* (Cuvier, 1831): Steene (1985), Allen (1985a), Myers (1989), Randall *et al.* (1990a, 1997a).

*Centropyge flavissima* (Cuvier, 1831): Allen *et al.* (1998), Coles *et al.* (1999).

**TAXONOMY:** Allen (1985a), Allen *et al.* (1998).

**COMMON NAMES:** Lemonpeel angelfish (AFS; Randall *et al.*, 1997a; Myers, 1999).

**HAWAIIAN RECORDS:** Fowler (1928) recorded this species from O'ahu but it does not occur naturally in the Hawaiian Islands (Allen, 1985a). The species was seen during the 1990s in Kāne'ohe Bay, Ke'ehi Lagoon, Kewalo Basin, and the Ala Wai Canal, O'ahu. Those specimens are thought to have been aquarium releases (R. Pyle, pers. comm.; Coles *et al.*, 1999). It is not known if *C. flavissima* has become established in Hawai'i but the increasing frequency of sightings suggests that this is possible.

**GENERAL RANGE:** Eastern Indian Ocean and Pacific from Cocos-Keeling to the Solomon Islands, Australia, the Ogasawara Islands, Micronesia, Fiji, Samoa, the Society Islands, the Marquesas, Ducie, and Easter Island. Perhaps introduced to the Hawaiian Islands. Engybenitic in or near coral at 2–25 m (Steene, 1985; Allen 1979; Myers, 1989; Randall *et al.*, 1990a, 1997b; Allen *et al.*, 1998).

### ***Centropyge interrupta* (Tanaka)**

*Angelichthys interruptus* Tanaka, 1918a, p. 224, Tanabe, Wakayama Prefecture, Japan.

*Centropyge interruptus* (Tanaka, 1918a): Randall (1976a, 1992b, 1996a), Allen (1985a), Ralston (1981), Springer (1982), Randall (1985a, 1993b, 1997b), Pyle (1990a).

*Centropyge interrupta* (Tanaka, 1918): Allen *et al.* (1998).

TAXONOMY: Allen (1985a), Allen *et al.* (1998).

COMMON NAMES: Japanese angelfish (AFS; Randall, 1996a), Japanese pygmy angelfish (Hoover, 1993).

HAWAIIAN RECORDS: Midway and Kure Atoll at 15–27 m. The first specimen of *C. interrupta* collected at Kure Atoll was suggested to have been a waif from Japan (Ralston, 1981). Subsequently, the species has been found to be common at Midway Island (Pyle, 1990a; Randall *et al.*, 1993b). The suggestion that *C. interrupta* does not have a breeding population in the northern Hawaiian Ridge (Springer, 1982) has thus been refuted.

GENERAL RANGE: Western and central North Pacific endemic known only from southern Japan, the Ogasawara Islands, and the Hawaiian Islands. Specimens from Mauritius reported as *C. interrupta* were subsequently described as *Centropyge debelius* Pyle, 1990. Engyebenthic in and near reefs at 15–60 m (Allen, 1985a; Pyle, 1990b; Randall, 1992b; Randall *et al.*, 1997b; Allen *et al.*, 1998).

### ***Centropyge loriculus*** (Günther)

*Holacanthus loriculus* Günther, 1874b, p. 53, pl. 40, Society Islands.

*Holacanthus loriculus* Günther, 1874b: Fowler (1928).

*Centropyge flammeus* Woods & Schultz in Schultz *et al.*, 1953: Woods & Schultz in Schultz *et al.* (1953), Gosline & Brock (1960).

*Centropyge loriculus* (Günther, 1874b): Fowler (1934), Axelrod & Emmons (1969), Randall (1976a, 1985a, 1996a), Steene (1985), Allen (1985a), Tinker (1982), Springer (1982), Okamoto & Kanenaka (1984), Randall *et al.* (1985a, 1990a), Myers (1989), Severns & Fiene-Severns (1993), Hoover (1993).

*Centropyge loricula* (Günther, 1874b): Fowler (1949), Allen *et al.* (1998), Hoover (2003).

TAXONOMY: Allen (1985a), Allen *et al.* (1998). Although some recent authors have applied the feminine suffix to the species epithet (in an effort to conform to the feminine gender of the genus *Centropyge*), the name “*loriculus*” is treated as a noun, and therefore maintains its original spelling.

COMMON NAMES: Flaming angelfish (AFS), Flame angelfish (Hoover, 1993; Randall *et al.*, 1997a; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to French Frigate at 1–58 m (Axelrod & Emmons 1969 as cited in Randall 1976a, Okamoto & Kanenaka 1984, Randall 1985a, Randall *et al.* 1985a; Severns & Fiene-Severns, 1993; Hoover, 1993). The Hawaiian Islands population of *C. loriculus* has minor but consistent color-pattern differences from populations elsewhere in the Pacific (Hoover, 1993). *Centropyge loriculus* in a small population at He‘eia Kea Harbor, O‘ahu, do not have the distinctive color pattern found elsewhere in the Hawaiian Islands and are probably the descendants of aquarium fishes that were released in Kāne‘ohe Bay.

GENERAL RANGE: Pacific endemic from New Guinea and Australia to Micronesia, Johnston, the Hawaiian Islands, Samoa, the Society Islands, Ducie, and Pitcairn. Engyebenthic in or near reefs and rubble at 1–60 m (Steene, 1985; Allen, 1985a; Springer, 1982; Myers, 1989; Randall *et al.*, 1985b, 1990a; Hoover, 1993; Allen *et al.*, 1998).

### ***Centropyge multicolor*** Randall & Wass

*Centropyge multicolor* Randall & Wass, 1974, p. 138, Fig. 1, Rigili [Leroy] Islet, Enewetok Atoll, Marshall Islands.

*Centropyge multicolor* Randall & Wass, 1974: Allen (1985a), Randall (1980a, 1985a), Tinker (1982), Springer (1982), Myers (1989), Pyle (1990b), Kosaki *et al.* (1991), Allen *et al.* (1998).

TAXONOMY: Allen (1985a), Allen *et al.* (1998).

COMMON NAMES: Multicolor angelfish (AFS; Myers, 1999).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island at 45–46 m but known at each locality from only single specimens. This species may occur in the region only as a waif (Randall, 1981a; Kosaki *et al.*, 1991).

GENERAL RANGE: Central Pacific endemic from Micronesia, Johnston Atoll, the Hawaiian Islands, Fiji, the Cook Islands, and the Society Islands. Engyebenthic in or near coral at 20–90 m (Allen, 1985a; Randall, 1981a; Springer, 1982; Myers, 1989; Pyle, 1990b; Allen *et al.*, 1998).

***Centropyge nahackyi* Kosaki**

*Centropyge nahackyi* Kosaki, 1989, p. 881, Fig. 1, Johnston Atoll, central North Pacific.

*Centropyge nahackyi* Kosaki, 1989: Kosaki (1989), Pyle (1990b), Kosaki *et al.* (1991), Randall (1996a), Allen *et al.* (1998).

TAXONOMY: Kosaki (1989), Allen *et al.* (1998).

COMMON NAMES: Nahacky's pygmy angelfish.

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island at 25–75 m but only one specimen recorded from Hawai'i as a waif (Kosaki, 1989; Kosaki *et al.*, 1991).

GENERAL RANGE: Johnston Atoll endemic with a waif recorded from the Hawaiian Islands. Engybenitic over rock, rubble, and coral at 25–75 m (Kosaki, 1989; Pyle, 1990b; Allen *et al.*, 1998).

***Centropyge nigriocellus* Woods & Schultz**

*Centropyge nigriocellus* Woods & Schultz in Schultz *et al.*, 1953, p. 607, Fig. 89, Johnston Island, central North Pacific.

*Centropyge nigriocellus* Woods & Schultz, 1953: Woods & Schultz in Schultz *et al.* (1953), Gosline & Brock (1960), Allen (1985a), Tinker (1982), Springer (1982), Randall *et al.* (1985a), Myers (1989), Randall (1992b).

*Centropyge nigriocella* Woods & Schultz, 1953: Allen *et al.* (1998).

TAXONOMY: Allen (1985a), Allen *et al.* (1998). Although recent authors have applied the feminine suffix to the species epithet (in an effort to conform to the feminine gender of the genus *Centropyge*), the name "*nigriocellus*" is treated as a noun, and therefore maintains its original spelling.

COMMON NAMES: Blackspot angelfish (AFS), Ocellated angelfish (Myers, 1999).

HAWAIIAN RECORDS: Johnston Atoll but not the Hawaiian Islands (Woods & Schultz in Schultz *et al.*, 1953; Randall *et al.*, 1985b).

GENERAL RANGE: Central Pacific endemic from Johnston Atoll and the Line, Mariana, Admiralty, Samoan, and Society Islands. Absent from the Hawaiian Islands. Engybenitic in or near reefs and rubble at 4–15 m (Allen, 1985a; Springer, 1982; Myers, 1989; Randall, 1992b; Allen *et al.*, 1998).

***Centropyge potteri* (Jordan & Metz)**

*Holacanthus potteri* Jordan & Metz, 1912, p. 525, pl. 71 (fig. 1), Honolulu, O'ahu, Hawaiian Islands.

*Holacanthus bispinosus* non Günther, 1860 [a valid *Centropyge* species not found in the Hawaiian Islands]: Günther (1874a)?, Jordan & Evermann (1905)?, Fowler (1929)?

*Holacanthus potteri* Jordan & Metz, 1912: Jordan & Metz (1912), Fowler (1928, 1931).

*Centropyge potteri* (Jordan & Metz, 1912): Fowler (1934, 1949), Gosline & Brock (1960), Hobson (1974), Allen (1985a), Tinker (1982), Okamoto & Kanenaka (1984), Randall (1985a, 1996a), Randall *et al.* (1985a, 1993b), Hoover (1993, 2003), Chave & Mundy (1994), Allen *et al.* (1998).

TAXONOMY: Allen (1985a), Allen *et al.* (1998).

COMMON NAMES: Russet angelfish (AFS), Potter's angelfish (Hoover, 1993; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 5–138 m (Jordan & Metz, 1912; Hobson, 1974; Allen, 1985a; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Hoover, 1993; Chave & Mundy, 1994).

GENERAL RANGE: Johnston Atoll and Hawaiian Islands endemic. Engybenitic near reefs and rock at 5–138 m (Allen, 1985a; Chave & Mundy, 1994; Allen *et al.*, 1998).

**[*Chaetodontoplus mesoleucus* (Bloch)]**

*Chaetodon mesoleucus* Bloch, 1787, p. 117, pl. 216 (fig. 2), Japan.

*Holacanthus bicolor* var. *oahuensis* Borodin, 1930: Borodin (1930).

*Chaetodontoplus mesoleucus* (Bloch, 1787): Pyle (2003).

TAXONOMY: Pyle (2003).

COMMON NAMES: Vermiculated angelfish (FAO).

HAWAIIAN RECORDS: Borodin recorded this species from O'ahu, describing it as a new variant of *Centropyge bicolor*. Pyle (2003) examined Borodin's specimen and determined it to be *Chaetodontoplus mesoleucus* (Bloch). Borodin's (1930) record of the species from the Hawaiian Islands was most likely due to a locality error, given the great distance between the natural range of this species (see Allen *et al.*, 1998) and the Hawaiian Islands, the timing of this record prior to the development of the trade in marine



aquarium fishes, and Borodin's (1930) several other unusual records from the Hawaiian Islands of species otherwise unknown from the region (i.e., *Chaetodon vagabundus*, *Choerodon anchorago*, and *Hologymnosus doliatus*). R.L. Pyle (pers. comm., Mar. 2005) observed a solitary individual of this species at Coconut Island in Kāneʻohe Bay, in 1994, which was likely an aquarium release.

GENERAL RANGE: Western Pacific and extreme eastern Indian Ocean endemic, from southern Japan through the South China Sea, Indonesia, and northern Australia eastward to Palau and the Solomon Islands. Engybenthic at inner coral lagoons and sheltered coastal coral reefs, usually at 1–20 m (Allen *et al.*, 1998).

### ***Genicanthus personatus* Randall**

*Genicanthus personatus* Randall, 1975a, p. 418, pl. 1, off Magic Island, Honolulu, Oʻahu, Hawaiian Islands.

*Genicanthus personatus* Randall, 1975a: Randall (1975a, 1980a, 1985a, 1996a), Allen (1985a), Tinker (1982), Uchida & Uchiyama (1986), Hoover (1993, 2003), Randall *et al.* (1993b), Chave & Mundy (1994), Allen *et al.* (1998).

TAXONOMY: Allen (1985a), Allen *et al.* (1998).

COMMON NAMES: Masked angelfish (AFS; Hoover, 1993; Randall, 1996a).

HAWAIIAN RECORDS: Hawaiʻi Island to Midway at 20–174 m, occurring shallower at Midway than in the main Hawaiian Islands (Randall, 1975a; Uchida & Uchiyama, 1986; Randall *et al.*, 1993b; Hoover, 1993; Chave & Mundy, 1994).

GENERAL RANGE: Hawaiian Islands endemic. Engybenthic over reefs, rock, and sand at 20–174 m (Allen, 1985a; Chave & Mundy, 1994; Allen *et al.*, 1998).

### [*Genicanthus* sp.]

*Genicanthus* sp.: Randall *et al.* (1985a).

TAXONOMY: Randall *et al.* (1985b).

HAWAIIAN RECORDS: Randall *et al.* (1985b) recorded a *Genicanthus* species from Johnston Atoll at 128 m and repeated a suggestion that it was not a known species from the genus. The validity of this suggestion remains unconfirmed.

GENERAL RANGE: Unknown.

### ***Pomacanthus imperator* (Bloch)**

*Chaetodon imperator* Bloch, 1787, p. 51, pl. 194, Japan.

*Pomacanthus imperator* Bloch, 1787: Brock (1948b), Gosline & Brock (1960), Steene (1985), Allen (1985a), Tinker (1982), Heemstra (1984), Randall (1985a, 1987c, 1996a), Myers (1989), Randall *et al.* (1990a, 1997a), Allen *et al.* (1998).

TAXONOMY: Allen (1985a), Allen *et al.* (1998).

COMMON NAMES: Emperor angelfish (AFS; Randall *et al.*, 1997a; Hoover, 1993).

HAWAIIAN RECORDS: Oʻahu at 27 m. This species is known in the Hawaiian Islands from only three records (Brock, 1948; Gosline & Brock, 1960; Randall, 1985a, 1996a). These may have been released aquarium fish (see Randall, 1987b), although one sighting was of a juvenile, which suggests that *P. imperator* may recruit naturally to the Hawaiian Islands as waifs (Randall, 1985a).

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to Australia, southern Japan, the Ogasawara Islands, Micronesia, the Hawaiian Islands, the Society Islands, Tuamotu Archipelago, and Pitcairn. Engybenthic over or near reefs at 1–70 m (Steene, 1985; Allen, 1985a; Heemstra, 1984; Myers, 1989; Randall *et al.*, 1990a, 1997b; Allen *et al.*, 1998).

### [*Pomacanthus semicirculatus* (Cuvier)]

*Holacanthus semicirculatus* Cuvier in Cuvier & Valenciennes, 1831, p. 191, pl. 183, Timor, Bourou, Waigeo [Waigiou], Indonesia, and Port Praslin, New Ireland I., Bismarck Archipelago.

*Pomacanthus semicirculatus* (Cuvier in Cuvier & Valenciennes, 1831): Randall *et al.* (1997a), Allen *et al.* (1998), Myers (1999).

TAXONOMY: Allen *et al.* (1998).

COMMON NAMES: Semicircle angelfish (AFS; Randall *et al.*, 1997a; Allen *et al.*, 1998; Myers, 1999), Koran angelfish (FAO).

**HAWAIIAN RECORDS:** A single, large *Pomacanthus semicirculatus* was observed in 2001–2002 and videotaped by Scott Makoto (Scott Makoto Divers) off Wai‘anae, O‘ahu, at ca. 60 m. There are no other records of this species from the region and it seems likely that this individual was released from the aquarium trade or hobby (A. Suzumoto, pers. comm., Jan. 2004).

**GENERAL RANGE:** Indo-Pacific from East Africa, the Seychelles, and the Maldives to Indonesia, northwestern Australia, southern Japan, the Great Barrier Reef, Palau, and Samoa. Engybenitic over coral reefs at 1–40 m, with an introduced specimen in the Hawaiian Islands reported from ca. 60 m. Juveniles are found in shallow protected reefs with mixed sand and reef bottoms, while adults occur in deeper water of protected reefs, often at caves or wrecks (Allen *et al.*, 1998; Myers, 1999).

[*Pygoplites diacanthus* (Boddaert)]

*Chaetodon diacanthus* Boddaert, 1772, pl. 9, Ambon Island, Moluccas Islands, Indonesia.

*Pygoplites diacanthus* (Boddaert, 1772): Allen *et al.* (1998).

**TAXONOMY:** Allen *et al.* (1998).

**COMMON NAMES:** Regal angelfish (AFS; Randall *et al.*, 1997a; Myers, 1999).

**HAWAIIAN RECORDS:** A single individual was seen several times in 1997 at ca. 19 m off the western side of Kewalo Beach Park, Honolulu, O‘ahu, (J. Kane, pers. comm., Dec. 1997). It is assumed that this was an aquarium release.

**GENERAL RANGE:** Indo-Pacific from South Africa and the Red Sea to Indonesia, northern Australia, New Caledonia, southern Japan, Micronesia to the Gilbert Islands, and French Polynesia. Engybenitic over coral reefs at 1–48 m (Allen *et al.*, 1998).

### Pentacerotidae — Armorheads

*Evistias acutirostris* (Temminck & Schlegel)

*Histiopaterus acutirostris* Temminck & Schlegel, 1844, p. 88, Nagasaki, Japan.

*Histiopaterus typus* non Temminck & Schlegel, 1844 [a valid species not found in the Hawaiian Islands]: Jordan & Jordan (1922), Fowler (1928, 1949), Gosline & Brock (1960), Clarke (1972), Tinker (1982), Okamoto & Kanenaka (1984), Uchida & Uchiyama (1986).

*Histiopaterus acutirostris* Temminck & Schlegel, 1844: Struhsaker (1973a).

*Evistias acutirostris* (Temminck & Schlegel, 1844): Randall (1981a, 1996a), Hardy (1983a), Masuda *et al.* (1984), Hoover (1993, 2003), Kuitert (1993), Randall *et al.* (1993b, 1997a), Chave & Mundy (1994).

**TAXONOMY:** Hardy (1983a).

**COMMON NAMES:** Striped boarfish (AFS), Whiskered boarfish (Hoover, 1993, 2003), Whiskered armorhead (Randall, 1996a).

**HAWAIIAN RECORDS:** Hawai‘i Island to Kure Atoll at 18–183 m, occurring shallower in the Northwestern Hawaiian Islands than the main islands (Jordan & Jordan, 1922; Clarke, 1972; Struhsaker, 1973a; Okamoto & Kanenaka, 1984; Uchida & Uchiyama, 1986; Randall *et al.*, 1993b; Hoover, 1993; Chave & Mundy, 1994).

**GENERAL RANGE:** Subtropical, anti equatorial Pacific endemic known from Japan, the Ogasawara Islands, the Hawaiian Islands, New Zealand, and Lord Howe Island. Engybenitic over rocks, reef, and sand at 18–193 m (Randall, 1982; Hardy, 1983a; Masuda *et al.*, 1984; Hoover, 1993; Kuitert, 1993; Chave & Mundy, 1994; Randall *et al.*, 1997b).

*Pentaceros japonicus* Döderlein

*Pentaceros japonicus* Steindachner, 1883b, p. 124, Tokyo, Japan.

*Pentaceros japonicus* Döderlein in Steindachner & Döderlein, 1883: Borets & Sokolovsky (1978), Novikov *et al.* (1981), Mochizuki in Okamura *et al.* (1982), Hardy (1983a), Humphreys *et al.* (1984), Machida in Okamura *et al.* (1985), Borets (1986), Mundy & Moser (1997), Randall *et al.* (1997a).

**TAXONOMY:** Hardy (1983a).

**COMMON NAMES:** Japanese armorhead (AFS).

**HAWAIIAN RECORDS:** The Hancock Koko seamounds at 1 m (juveniles) and 290–830 m (adults) (Hardy, 1983a; Humphreys *et al.*, 1984; Borets, 1986; Mundy & Moser, 1997). Only one specimen has been recorded from within the Hawaiian EEZ, so this species might be considered a waif in the region.

**GENERAL RANGE:** Western and central North Pacific endemic from Japan, Korea, the Okinawa Trough, the

Kyushu-Palau Ridge, the Ogasawara Islands and the Emperor Seamounts. Juveniles pelagic, adults engybenthic at 100–830 m (Mochizuki *in* Okamura *et al.*, 1982; Hardy, 1983a; Machida *in* Okamura *et al.*, 1985; Borets, 1986; Mundy & Moser, 1997; Randall *et al.*, 1997b).

***Pseudopentaceros wheeleri* Hardy**

*Pseudopentaceros wheeleri* Hardy, 1983a, p. 209, Fig. 11, Kinmei Seamount, Emperor Seamounts, central North Pacific.

*Pentaceros richardsoni* non Smith, 1844 [a valid Southern Hemisphere *Pseudopentaceros* species]: Borets & Sokolovsky (1978), Novikov *et al.* (1981), Randall (1980a), Humphreys *et al.* (1984), Borets (1986).

*Pseudopentaceros pectoralis* Hardy, 1983a: Hardy (1983a).

*Pseudopentaceros wheeleri* Hardy, 1983a: Hardy (1983a), Uchida & Uchiyama (1986), Boehlert & Sasaki (1988), Humphreys *et al.* (1989), Mundy & Moser (1997), Randall *et al.* (1997a).

TAXONOMY: Humphreys *et al.* (1989b).

COMMON NAMES: Slender armorhead (AFS), Longfin armorhead (AFS), Pelagic armorhead.

HAWAIIAN RECORDS: Necker to the Hancock and Koko seamounts at 150–500 m (adults) and near the surface (juveniles) (Borets & Sokolovsky, 1978; Randall, 1981a; Humphreys *et al.*, 1984; Borets, 1986; Uchida & Uchiyama, 1986; Boehlert & Sasaki, 1988; Mundy & Moser, 1997).

GENERAL RANGE: North Pacific endemic; pelagic juveniles known from Japan and the Ogasawara Islands to the Aleutians and California, adults known from Japan, the Emperor Seamounts, the Northwestern Hawaiian Islands, and California. Juveniles epipelagic near the surface, adults engybenthic at 146–500 m (Hardy, 1983a; Borets, 1986; Boehlert & Sasaki, 1988; Randall *et al.*, 1997b).

## Kyphosidae — Sea chubs

***Girella leonina* (Richardson)**

*Crenidens leoninus* Richardson, 1846, p. 242, Canton, China.

*Girella leonina* (Richardson, 1846): Yagishita & Nakabo (2000), Randall & Stender (2002).

TAXONOMY: Yagishita & Nakabo (2000). Nelson (1994) included *Girella* in the Kyphosidae but Johnson & Fritzsche (1989) and Yagishita & Nakabo (2000) recognized the Girellidae as a distinct family.

HAWAIIAN RECORDS: Midway at 1–15 m. The few specimens recorded from the Hawaiian Islands in 1999 and 2000 are thought to have been waifs from the western North Pacific (Randall & Stender, 2002).

GENERAL RANGE: A western North Pacific endemic occurring as waifs in the central North Pacific. Recorded from the Hong Kong, Taiwan, the Ryukyus, the southern Korean Peninsula, southern and central Japan, and the Ogasawara Islands, with waifs at the Northwestern Hawaiian Islands. Benthopelagic at 1–15 m (Yagishita & Nakabo, 2000; Randall & Stender, 2002).

***Kyphosus cinerascens* (Forsskål)**

*Sciaena cinerascens* Forsskål, 1775, p. 53, Red Sea [see Eschmeyer, 1998 for comments on the names in Forsskål's description].

*Kyphosus lembus* non (Cuvier *in* Cuvier & Valenciennes, 1831) [a junior synonym of *Kyphosus vaigiensis* (Quoy & Gaimard, 1825), a valid species also found in the Hawaiian Islands]: Fowler (1928, 1931, 1949) in part?

*Kyphosus cinerascens* (Forsskål, 1775): Fowler (1928, 1931, 1934, 1949), Randall (1980a, 1985a, 1996a), Tinker (1982 appendix), Masuda *et al.* (1984), Randall *et al.* (1985a, 1993b, 1997a), Smith *in* Smith & Heemstra (1986), Myers (1989), Kuitert (1993), Hoover (1994, 2003).

TAXONOMY: Smith *in* Smith & Heemstra (1986).

COMMON NAMES: Nenu (Hoover, 1994, 2003; Randall, 1996a), Snubnose chub, Highfin chub (Hoover, 1994, 2003; Randall, 1996a), Highfin rudderfish (Myers, 1999), Topsail drummer (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Johnston Atoll and O'ahu to Midway, probably throughout the archipelago, at 1–3 m (Randall, 1981a; Randall *et al.*, 1985b, 1993b; Hoover, 1994).

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, and the Tuamotu Archipelago. Benthopelagic at 1–24 m, juveniles associated with floating material (Masuda *et al.*, 1984; Smith *in* Smith & Heemstra, 1986; Myers, 1989; Kuitert, 1993; Randall *et al.*, 1997b).

***Kyphosus hawaiiensis* Sakai & Nakabo**

*Kyphosus hawaiiensis* Sakai & Nakabo, 2004, p. 24, Fig. 3, Moloka'i, Hawaiian Islands.

*Pimelepterus fuscus* non (Lacépède, 1803) [a synonym of *Kyphosus bigibbus*, a valid species not found in the Hawaiian Islands]: Steindachner (1900, in part)?

*Kyphosus elegans* non (Peters, 1869) [a valid eastern Pacific species]: Jenkins (1903, in part)?, Snyder (1904, in part)?

*Kyphosus sandwicensis* non (Sauvage, 1880) [a valid species also found in the Hawaiian Islands]: Jordan & Evermann (1905).

*Kyphosus fuscus* non (Lacépède, 1803): Jordan & Evermann (1905, in part)?, Fowler (1928, in part?, 1931, in part?, 1949, in part)?

*Kyphosus cinerascens* non (Forsskål, 1775) [a valid species also found in the Hawaiian Islands]: Gosline & Brock (1960, in part)?, Hobson (1974, in part)?, Tinker (1982, in part)?, Okamoto & Kanenaka (1984, in part)?

*Kyphosus bigibbus* non Lacépède, 1801 [a valid species not found in the Hawaiian Islands]: Fowler (1934, in part)?, Randall (1980a, in part?, 1985a, in part?, 1996a, in part)?, Randall *et al.* (1985a, in part?, 1993b, in part)?, Uchida & Uchiyama (1986, in part)?, Hoover (1993, in part?, 2003, in part)?

*Kyphosus hawaiiensis* Sakai & Nakabo, 2004: Sakai & Nakabo (2004), Randall (2004a).

**TAXONOMY:** Sakai & Nakabo (2004), Randall (2004a). The regional synonymy given above is uncertain due to the recent description of this species and its previous confusion with other species, particularly *K. bigibbus* Lacépède, 1801.

**COMMON NAMES:** Nenuë (Hoover, 1993, 2003; Randall, 1996a), Enenuë, Nenuë pāiii, Manaloa, Hawaiian chub (Randall, 2004a), Insular rudderfish, Gray chub (Randall, 1996a; Myers, 1999; Hoover, 2003), Brown chub (Hoover, 1993, 2003), Gray rudderfish (Myers, 1999) – the last three names applied to the species when it was thought to be conspecific with *K. bigibbus*.

**HAWAIIAN RECORDS:** Moloka'i to at least as far north as Lisianski from 1 m to unknown depths (Sakai & Nakabo, 2004; Randall, 2004a), but probably throughout the emergent islands. Of the two species in the Hawaiian Islands previously recognized as *K. bigibbus*, *K. hawaiiensis* is the less common, more territorial species that often has a light anterior body or mid-body bar, and a darker posterior body (J. Hoover, [http://www.hawaiiifishes.com/fish\\_of\\_month/past\\_fom/fom\\_05\\_04.htm](http://www.hawaiiifishes.com/fish_of_month/past_fom/fom_05_04.htm) May 2004, viewed 15 March 2005).

**GENERAL RANGE:** Central Pacific endemic known only from the Hawaiian and Line Islands (Washington Island). Benthopelagic in shallow water, from 1 m to unknown depths, in the surge zone near coral and rocky reefs (Sakai & Nakabo, 2004; Randall, 2004a).

***Kyphosus sandwicensis* (Sauvage)**

*Pimelepterus sandwicensis* Sauvage, 1880, p. 221 [11], Hawaiian Islands: Sauvage (1880).

*Pimelepterus sandwicensis* Sauvage, 1880: Sauvage (1880).

*Pimelepterus fuscus* non (Lacépède, 1803) [a synonym of *Kyphosus bigibbus*, a valid species not found in the Hawaiian Islands]: Steindachner (1900, in part)?

*Kyphosus elegans* non (Peters, 1869) [a valid eastern-Pacific species]: Jenkins (1903, in part)?, Snyder (1904, in part)?

*Kyphosus fuscus* non (Lacépède, 1803): Jordan & Evermann (1905, in part)?, Fowler (1928, in part?, 1931, in part?, 1949, in part)?

*Kyphosus cinerascens* non (Forsskål, 1775) [a valid species also found in the Hawaiian Islands]: Gosline & Brock (1960, in part), Hobson (1974, in part), Tinker (1982, in part), Okamoto & Kanenaka (1984, in part).

*Kyphosus bigibbus* non Lacépède, 1801 [a valid species not found in the Hawaiian Islands]: Fowler (1934), Randall (1980a, 1985a, 1996a, in part), Masuda *et al.* (1984, in part), Randall *et al.* (1985a, in part, 1993b, in part, 1997a, in part), Uchida & Uchiyama (1986, in part), Myers (1989, in part), Hoover (1993, in part, 2003, in part).

*Kyphosus pacificus* Sakai & Nakabo, 2004: Sakai & Nakabo (2004).

*Kyphosus sandwicensis* (Sauvage, 1880) [a valid species also found in the Hawaiian Islands]: Randall (2004a).

**TAXONOMY:** Sakai & Nakabo (2004), Randall (2004a). The assertion that *K. sandwicensis* (Sauvage) is the senior synonym of *K. pacificus* Sakai & Nakabo was made in a popular article (Randall, 2004a) and needs further corroboration in a more detailed paper that directly compares the types of the two nominal species. The California Academy of Science Catalog of Fishes website lists *K. sandwicensis* (Sauvage) as a junior synonym of *K. cinerascens* (Forsskål) (<http://www.calacademy.org/research/ichthyology/catalog/fishcatmain.asp> updated on 14 Jan. 2005, viewed 15 March 2005).

COMMON NAMES: Nenuë (Hoover, 1993, 2003; Randall, 1996a), Eneue, Nenuë piii, Manaloa, Pacific chub (Randall, 2004a), Gray chub (Randall, 1996a; Myers, 1999; Hoover, 2003), Brown chub (Hoover, 1993, 2003), Gray rudderfish (Myers, 1999), Insular rudderfish – the last four names applied to the species when it was thought to be conspecific with *K. bigibbus*.

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 1–42 m (Sauvage, 1880; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall, 1985a, 1993b; Uchida & Uchiyama, 1986). Randall (1980a, 2004a) commented on the status of the four species of *Kyphosus* found in the Hawaiian Islands. It is possible that the two species listed by Jordan & Evermann (1905) refer to two or three of these species rather than to a single species as suggested by Gosline & Brock (1960). Of the two recently recognized Hawaiian Islands *Kyphosus* species previously called *K. bigibbus*, *K. sandwicensis* is the more common, uniformly colored species that often forms large mobile aggregations (Randall, 2004a).

GENERAL RANGE: A Pacific endemic, mainly antiequatorial, from southern Japan, the Ogasawara Islands, and the Great Barrier Reef of Australia, through Micronesia to the Hawaiian Islands, the Tuamotu Archipelago, and Rapa. Benthopelagic at 1–42 m, juveniles associated with floating material (Masuda *et al.*, 1984; Randall *et al.*, 1985b, 1993b, 1997b; Uchida & Uchiyama, 1986; Myers, 1989; Sakai & Nakabo, 2004; Randall, 2004a).

### *Kyphosus vaigiensis* (Quoy & Gaimard)

*Pimelepterus vaigiensis* Quoy & Gaimard, 1825, p. 386, pl. 62, Waigeo [Waigiou], Indonesia.

*Kyphosus vaigiensis* (Quoy & Gaimard, 1825): Fowler (1928, 1931, 1934, 1949), Randall (1980a, 1985a, 1996a), Tinker (1982 appendix), Randall *et al.* (1985a), Smith *in* Smith & Heemstra (1986), Myers (1989), Randall *et al.* (1993b), Kuitert (1993), Hoover (1994, 2003), Sakai & Nakabo (1995), Randall *et al.* (1997a).

TAXONOMY: Randall (1981a).

COMMON NAMES: Nenuë (Hoover, 1994, 2003; Randall, 1996a), Brassy chub (AFS; Hoover, 1994, 2003; Myers, 1999), Lowfin chub (Hoover, 1994, 2003; Randall, 1996a), Lowfin rudderfish (Myers, 1999), Long-finned drummer (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Johnston Atoll and O'ahu to Midway, probably throughout the archipelago, at 1 m (Randall, 1981a; Randall *et al.*, 1985b, 1993b; Hoover, 1994).

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to Australia, southern Japan, the Ogasawara Islands, Micronesia, the Hawaiian Islands, the Tuamotu Archipelago, and Rapa. Benthopelagic, juveniles associated with floating material (Smith *in* Smith & Heemstra, 1986; Myers, 1989; Kuitert, 1993; Sakai & Nakabo, 1995; Randall *et al.*, 1997b).

### *Microcanthus strigatus* (Cuvier)

*Chaetodon strigatus* Cuvier *in* Cuvier & Valenciennes, 1831, p. 25, pl. 170, Japan.

*Chaetodon strigatus* Cuvier, 1831: Günther (1874a).

*Microcanthus hawaiiensis* Fowler, 1941: Fowler (1941, 1949).

*Microcanthus strigatus* (Cuvier, 1831): Jenkins (1903), Jordan & Snyder (1904a), Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Struhsaker (1973a), Randall (1981a, 1985a, 1996a), Tinker (1982), Matsuura *in* Okamura *et al.* (1984), Hoover (1993, 2003), Kuitert (1993), Randall *et al.* (1997a).

TAXONOMY: Randall (1985a). Nelson (1994) is followed here for inclusion of *Microcanthus* in the Kyphosidae but Johnson (1984) and Johnson & Fritzsche (1989) recognized the Microcanthidae as a distinct family. Kuitert (1993) suggested that the northern and southern populations might be separate species. Even if this is true, the name for the northern populations would be unchanged because the type specimen of *M. strigatus* was from Japan.

COMMON NAMES: Stripey (AFS; Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Hawai'i Island to O'ahu at 1–128 m (Günther, 1874; Jordan & Evermann, 1905; Fowler, 1931; Struhsaker, 1973a; Tinker, 1982; Randall, 1985a).

GENERAL RANGE: Pacific endemic, antiequatorial, from Japan, Taiwan and the Ogasawara Islands to the Hawaiian Islands in the north and New Caledonia and Australia to Lord Howe Island in the south. Engyberthentic in over mud and sand in turbid areas, occasionally over reefs and rock, at 1–140 m (Randall, 1982, 1985a; Matsuura *in* Okamura *et al.*, 1984; Hoover, 1993; Kuitert, 1993; Randall *et al.*, 1997b).

***Sectator ocyurus*** (Jordan & Gilbert)

*Pimelepterus ocyurus* Jordan & Gilbert, 1882c, p. 327, Panama Bay, eastern tropical Pacific.

*Sectator azureus* Jordan & Evermann, 1903: Jordan & Evermann (1903a, 1905), Fowler (1928, 1934, 1949), Gosline & Brock (1960 text), Tinker (1982).

*Sectator ocyurus* (Jordan & Gilbert, 1882c): Gosline & Brock (1960 appendix), Randall (1961b, 1996a), Fujita *et al.* (1984), Masuda *et al.* (1984), Randall *et al.* (1985a), Uchida & Uchiyama (1986), Allen & Robertson (1994), Robertson & Allen (2002).

TAXONOMY: Randall (1961b), Fujita *et al.* (1984).

COMMON NAMES: Bluestriped chub (AFS), Rainbow chub.

HAWAIIAN RECORDS: O'ahu to Laysan at 18 m (Jordan & Evermann, 1903, 1905; Uchida & Uchiyama, 1986). Randall (1985a) suggested that Hawaiian specimens are waifs from the eastern Pacific.

GENERAL RANGE: Eastern and central South Pacific endemic with resident populations at the Marquesas, all of the offshore eastern tropical Pacific islands, and Baja California to Peru. Waifs have been recorded from southern Japan, the Hawaiian Islands, Baker Island, the Society Islands, and southern California. Epipelagic, often near floating objects, and benthopelagic at 1–18 m (Randall, 1961b; Fujita *et al.*, 1984; Masuda *et al.*, 1984; Uchida & Uchiyama, 1986; Allen & Robertson, 1994; Robertson & Allen, 2002).

**Kuhliidae — Flagtails, Aholeholes****[*Kuhlia rupestris* (Lacépède)]**

*Centropomus rupestris* Lacépède, 1802, p. 252, 273, Gol Ravine, Réunion Island, western Indian Ocean.

*Kuhlia rupestris* (Lacépède, 1802): Brock (1960), Tinker (1982), Maciolek (1984), Masuda *et al.* (1984), Smith *in* Smith & Heemstra (1986), Randall (1987a, 1996a), Myers (1989), Paxton *et al.* (1989), Allen (1991b), Randall *et al.* (1997a), Randall & Randall (2001).

TAXONOMY: Smith *in* Smith & Heemstra (1986), Allen (1991b), Randall & Randall (2001).

COMMON NAMES: Rock flagtail (Myers, 1999), Jungle perch.

HAWAIIAN RECORDS: Introduced to O'ahu in 1957 and in 1958 but not established (Brock, 1960; Maciolek, 1984; Randall, 1987a). Randall & Randall (2001) did not mention these translocations but did discuss a failed attempt to bring *K. malo* (Valenciennes, 1831) to the Hawaiian Islands from Tahiti in 1958 (the fish died en route and thus were never introduced here). The records of *K. rupestris* translocations by Brock (1960), cited later by Maciolek (1984) and Randall (1987) clearly stated that those fish were brought from Guam, corroborating the identification.

GENERAL RANGE: Indo-Pacific from South Africa to the Ryukyu and Ogasawara Islands, Australia, Micronesia, and Samoa. Engybenthic in shallow, coastal freshwaters, estuaries, and turbid neritic areas (Masuda *et al.*, 1984; Smith *in* Smith & Heemstra, 1986; Randall, 1987a; Myers, 1989; Paxton *et al.*, 1989; Allen, 1991b; Randall *et al.*, 1997b; Randall & Randall, 2001).

***Kuhlia sandvicensis*** (Steindachner)

*Moronopsis argenteus* var. *sandvicensis* Steindachner, 1876, p. 206, "Hawaiian Islands".

*Kuhlia taeniura* non (Cuvier *in* Cuvier & Valenciennes, 1829) [a junior synonym of *K. mugil* (Forster, 1801), a valid species not found in the Hawaiian Islands]: Smith & Swain (1882), Jordan & Evermann (1905, in part), Fowler (1928, in part), Tinker (1982) in part?

*Moronopsis argenteus* var. *sandvicensis* Steindachner, 1876: Steindachner (1876).

*Moronopsis sandvicensis* Steindachner, 1876: Steindachner (1887).

*Kuhlia malo* non (Valenciennes *in* Cuvier & Valenciennes, 1831) [a valid French Polynesian endemic species not found in the Hawaiian Islands]: Fowler (1900), Steindachner (1900), Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Jordan & Jordan (1922) all in part.

*Kuhlia marginata* non (Cuvier *in* Cuvier & Valenciennes, 1829) [a valid species not found in the Hawaiian Islands or Johnston Atoll]: Gosline (1955), Randall (1973, 1996a), Tinker (1982), Randall *et al.* (1985a).

*Kuhlia sandvicensis* (Steindachner, 1876): Fowler (1928), Gosline (1965), Gosline & Brock (1960), Hobson (1974), Tinker (1982), Okamoto & Kanenaka (1984), Randall (1985a, 1996a), Randall *et al.* (1985a, 1993b), Uchida & Uchiyama (1986), Hoover (1993) — all in part? [See note under Taxonomy, below], Randall & Randall (2001), Hoover (2003).

TAXONOMY: Randall & Randall (2001). It cannot be determined if specimens of *K. sandvicensis* (Steindachner, 1876) mentioned by authors prior to 2001 were that species, *K. xenurus* (Jordan &

Gilbert, 1882), or a mixture of both species, but according to Randall & Randall (2001) *K. sandvicensis* is the less common of the two species in Hawaiian waters, making it likely that most references to *K. sandvicensis* actually refer to *K. xenurus*.

COMMON NAMES: “The other Āholehole”.

HAWAIIAN RECORDS: Johnston Atoll and unspecified locations in the Hawaiian Islands (Smith & Swain, 1882; Randall, 1973; Randall & Randall, 2001).

GENERAL RANGE: Central Pacific endemic from the Marshall Islands to the Society Islands, Johnston Atoll, and the Hawaiian Islands. Engyebenthic in shallow coastal and brackish waters (Randall & Randall, 2001).

### *Kuhlia xenura* (Jordan & Gilbert)

*Xenichthys xenurus* Jordan & Gilbert, 1882b, p. 454, San Salvador, El Salvador [an erroneous type locality].

*Dules marginatus* non Cuvier in Cuvier & Valenciennes, 1829 [a valid *Kuhlia* species not found in the Hawaiian Islands or Johnston Atoll]: Günther (1873–1910, 1880, in part), Fowler (1949, in part).

*Moronopsis marginatus* non (Cuvier, 1829): Streets (1877).

*Xenichthys xenurus* Jordan & Gilbert, 1882b: Jordan & Gilbert (1882) with a false locality record.

*Kuhlia malo* non (Valenciennes in Cuvier & Valenciennes, 1831) [a valid French Polynesian endemic species not found in the Hawaiian Islands]: Boulenger (1895), Steindachner (1900), Fowler (1900), Jenkins (1903), Snyder (1904), Jordan & Evermann (1905) (all in part?).

*Kuhlia taeniura* non (Cuvier in Cuvier & Valenciennes, 1829) [a junior synonym of *K. mugil* (Forster, 1801), a valid species not found in the Hawaiian Islands]: Jordan & Evermann (1905) in part?

*Kuhlia marginata* non (Cuvier, 1829) [a valid species not found in the Hawaiian Islands]: Fowler (1928, in part).

*Kuhlia rupestris* non (Lacépède, 1802) [a valid species not found in the Hawaiian Islands]: Fowler (1928, in part).

*Dules rupestris* non (Lacépède, 1802): Fowler (1949, in part).

*Dules sandvicensis* non (Steindachner, 1876) [a valid *Kuhlia* species that also occurs in the Hawaiian Islands]: Fowler (1931, 1934, 1949 in part).

*Kuhlia sandvicensis* non (Steindachner, 1876): Fowler (1928), Gosline & Brock (1960), Gosline (1965), Hobson (1974), Tinker (1982), Okamoto & Kanenaka (1984), Randall (1985a, 1996a), Randall *et al.* (1985a, 1993b), Uchida & Uchiyama (1986), Hoover (1993), Yamamoto & Tagawa (2000).

*Kuhlia xenura* (Jordan & Gilbert, 1882b): Randall & Randall (2001), Hoover (2003).

TAXONOMY: Randall & Randall (2001). See comment for *K. sandvicensis*.

COMMON NAMES: Āholehole (Hoover, 1993, 2003; Randall, 1996a), Hawaiian flagtail (Hoover, 1993, 2003; Randall, 1996a), Mountain bass (DLNR).

HAWAIIAN RECORDS: Hawai‘i Island to Kure Atoll at 1–22 m, usually at 1–5 m, and in tide- and splash-pools to elevations of 5 m above sea level (Günther, 1873–1910; Steindachner, 1900; Gosline, 1965; Hobson, 1974; Okamoto & Kanenaka, 1984; Uchida & Uchiyama, 1986; Randall *et al.*, 1993b; Randall & Randall, 2001).

GENERAL RANGE: A Hawaiian Islands endemic, absent from Johnston Atoll. Engyebenthic in brackish water, tide pools, over sand, and near rocks and reef in estuaries, back-reefs, or areas of strong surge from 5 m above sea level to 22 m, usually at 1–5 m (Jordan & Evermann, 1905; Gosline, 1965; Hobson, 1974; Randall, 1985a; Randall *et al.*, 1985b; Randall & Randall, 2001).

## Oplegnathidae — Knifejaws

### *Oplegnathus fasciatus* (Temminck & Schlegel)

*Scaradon fasciatus* Temminck & Schlegel, 1844, p. 89, pl. 46 (figs. 1–2), Nagasaki, Japan.

*Hoplegnathus fasciatus* (Temminck & Schlegel, 1844): Steindachner (1893), Gosline & Brock (1960).

*Oplegnathus fasciatus* (Temminck & Schlegel, 1844): Fowler (1928), Hobson (1980), Okamoto & Kawamoto (1980), Tinker (1982), Araga in Masuda *et al.* (1984), Randall *et al.* (1993b, 1997b), Randall (1996a), Hoover (2003).

TAXONOMY: Araga in Masuda *et al.* (1984).

COMMON NAMES: Barred knifejaw (Randall, 1996a; Hoover, 2003).

HAWAIIAN RECORDS: Hawai‘i Island to Kure Atoll at 1–10 m, rare in the main Hawaiian Islands (Steindachner, 1893; Hobson, 1980; Okamoto & Kawamoto, 1980; Randall *et al.*, 1993b). Tinker

(1982) suggested that Steindachner's (1893) report was based on a mislabeled specimen. Steindachner (1893) did not give a collection locality for his specimen, but only mentioned the collector, Pillwax, who had collected in the Hawaiian Islands but other locales as well. Nevertheless, subsequent records verified the occurrence of *O. fasciatus* in the Hawaiian Islands (Randall *et al.*, 1993b).

GENERAL RANGE: Western and central North Pacific endemic from Japan, the Ogasawara Islands and the Hawaiian Islands. Engyberthic at 1–10 m, juveniles associated with floating material (Araga *in* Masuda *et al.*, 1984; Randall *et al.*, 1993b, 1997b).

***Oplegnathus punctatus* (Temminck & Schlegel)**

*Scaradon punctatus* Temminck & Schlegel, 1844, p. 91, Nagasaki, Japan.

*Oplegnathus punctatus* (Temminck & Schlegel, 1844): Hobson (1980), Okamoto & Kawamoto (1980), Okamoto & Kanenaka (1984), Araga *in* Masuda *et al.* (1984), Randall *et al.* (1985a, 1993b, 1997b), Machida *in* Okamura *et al.* (1985), Myers (1989), Puleloa (1994), Hoover (1994, 2003), Randall (1996a), Myers & Donaldson (1996).

TAXONOMY: Araga *in* Masuda *et al.* (1984).

COMMON NAMES: Spotted knifejaw (Hoover, 1994, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 3–46 m, more abundant in the Northwestern Hawaiian Islands than in the main Hawaiian Islands (Hobson, 1980; Okamoto & Kawamoto, 1980; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Puleloa, 1994; Hoover, 1994).

GENERAL RANGE: Western and central North Pacific endemic from Japan, the Ogasawara Islands, the South China Sea, the Marianas, and the Hawaiian Islands. Benthopelagic at 3–135 m, juveniles associated with floating material (Araga *in* Masuda *et al.*, 1984; Machida *in* Okamura *et al.*, 1985; Myers, 1989; Puleloa, 1994; Myers & Donaldson, 1996; Randall *et al.*, 1997b).

## Cirrhitidae

### Cirrhitidae — Hawkfishes

***Amblycirrhitus bimacula* (Jenkins)**

*Cirrhitodea bimacula* Jenkins, 1903, p. 489, Fig. 36, Honolulu, O'ahu, Hawaiian Islands.

*Cirrhitodea bimacula* Jenkins, 1903: Jenkins (1903), Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960).

*Amblycirrhitus bimacula* (Jenkins, 1903): Tinker (1982), Randall (1985a, 1996a), Randall *et al.* (1985a, 1990a, 1993b), Randall *in* Smith & Heemstra (1986), Donaldson (1986), Myers (1989), Hoover (2003).

TAXONOMY: Randall *in* Smith & Heemstra (1986), Donaldson (1986).

COMMON NAMES: Piliko'a (Randall, 1996a), Twospot hawkfish (Randall, 1996a; Hoover, 2003), Twinspot hawkfish (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Johnston Atoll and O'ahu to Midway at 8 m (Jenkins, 1903; Jordan & Evermann, 1905; Randall *et al.*, 1985b, 1993b).

GENERAL RANGE: Indo-Pacific from South Africa to Japan, Australia, Micronesia, the Hawaiian Islands, and French Polynesia. Benthic in coral, rubble, and rock at 2–15 m (Randall, 1985a; Randall *in* Smith & Heemstra, 1986; Donaldson, 1986; Myers, 1989; Randall *et al.*, 1990a, 1993b).

[*Cirrhitichthys falco* Randall]

*Cirrhitichthys falco* Randall, 1963, p. 435, pl. 13 (fig. 2), Davao Gulf, Mindanao, Philippines.

*Cirrhitichthys aprinus* non (Cuvier *in* Cuvier & Valenciennes, 1829): Chapman & Schultz (1952), Gosline & Brock (1960)?, Tinker (1982)?

*Cirrhitichthys serratus* Randall, 1963: Randall (1963, 1976a), Springer (1982), Donaldson (1986).

*Cirrhitichthys falco* Randall, 1963: Randall (1963, 1997), Springer (1982), Donaldson (1986), Myers (1989), Kuiter (1993), Randall *et al.* (1990a, 1997a).

TAXONOMY: Randall (1963, 1997).

COMMON NAMES: Spotted hawkfish, Falco hawkfish (Myers, 1999), Dwarf hawkfish (Randall *et al.*, 1997a), Boar hawkfish, Blotched hawkfish.



HAWAIIAN RECORDS: According to Randall (1997), *Cirrhichthys serratus* Randall, 1963, described from 11 specimens collected on a drydock in Pearl Harbor, is a junior synonym of *C. falco* Randall, 1963. The drydock had been transported to the Hawaiian Islands from Guam and it is almost certain that these specimens originated in Guam. *Cirrhichthys falco* is considered a nonindigenous species in the Hawaiian Islands that has not become established here. Records of *C. aprinus* (Cuvier, 1829) from the same drydock by Chapman & Schultz (1952), Gosline & Brock (1960), and Tinker (1982) may refer to *C. falco* or they may refer to *C. oxycephalus* (Bleeker, 1855), also recorded from the drydock by Randall (1963) (see below).

GENERAL RANGE: Indo-Pacific found from the Maldives eastward through the Ryukyu and Ogasawara Islands, the Philippines, Indonesia, and southeastern Australia to the Caroline Islands and Samoa. Benthic in coral at 4–46 m (Myers, 1989; Kuitert, 1993; Randall *et al.*, 1990a, 1997b).

[*Cirrhichthys oxycephalus* (Bleeker)]

*Cirrhites oxycephalus* Bleeker, 1855a, p. 408, Ambon Island, Moluccas Islands, Indonesia.

*Cirrhichthys aprinus* non (Cuvier in Cuvier & Valenciennes, 1829): Chapman & Schultz (1952), Gosline & Brock (1960)?, Randall (1963), Tinker (1982)?

*Cirrhichthys oxycephalus* (Bleeker, 1855): Fowler (1928, 1931, 1934), Randall (1963, 1976a), Randall in Smith & Heemstra (1986), Donaldson (1986), Myers (1989), Randall *et al.* (1990a, 1997a), Allen & Robertson (1994), Robertson & Allen (2002).

TAXONOMY: Randall (1963), Randall in Smith & Heemstra (1986), Donaldson (1986).

COMMON NAMES: Pixy hawkfish (AFS; Randall *et al.*, 1997a; Myers, 1999), Coral hawkfish.

HAWAIIAN RECORDS: Randall (1963) recorded three specimens of this species from a drydock at Pearl Harbor, O'ahu, which had been transported from Guam, Marianas Islands. He suggested that the species was introduced (see *C. falco*, above). Randall's comment that "Some recent authors have erroneously used the name *aprinus* for the species *oxycephalus* Bleeker" could be interpreted to mean that Chapman & Schultz (1952), Gosline & Brock's (1960), and Tinker's (1982) listings of *C. aprinus* refer to *C. oxycephalus*.

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to Australia, the Ogasawara Islands, Micronesia, the Marquesas, Rapa, the offshore eastern tropical Pacific islands, and the Gulf of California to Ecuador. Benthic on reefs and rocks at 2–40 m (Randall in Smith & Heemstra, 1986; Donaldson, 1986; Myers, 1989; Randall *et al.*, 1990a, 1997b; Allen & Robertson, 1994; Robertson & Allen, 2002).

*Cirrhites fasciatus* (Bennett)

*Cirrhites fasciatus* Bennett, 1828, p. 39, "Hawaiian Islands".

*Cirrhites fasciatus* Bennett, 1828: Bennett (1828).

*Cirrhites cinctus* Günther, 1860: Günther (1860, 1874b), Steindachner (1900).

*Cirrhites fasciatus* Bennett, 1828: Gill (1862a).

*Paracirrhites cinctus* (Günther, 1860): Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960).

*Paracirrhites fasciatus* (Bennett, 1828): Fowler (1949).

*Cirrhites fasciatus* (Bennett, 1828): Randall (1963, 1981a, 1985a, 1992b, 1996a), Hobson (1974), Tinker (1982), Okamoto & Kanenaka (1984), Donaldson (1986), Godwin & Kosaki (1989), Hoover (1993, 2003), Randall *et al.* (1993b), Chave & Mundy (1994).

TAXONOMY: Randall (1963), Donaldson (1986).

COMMON NAMES: Pili-ko'a (Hoover, 1993, 2003), Piliko'a (Randall, 1996a), Redbarred hawkfish (AFS; Randall, 1996a; Hoover, 2003), Redbanded hawkfish (Hoover, 1993).

HAWAIIAN RECORDS: Hawai'i Island to Kure Atoll at 9–52 m (Bennett, 1828; Jordan & Evermann, 1905; Hobson, 1974; Okamoto & Kanenaka, 1984; Godwin & Kosaki, 1989; Randall *et al.*, 1993b; Chave & Mundy, 1994).

GENERAL RANGE: Indo-Pacific but known only from Japan, the Hawaiian Islands, Madagascar, and Mauritius. Benthic on reefs and rock at 1–52 m (Hobson, 1974; Randall, 1982, 1992b; Donaldson, 1986; Chave & Mundy, 1994).

***Cirrhites pinnulatus*** (Forster)

*Labrus pinnulatus* Forster in Bloch & Schneider, 1801, p. 264, Tahiti, Society Islands.

*Cirrhites maculosus* Bennett, 1828: Bennett (1828).

*Cirrhichthys maculatus* (Lacépède, 1803): Günther (1860, 1880).

*Cirrhites marmoratus* (Lacépède, 1801): Gill (1862a)? [mentioned from "Polynesia", but not specifically from the Hawaiian Islands], Jordan & Evermann (1905).

*Cirrhites alternatus* Gill, 1862: Gill (1862a), Gosline & Brock (1960).

*Cirrhites maculatus* Lacépède, 1803: Günther (1874b).

*Cirrhites maculatus* Lacépède, 1803: Steindachner (1900).

*Cirrhites marmoratus* (Lacépède, 1801): Jenkins (1903), Snyder (1904).

*Cirrhites pinnulatus* (Forster, 1801): Fowler (1928, 1931, 1934, 1949), Randall (1963, 1985a, 1996a), Hobson (1974), Tinker (1982), Okamoto & Kanenaka (1984), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Uchida & Uchiyama (1986), Randall *in* Smith & Heemstra (1986), Donaldson (1986), Myers (1989), Godwin & Kosaki (1989), Hoover (1993, 2003).

TAXONOMY: Randall (1963), Randall *et al.* (1985b), Donaldson (1986).

COMMON NAMES: Po'opu'a (Hoover, 1993, 2003; Randall, 1996a), O'opukai (Gosline & Brock, 1960), Stocky hawkfish (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 1–23 m (Bennett, 1828; Jordan & Evermann, 1905; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Godwin & Kosaki, 1989).

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, the Kermadec Islands, the Marquesas, and Rapa. Benthic on rock in surge areas at 1–23 m, usually at 1–3 m (Hobson, 1974; Randall *in* Smith & Heemstra, 1986; Myers, 1989; Godwin & Kosaki, 1989; Randall *et al.*, 1990a, 1993b, 1997b).

***Oxycirrhites typus*** Bleeker

*Oxycirrhites typus* Bleeker, 1857a, p. 40, Ambon Island, Moluccas Islands, Indonesia.

*Oxycirrhites typus* Bleeker, 1857a: Randall (1963, 1976a, 1985a, 1996a), Morris & Morris (1967), Struhsaker (1973a), Tinker (1982), Donaldson (1986), Myers (1989), Randall *et al.* (1990a, 1997a), Hoover (1993, 2003), Allen & Robertson (1994).

TAXONOMY: Randall (1963), Donaldson (1986).

COMMON NAMES: Longnose hawkfish (AFS; Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Maui to Kaua'i at 21–101 m (Randall, 1963; Morris & Morris, 1967; Struhsaker, 1973a; Hoover, 1993).

GENERAL RANGE: Indo-transPacific from the Red Sea to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, the Galapagos, and the eastern Pacific from the Gulf of California to Colombia. Benthic in gorgonians and black corals at 10–101 m (Randall, 1985a; Myers, 1989; Randall *et al.*, 1990a, 1997b; Allen & Robertson, 1994).

***Paracirrhites arcatus*** (Cuvier)

*Cirrhites arcatus* Cuvier in Cuvier & Valenciennes, 1829a, p. 74, Mauritius, western Indian Ocean.

*Cirrhites arcatus* Cuvier, 1829: Günther (1874b, 1880), Steindachner (1900).

*Cirrhites arcatus* Cuvier, 1829: Gill (1862a).

*Paracirrhites arcatus* (Cuvier, 1829): Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Randall (1963, 1985a, 1996a), Hobson (1974), Tinker (1982), Okamoto & Kanenaka (1984), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Randall *in* Smith & Heemstra (1986), Donaldson (1986), Myers (1989), Godwin & Kosaki (1989), Hoover (1993, 2003), Chave & Mundy (1994).

TAXONOMY: Randall (1963), Donaldson (1986).

COMMON NAMES: Pili-ko'a (Hoover, 1993, 2003; Randall, 1996a), Whiteline hawkfish (AFS), Arc-eye hawkfish (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 9–57 m (Günther, 1874; Jordan & Evermann, 1905; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Godwin & Kosaki, 1989; Chave & Mundy, 1994). The depth maximum of more than 305 m given by Randall (1985a) is undoubtedly a typographic error.

GENERAL RANGE: Indo-Pacific from South Africa to southern Japan, Australia, the Ogasawara Islands, Micronesia, the Hawaiian Islands, and French Polynesia. Benthic in coral heads, often *Pocillopora meandrina* Dana in the Hawaiian Islands, at 1–91 m (Hobson, 1974; Randall *in* Smith & Heemstra, 1986; Myers, 1989; Randall *et al.* 1990a, 1997b; Chave & Mundy, 1994).

***Paracirrhites forsteri* (Schneider)**

*Grammistes forsteri* Schneider *in* Bloch & Schneider, 1801, p. 191, Saint Christine or Waitaho, Marquesas Islands.

*Cirrhites forsteri* (Schneider, 1801): Günther (1874b), Streets (1877), Steindachner (1900), Fowler (1900).

*Paracirrhites forsteri* (Schneider, 1801): Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Randall (1963, 1985a, 1996a), Hobson (1974), Tinker (1982), Okamoto & Kanenaka (1984), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Randall *in* Smith & Heemstra (1986), Donaldson (1986), Myers (1989), Hoover (1993, 2003).

TAXONOMY: Randall (1963), Donaldson (1986).

COMMON NAMES: Hilu pili-ko‘a (Hoover, 1993, 2003; Randall, 1996a), Pili-ko‘a (Gosline & Brock, 1960), Freckled hawkfish (AFS), Blackside hawkfish (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to Kure Atoll at 9 m (Günther, 1874; Jordan & Evermann, 1905; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Hoover, 1993).

GENERAL RANGE: Indo-Pacific from east Africa and the Red Sea to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, the Marquesas, and Ducie. Benthic on coral and rock at 1–33 m (Hobson, 1974; Randall *in* Smith & Heemstra, 1986; Myers, 1989; Randall *et al.*, 1990a, 1997b).

### Cheilodactylidae — Morwongs

***Cheilodactylus (Goniistius) vittatus* Garrett**

*Cheilodactylus vittatus* Garrett, 1864, p. 103, “Hawaiian Islands”.

*Gregoryina gygis* Fowler & Ball, 1924; Fowler & Ball (1924), Fowler (1928), Gosline & Brock (1960).

*Goniistius vittatus* (Garrett, 1864): Jordan & Dickerson (1908).

*Cheilodactylus vittatus* Garrett, 1864: Garrett (1864), Steindachner (1900), Jenkins (1903), Jordan & Snyder (1904b), Jordan & Evermann (1905), Fowler (1928, 1931, 1949), Gosline & Brock (1960), Randall (1976a, 1983a, 1985a, 1992b, 1996a), Tinker (1982), Humphreys *et al.* (1984), Uchida & Uchiyama (1986), Hoover (1993, 2003), Randall *et al.* (1993b), Burrige & White (2000), Burrige (2004).

TAXONOMY: Randall (1983a). Burrige & White (2000) suggested that *Goniistius* deserves recognition as a genus distinct from *Cheilodactylus* but also stated that the species traditionally recognized as being in *Goniistius* fall into two groups that have levels of genetic divergence between themselves that are as great as the divergence between any *Goniistius* and other cheilodactylid genera. Given that the type species of *Goniistius*, *G. zonatus* (Cuvier), is not in the same clade as *G. vittatus* (see Burrige & White, 2000), it seems as likely that *G. vittatus* will eventually be placed in a genus different from *Goniistius*. Therefore, the traditional placement of *vittatus* in *Cheilodactylus* is maintained here pending clarification of its status in a formal generic revision.

COMMON NAMES: Kikākapu (Hoover, 1993, 2003; Randall, 1996a), Hawaiian morwong (AFS; Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: O‘ahu to Kure Atoll at 1–66 m, rare in the main Hawaiian Islands and occurring more shallow to the north (Garrett, 1864; Jordan & Evermann, 1905; Uchida & Uchiyama, 1986; Randall *et al.*, 1993b; Hoover, 1993).

GENERAL RANGE: A Hawaiian Islands endemic. Previously called an antitropical Pacific species but putative *C. vittatus* from New Caledonia, Lord Howe Island, and elsewhere in the western South Pacific have been described as a sister species, *C. francisi* Burrige, 2004. Benthic on reefs and rock at 1–66 m (Randall, 1983a, 1992; Uchida & Uchiyama, 1986; Burrige, 2004).

## Cepolidae — Bandfishes

### *Sphenanthias* sp.

*Owstonia* species: Grigg *et al.* (1987), Chave & Mundy (1994).

“... one of the unidentified forms resembled uranoscopelids [sic] most closely ...”: Clarke (1991).

TAXONOMY: No recent revision. Although Smith-Vaniz in Smith & Heemstra (1986) synonymized *Sphenanthias* with *Owstonia*, more recent information has justified the continued recognition of these genera as distinct (Leis & Carson-Ewart, 2000). The Hawaiian species has larval head-spine characters that support its placement in *Sphenanthias*.

HAWAIIAN RECORDS: Cross and Lō‘ihi Seamounts to O‘ahu at 300–600 m (Grigg *et al.*, 1987; Clarke, 1991; Chave & Mundy, 1994).

GENERAL RANGE: Unknown. Benthic and engybenthic near holes in rocks at 300–600 m (Grigg *et al.*, 1987; Chave & Mundy, 1994).

## Labroidei

### Cichlidae — Cichlids

#### *Amphilophus citrinellus* (Günther)

*Heros citrinellus* Günther, 1864b, p. 153, Lake Nicaragua, Nicaragua.

*Cichlasoma citrinellum* (Günther, 1864b): Konings (1989), Fuller *et al.* (1999).

*Amphilophus citrinellum* (Günther, 1864b): Yamamoto & Tagawa (2000).

*Amphilophus citrinellus* (Günther, 1864b): Kullander (1996), Kullander & Hartel (1997).

TAXONOMY: Kullander (1996), Kullander & Hartel (1997).

COMMON NAMES: Midas cichlid (AFS).

HAWAIIAN RECORDS: First discovered in the Hawaiian Islands in a sump at Haleiwa in 1989 and then in Wahiawā Reservoir (Lake Wilson), O‘ahu, in 1991. The population in Wahiawā Reservoir has grown large. Populations have also become established in Ho‘omaluhia Reservoir and quarry ponds at Mokuleia and Honolulu on O‘ahu (Fuller *et al.*, 1999; Yamamoto & Tagawa, 2000). See also *A. labi-atum*.

GENERAL RANGE: Indigenous to Atlantic slope drainages and large lakes of Central America from Honduras to Nicaragua and Costa Rica. Engybenthic in shallow freshwater lakes and brackish waters (Konings, 1989; Fuller *et al.*, 1999).

#### *Amphilophus labiatus* (Günther)

*Heros labiatus* Günther, 1864a, p. 27, pl. 4, Lake Managua, Nicaragua.

*Cichlasoma labiatum* (Günther, 1864a): Fuller *et al.* (1999).

*Amphilophus labiatum* (Günther, 1864a): Yamamoto & Tagawa (2000).

*Amphilophus labiatus* (Günther, 1864a): Kullander & Hartel (1997).

TAXONOMY: Kullander (1996). *Amphilophus froebelii* Agassiz, 1859, may be an older name for this species (Kullander & Hartel, 1997) but differing opinions exist as to its availability as a valid senior synonym (see Eschmeyer, 1998). Kullander & Hartel (1997) continued usage of *Amphilophus labiatus* pending a ruling on the status of these names by the International Commission on Zoological Nomenclature.

COMMON NAMES: Red devil (AFS).

HAWAIIAN RECORDS: Cichlids resembling *A. labiatus* have established a reproducing population in Ho‘omaluhia Reservoir on windward O‘ahu, although there is a question as to whether these might be *A. citrinellus* exhibiting a thick-lipped phenotypic variation (Fuller *et al.*, 1999; Yamamoto & Tagawa, 2000).

GENERAL RANGE: Indigenous to Atlantic Slope drainages and the great lakes of Nicaragua (Fuller *et al.*, 1999).

***Archocentrus nigrofasciatus*** (Günther)

*Heros nigrofasciatus* Günther, 1867, p. 601, Lakes Amatitlan and Atitlan, Guatemala.

*Cichlasoma* species: Maciolek (1984)?

*Cichlasoma nigrofasciatum* (Günther, 1867): Hensley & Courtenay in Lee *et al.* (1980), Konings (1989), Devick (1991), Fuller *et al.* (1999), Englund *et al.* (2000b).

*Archocentrus nigrofasciatus* (Günther, 1867): Kullander (1996), Kullander & Hartel (1997), Yamamoto & Tagawa (2000), Englund & Eldredge (2001).

TAXONOMY: Kullander (1996), Kullander & Hartel (1997).

COMMON NAMES: Convict cichlid (AFS).

HAWAIIAN RECORDS: First recorded from streams in Manoa and near Haleiwa, O'ahu, in 1983. Now established in several streams and reservoirs on O'ahu. Also established on Kaua'i in 'Ōpaeka'a and Kalama Streams in the Wailua River drainage and the Hanalei River (Devick, 1991; Fuller *et al.*, 1999; Englund *et al.*, 2000b; Yamamoto & Tagawa, 2000; Englund & Eldredge, 2001). The *Cichlasoma* sp. of Maciolek (1984) was likely *A. nigrofasciatus*, given the dates of introduction of that species, although Devick (1991) recorded another unidentified species of *Cichlasoma* as present on O'ahu well before Maciolek's (1984) review.

GENERAL RANGE: Indigenous to Central America from Guatemala to Panama, primarily in Pacific drainages but on both versants of Costa Rica. Introduced to various localities in North America and the Hawaiian Islands. Engybenthic in shallow, freshwater lakes and streams (Hensley & Courtenay in Lee *et al.*, 1980; Konings, 1989).

***Archocentrus spilurus*** (Günther)

*Heros spilurus* Günther, 1862, p. 289, Lake Isabel, Guatemala.

*Cichlasoma spilurum* (Günther, 1862): Astorqui (1971), Konings (1989), Devick (1991), Fuller *et al.* (1999).

*Cichlasoma spilurus* (Günther, 1862): Yamamoto & Tagawa (2000).

*Archocentrus spilurus* (Günther, 1862): Kullander (1996).

TAXONOMY: Kullander (1996).

COMMON NAMES: Blue-eye cichlid (AFS), Cutter's cichlid, Sculli (Yamamoto & Tagawa, 2000).

HAWAIIAN RECORDS: This species was reported to have been introduced to O'ahu in 1984 (Devick, 1991; Fuller *et al.*, 1999). Yamamoto & Tagawa (2000) stated that it was well established in Nu'uuanu Reservoir and Hausten Ditch but disappeared from the reservoir after the 1984 drought, which suggests that the species was introduced prior to that year. Given the species' occurrence in two disjunct habitats of O'ahu, more investigation of its persistence on O'ahu might be warranted to demonstrate its absence from open waters of the state.

GENERAL RANGE: Indigenous to Atlantic drainages of Central America, from Belize and Guatemala to Costa Rica. Engybenthic in shallow freshwater streams and lakes (Astorqui, 1971; Konings, 1989).

***Astronotus ocellatus*** (Agassiz)

*Lobotes ocellatus* Agassiz in Spix & Agassiz, 1831, p. 129, pl. 68, "Atlantic Ocean" [an erroneous type locality].

*Astronotus ocellatus* (Agassiz, 1831): Brock (1960), Hensley & Courtenay in Lee *et al.* (1980), Maciolek (1984), Devick (1991), Fuller *et al.* (1999), Yamamoto & Tagawa (2000).

TAXONOMY: Hensley & Courtenay in Lee *et al.* (1980).

COMMON NAMES: Oscar (AFS).

HAWAIIAN RECORDS: Reservoirs on O'ahu and Kaua'i; introduced in 1952 and 1958 (Brock, 1960; Maciolek, 1984; Devick, 1991; Fuller *et al.*, 1999). It is now apparently found only in the Wahiawā Reservoir on O'ahu (Yamamoto & Tagawa, 2000).

GENERAL RANGE: Indigenous to South America in the Rio Negro, Amazon, Parana, and Rio Paraguay drainages. Introduced to Florida and the Hawaiian Islands. Engybenthic in shallow, lotic freshwaters (Hensley & Courtenay in Lee *et al.*, 1980).

***Cichla ocellaris*** Bloch & Schneider

*Cichla ocellaris* Bloch & Schneider, 1801, p. 340, pl. 66, "India orientali" [South America].

*Cichla ocellaris* Bloch & Schneider, 1801: Stiassny (1982), Maciolek (1984), Kullander & Nijssen (1989), Devick (1991), Fuller *et al.* (1999).

TAXONOMY: Stiassny (1982), Kullander & Nijssen (1989).

COMMON NAMES: Peacock cichlid (AFS), Peacock bass, Tucunare (Yamamoto & Tagawa, 2000; DLNR).

HAWAIIAN RECORDS: Imported from New York in 1957 but not stocked into open waters of the state until 1961. Now established in larger reservoirs of Hawai'i Island, Maui, O'ahu, and Kaua'i. *Cichla ocellaris* is considered one of the most desirable freshwater sportfishes in the Hawaiian Islands (Maciolek, 1984; Devick, 1991; Fuller *et al.*, 1999; Yamamoto & Tagawa, 2000).

GENERAL RANGE: South America, probably restricted to the Guianas. Introduced in Panama, Florida, and the Hawaiian Islands. Engybenthic in shallow freshwaters (Kullander & Nijssen, 1989).

["*Cichlasoma* sp."]

*Cichlasoma* species: Devick (1991).

TAXONOMY: The identity of this species has not been determined (Devick, 1991).

COMMON NAMES: Cichlid.

HAWAIIAN RECORDS: Introduced from an unknown source in the 1960s to reservoirs of O'ahu (Devick, 1991). Yamamoto & Tagawa (2000) did not mention an additional *Cichlasoma* species in their review of freshwater animals of the Hawaiian Islands.

GENERAL RANGE: Unknown.

### ***Hemichromis elongatus*** (Guichenot)

*Chromichthys elongatus* Guichenot in Duméril, 1861, p. 257, pl. 22 (fig. 3), Gabon, Africa.

*Hemichromis elongatus* (Guichenot in Duméril, 1861): Loiselle (1979), Miyada (1991), Outram *et al.* (1996), Fuller *et al.* (1999), Englund *et al.* (2000a, 2000b), Yamamoto & Tagawa (2000), Englund & Eldredge (2001).

TAXONOMY: Loiselle (1979).

COMMON NAMES: Banded jewelfish (AFS), Banded jewel cichlid (Yamamoto & Tagawa 2000), Five spot (Yamamoto & Tagawa, 2000), Jewel cichlid (Englund & Eldredge, 2001).

HAWAIIAN RECORDS: Introduced into the Wahiawā Reservoir (Lake Wilson) on O'ahu in 1990 or 1991 and now established in shallow waters there (Miyada, 1991; Outram *et al.*, 1996; Fuller *et al.*, 1999). In the late 1990s, banded jewelfish were introduced and established in the Ho'omaluhia Reservoir, Kawainui Marsh, and a few streams of O'ahu (Englund *et al.*, 2000a,b; Yamamoto & Tagawa, 2000; Englund & Eldredge, 2001).

GENERAL RANGE: Indigenous to western Africa from Guinea, Sierra Leone, and Liberia to Togo and northern Angola. Engybenthic in shallow freshwater lakes and streams (Loiselle, 1979).

### ***Hypsophrys nicaraguensis*** (Günther)

*Heros nicaraguensis* Günther, 1864b, p. 153, Lake Nicaragua, Nicaragua.

*Cichlasoma nicaraguensis* (Günther, 1864b): Baensch & Riehl (1993).

*Hypsophrys nicaraguensis* (Günther, 1864b): Kullander & Hartel (1997), Yamamoto & Tagawa (2000).

TAXONOMY: Kullander & Hartel (2000).

COMMON NAMES: Moga (AFS), Nicaragua cichlid (Yamamoto & Tagawa, 2000).

HAWAIIAN RECORDS: Introduced and established in Ho'omaluhia Reservoir and conjoining streams on O'ahu in the late 1990s (Yamamoto & Tagawa, 2000).

GENERAL RANGE: Central America; indigenous to Lakes Nicaragua and Managua in Nicaragua, and the Rio San Juan drainage in Costa Rica. Engybenthic in shallow freshwater lakes and streams (Baensch & Riehl, 1993).

### ***Melanochromis johannii*** (Eccles)

*Pseudotropheus johannii* Eccles, 1973, p. 4, Fig. 2, south of Cape Ngombo, eastern shore of Lake Malawi, east Africa.

*Melanochromis johannii* (Eccles, 1973): Fuller *et al.* (1999), Yamamoto & Tagawa (2000).

TAXONOMY: Fuller *et al.* (1999).

COMMON NAMES: Bluegray mbuna (AFS), Johanni cichlid (Yamamoto & Tagawa, 2000), Blue mbuna (Englund & Eldredge, 2001), Johanni mbuna.

HAWAIIAN RECORDS: Introduced in ca. 1993 to Ho‘omaluhia Reservoir and adjacent Kamo‘oali‘i Stream on windward O‘ahu. The population of this species there is apparently expanding rapidly (Fuller *et al.*, 1999; Yamamoto & Tagawa, 2000; Englund & Eldredge, 2001).

GENERAL RANGE: Endemic to Lake Malawi, eastern Africa. Engybenthic in rocky habitats of shoreline areas; freshwater (Fuller *et al.*, 1999; Yamamoto & Tagawa, 2000).

***Oreochromis macrochir*** (Boulenger)

*Tilapia macrochir* Boulenger, 1912, p. 139, Upper Zambezi River, Africa.

*Tilapia macrochir* Boulenger, 1912: Brock (1960), Maciolek (1984), Devick (1991).

*Oreochromis macrochir* (Boulenger, 1912): Philippart & Ruwet (1982), Trewavas (1983), Fuller *et al.* (1999), Yamamoto & Tagawa (2000).

TAXONOMY: Trewavas (1983). See comments on hybridization under *O. mossambicus*.

COMMON NAMES: Longfin tilapia (AFS).

HAWAIIAN RECORDS: Introduced from Zaire to reservoirs on O‘ahu and Maui in 1957–1959. Established in reservoirs on Hawai‘i Island, Maui, and O‘ahu. Abundant in Wahiawā Reservoir (Lake Wilson), O‘ahu. Hybrids of *O. macrochir* and other tilapiines occur at least in the Nu‘uanu Reservoirs of O‘ahu (Brock, 1960; Maciolek, 1984; Devick, 1991; Fuller *et al.*, 1999; Yamamoto & Tagawa, 2000).

GENERAL RANGE: Indigenous to east-central Africa from Zaire to northern South Africa. Introduced to Madagascar and the Hawaiian Islands. Engybenthic in shallow, still freshwaters at 1–14 m (Philippart & Ruwet, 1982; Trewavas, 1983).

***Oreochromis mossambicus*** (Peters)

*Chromis (Tilapia) mossambicus* Peters, 1852, p. 681, Zambezi River, Africa.

*Tilapia mossambica* (Peters, 1852): Brock (1960), Maciolek (1984), Randall (1987a), Devick (1991).

*Oreochromis mossambicus* (Peters, 1852): Philippart & Ruwet (1982), Trewavas (1983), Coles *et al.* (1997, 1999), Fuller *et al.* (1999), Yamamoto & Tagawa (2000).

TAXONOMY: Trewavas (1983). As noted by Fuller *et al.* (1999) and Yamamoto & Tagawa (2000) tilapiines hybridize freely in areas where they are introduced and many of the tilapiine stocks initially imported to the Hawaiian Islands and other parts of the United States were of hybrid origin. Yamamoto & Tagawa (2000) said that “about ten species of tilapia are believed to be established in Hawaiian waters” although only six have been recorded in published literature as established here. Most tilapiine stocks present in open and confined conditions in the state are of hybrid origin to at least some degree. Identification of tilapiines to species in the Hawaiian Islands is therefore problematic, if not impossible. This is particularly true for fish having unnatural colorations such as the various orange, yellow, or reddish “Hawaiian sunfish” or “Hawaiian perch.” Unpublished research by the University of Hawai‘i and several aquaculturists in the state has confirmed that more hybrid stocks from more parental species of tilapiines have been imported into the state than have been documented in published sources. In addition to the species listed in this checklist, parental species for tilapiine hybrids now in the state are suspected or have been demonstrated to include *Oreochromis aureus* (Steindachner, 1864), *O. niloticus* (Linnaeus, 1758), *O. rukwaensis* (Hilgendorf & Pappenheim, 1903), and *O. urolepis hornorum* (Trewavas, 1966). Identifications of any tilapiines as pure species from the State of Hawai‘i must therefore be viewed skeptically.

COMMON NAMES: Mozambique tilapia (AFS), Hawaiian sunfish (Yamamoto & Tagawa, 2000), Hawaiian perch (Yamamoto & Tagawa, 2000), Tilapia (DLNR).

HAWAIIAN RECORDS: Introduced to the Hawaiian Islands from Singapore in 1951 and 1952. Established and abundant in reservoirs, lakes, ponds, streams, and littoral waters with freshwater influence on Hawai‘i Island, Maui, Moloka‘i, O‘ahu, and Kaua‘i. Displaced in saline habitats by the more recently introduced *Sarotherodon melanotheron* (Brock, 1960; Maciolek, 1984; Randall, 1987a; Devick, 1991; Coles *et al.*, 1997, 1999; Fuller *et al.*, 1999; Yamamoto & Tagawa, 2000). Red or orange varieties of *O. mossambicus* hybrids from aquaculture are marketed as “Hawaiian sunfish” or “Hawaiian perch” (Yamamoto & Tagawa, 2000).

GENERAL RANGE: Indigenous to southwestern Africa from Kenya to South Africa. Widely introduced throughout tropical and subtropical regions of the world; one of the most widely distributed nonindi-

genous fish species. Engybenitic in shallow, mostly lotic, fresh and brackish waters at 1–15 m (Philippart & Ruwet, 1982; Trewavas, 1983).

***Parachromis managuensis* (Günther)**

*Heros managuensis* Günther, 1867, p. 602, Lake Managua, Nicaragua.

*Parachromis gulosus* Agassiz, 1859: Kullander & Hartel (1997).

*Cichlasoma managuense* (Günther, 1867): Fuller *et al.* (1999), Englund *et al.* (2000b).

*Parachromis managuensis* (Günther, 1867): Kullander & Hartel (1997), Yamamoto & Tagawa (2000).

TAXONOMY: Kullander & Hartel (1997) demonstrated that *Parachromis gulosus* Agassiz, 1859, is the oldest available name known for this species but they proposed continued usage of *Parachromis managuensis* (Günther, 1867) for the species pending a ruling on the status of these names by the International Commission on Zoological Nomenclature.

COMMON NAMES: Jaguar guapote (AFS), Jaguar cichlid (Yamamoto & Tagawa, 2000).

HAWAIIAN RECORDS: Introduced in ca. 1992 and established in the Quarry Pond on the University of Hawai'i Manoa campus in Honolulu, O'ahu, and the adjacent Manoa Stream (Fuller *et al.*, 1999; Englund *et al.*, 2000b; Yamamoto & Tagawa, 2000).

GENERAL RANGE: Indigenous to Central America in Atlantic slope drainages of Honduras and Costa Rica. Introduced to Florida, the Hawaiian Islands, and Utah, U.S.A.; in Florida it is regarded as a threat to other fish species. Engybenitic in shallow, freshwater streams and lakes (Fuller *et al.*, 2000).

[*Pelvicachromis pulcher* (Boulenger)]

*Pelmatochromis pulcher* Boulenger, 1901, p. 9, pl. 4, confluence of Ethiop and Jamieson Rivers, Niger Delta, west Africa.

*Pelvicachromis pulcher* (Boulenger, 1901): Riehl & Baensch (1987), Greenwood (1987), Robins *et al.* (1991b), Devick (1991).

TAXONOMY: Greenwood (1987), Robins *et al.* (1991b).

COMMON NAMES: Rainbow krib (AFS), Kribensis (Riehl & Baensch, 1987).

HAWAIIAN RECORDS: Introduced to Nu'uuanu Reservoir on O'ahu in 1984 (Devick, 1991). Apparently no longer extant in open waters of the Hawaiian Islands following drying of that reservoir in the same year (Yamamoto & Tagawa, 2000).

GENERAL RANGE: Indigenous to Nigeria, Africa. Engybenitic in shallow, coastal, freshwater and brackish streams and rivers (Riehl & Baensch, 1987; Greenwood, 1987).

[*Pterophyllum* sp.]

*Pterophyllum* species: Devick (1991).

TAXONOMY: The species introduced to the Hawaiian Islands was not identified but is probably *P. scalare* (Cuvier *in* Cuvier & Valenciennes, 1831), the most common species kept in aquaria (Schultz, 1967).

COMMON NAMES: Freshwater angelfish (AFS), Angelfish.

HAWAIIAN RECORDS: Introduced in 1982 to freshwater reservoirs of O'ahu (Devick, 1991). Fuller *et al.* (1999) and Yamamoto & Tagawa (2000) did not mention *Pterophyllum* species introduced in the state and it is likely that this genus did not establish a population in open waters here.

GENERAL RANGE: Indigenous to South America; *P. scalare* (Cuvier, 1831) and *P. dumerilii* (Castelnaud, 1855) are found in the Amazon drainages and coastal drainages of the Guianas, and *P. altum* Pellegrin, 1903, is found in the Orinoco Basin. Engybenitic in shallow freshwater rivers and streams (Schultz, 1967).

***Sarotherodon melanotheron* Rüppell**

*Sarotherodon melanotheron* Rüppell, 1852, p. 21, Guinea, Africa.

*Sarotherodon melanotheron* Rüppell, 1852: Philippart & Ruwet (1982), Trewavas (1983), Coles *et al.* (1997, 1999), Fuller *et al.* (1999), Englund *et al.* (2000a, 2000b), Yamamoto & Tagawa (2000).

*Tilapia melanotheron* (Rüppell, 1852): Maciolek (1984), Randall (1987a), Devick (1991), Englund & Eldredge (2001).

TAXONOMY: Trewavas (1983). This species was imported to the Hawaiian Islands as *Tilapia macrocephalus* (Bleeker *in* Günther, 1862), a junior synonym of *S. melanotheron* and is mentioned using



that synonym in unpublished records of its importation here. See comments on hybridization under *Oreochromis mossambicus*.

COMMON NAMES: Blackchin tilapia (AFS), Silvery tilapia (Randall, 1987a), Tilapia (DLNR).

HAWAIIAN RECORDS: Fresh and brackish waters of O'ahu and Kaua'i. Imported from New York to O'ahu in 1962 and 1972. It is the most abundant cichlid in coastal, brackish-, and low-elevation freshwaters of O'ahu, where it is frequently misidentified as *Oreochromis mossambicus* (Maciolek, 1984; Randall, 1987a; Devick, 1991; Coles *et al.*, 1997, 1999; Fuller *et al.*, 1999; Englund *et al.*, 2000a, b; Yamamoto & Tagawa, 2000).

GENERAL RANGE: Indigenous to coastal, eastern Africa from Mauritania to Angola. Introduced in Florida and the Hawaiian Islands. Engybenthic in brackish water lagoons and estuaries (Philippart & Ruwet, 1982; Trewavas, 1983).

### *Thorichthys meeki* Brind

*Thorichthys helleri meeki* Brind, 1918, p. 119, unnumbered figure, near Progreso, Yucatan, Mexico.

*Cichlasoma meeki* (Brind, 1918); Brock (1960), Hensley & Courtenay *in Lee et al.* (1980), Maciolek (1984), Miller & Taylor (1984), Konings (1989), Devick (1991), Fuller *et al.* (1999).

*Thorichthys meeki* Brind, 1918; Yamamoto & Tagawa (2000).

TAXONOMY: Miller & Taylor (1984) included this species in the “*Thorichthys* group” of *Cichlasoma*. Kullander (1996) recognized *Thorichthys* as a valid genus.

COMMON NAMES: Firemouth cichlid (AFS).

HAWAIIAN RECORDS: Introduced to Nu'uau Reservoir on O'ahu in 1940. Now established in reservoirs, streams, and canals of O'ahu (Brock, 1960; Maciolek, 1984; Devick, 1991; Fuller *et al.*, 1999; Yamamoto & Tagawa, 2000).

GENERAL RANGE: Indigenous to the Yucatan Peninsula of Central America, from Mexico through Belize. Introduced to Florida, Arizona, and the Hawaiian Islands. Engybenthic in shallow freshwater streams and lakes, and brackish lagoons (Hensley & Courtenay *in Lee et al.*, 1980; Konings, 1989).

### *Tilapia rendalli* (Boulenger)

*Chromis rendalli* Boulenger, 1897, p. 915, Fig. 1, Upper Shiré River, “British Central Africa”.

*Tilapia melanopleura* Duméril, 1861 [a junior synonym of *T. zillii* (Gervais, 1848), a valid species also introduced to the Hawaiian Islands]: Brock (1960), Maciolek (1984), Devick (1991), Yamamoto & Tagawa (2000).

*Tilapia rendalli* (Boulenger, 1897): Trewavas (1982), Philippart & Ruwet (1982), Robins *et al.* (1991b), Fuller *et al.* (1999).

TAXONOMY: Trewavas (1982), Fuller *et al.* (1999). Robins *et al.* (1991b) identified the species referred to as *T. melanopleura* in references to fishes of the Hawaiian Islands as *T. rendalli*. *Tilapia melanopleura* is a junior synonym of *T. zillii* (see Eschmeyer, 1998). Doubt exists about the identity of the introduced species on the mainland usually identified as *T. “melanopleura”* or *T. zillii*. These species could be *T. guineensis* (Günther), *T. rendalli*, or hybrids (Hensley & Courtenay *in Lee et al.*, 1980). “*Tilapia melanopleura*” has also been misused as a name for *Oreochromis aureus* (see Trewavas, 1983). Two species of *Tilapia* (*sensu stricto*) have been recognized as introduced to Hawaiian waters, *T. zillii* and *T. rendalli*, and both may be established in Hawai'i (Maciolek, 1984; Robins *et al.*, 1991b) but it is possible that records of both species refer only to *T. zillii* (Fuller *et al.*, 1999). They interbreed readily; thus hybrids can also be expected here. See also the comments on tilapiine hybridization under *Oreochromis mossambicus*.

COMMON NAMES: Redbreast tilapia (AFS).

HAWAIIAN RECORDS: Reservoirs of O'ahu. Introduced from Zaire to Kaua'i in 1956 and to O'ahu in 1957. Also established in a reservoir of Kaua'i in the late 1950s. Now apparently only found on O'ahu (Brock, 1960; Maciolek, 1984; Devick, 1991; Fuller *et al.*, 1999; Yamamoto & Tagawa, 2000).

GENERAL RANGE: Indigenous to south-central Africa from Zaire to Tanzania and northern South Africa. Introduced to Madagascar, Mauritius, Sri Lanka, Thailand, throughout South America, Mexico, and the Hawaiian Islands. Engybenthic in shallow freshwater lakes and rivers at 1.0–7.5 m (Philippart & Ruwet, 1982).

*Tilapia zillii* (Gervais)

*Acerina zillii* Gervais, 1848, p. 203, artesian well at Tuggurth, Algeria.

*Tilapia zilli* (Gervais, 1848) [*lapsus* for *zillii*]: Brock (1960), Maciolek (1984), Devick (1991).

*Tilapia zillii* (Gervais, 1848): Trewavas (1982), Philippart & Ruwet (1982), Robins *et al.* (1991b), Fuller *et al.* (1999), Yamamoto & Tagawa (2000).

TAXONOMY: Trewavas (1982), Robins *et al.* (1991b). See comments for *T. rendalli* and on hybridization under *Oreochromis mossambicus*.

COMMON NAMES: Redbelly tilapia (AFS).

HAWAIIAN RECORDS: Reservoirs of Hawai'i Island, Maui, O'ahu, and Kaua'i; perhaps only extant on Maui and O'ahu. Introduced from Antigua to Maui in 1955 and transplants were made to reservoirs on Hawai'i and O'ahu in 1957 (Brock, 1960; Maciolek, 1984; Devick, 1991; Yamamoto & Tagawa, 2000).

GENERAL RANGE: Indigenous to northwestern and north-central Africa except the Sahara, and the northwestern Arabian Peninsula. Introduced to Madagascar, Indonesia, Fiji, Taiwan, North America, Great Britain, and the Hawaiian Islands. Engybenthic in shallow freshwater lakes and rivers at 1–7 m (Philippart & Ruwet, 1982).

Pomacentridae — Damselfishes<sup>57</sup>*Abudefduf abdominalis* (Quoy & Gaimard)

*Glyphisodon abdominalis* Quoy & Gaimard, 1825, p. 390, "Hawaiian Islands".

*Glyphisodon abdominalis* Quoy & Gaimard, 1825: Quoy & Gaimard (1825), Jenkins (1903), Snyder (1904).

*Glyphidodon saxatilis* non (Linnaeus, 1758) [a valid Atlantic Ocean *Abudefduf* species]: Streets (1877), Steindachner (1900).

*Abudefduf sexfasciatus* non (Lacépède, 1801) [a valid species not found in the Hawaiian Islands]: Fowler (1900).

*Abudefduf abdominalis* (Quoy & Gaimard, 1825): Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Hobson (1974), Allen (1975, 1991a), Tinker (1982), Okamoto & Kanenaka (1984), Randall (1985a, 1996a), Uchida & Uchiyama (1986), Kosaki *et al.* (1991), Hoover (1993, 2003), Randall *et al.* (1993b).

TAXONOMY: Allen (1975, 1991a).

COMMON NAMES: Mamo (Hoover, 1993, 2003; Randall, 1996a), Maomao (Gosline & Brock, 1960), Hawaiian sergeant (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 1–50 m (Quoy & Gaimard, 1825; Hobson, 1974; Okamoto & Kanenaka, 1984; Uchida & Uchiyama, 1986; Kosaki *et al.*, 1991; Allen, 1991a; Hoover, 1993; Randall *et al.*, 1993b).

GENERAL RANGE: Johnston Atoll and Hawaiian Islands endemic. Engybenthic and benthopelagic over rocks and reef at 1–50 m (Hobson, 1974; Randall, 1985a; Uchida & Uchiyama, 1986; Allen, 1991a; Hoover, 1993).

*Abudefduf sordidus* (Forsskål)

*Chaetodon sordidus* Forsskål, 1775, p. 62, xiii, Jidda, Saudi Arabia, Red Sea.

*Glyphisodon sordidus* (Forsskål, 1775): Jenkins (1903), Snyder (1904).

*Glyphidodon melas* non (Cuvier in Cuvier & Valenciennes, 1830) [a valid *Neoglyphidodon* species not found in the Hawaiian Islands]: Steindachner (1900).

*Abudefduf sordidus* (Forsskål, 1775): Fowler (1900), Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Hobson (1974), Allen (1975, 1991a), Tinker (1982), Okamoto & Kanenaka (1984), Randall (1985a, 1996a), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Myers (1989), Hoover (1993, 2003).

TAXONOMY: Allen (1975, 1991a).

COMMON NAMES: Kūpīpī (Hoover, 1993, 2003; Randall, 1996a), Blackspot sergeant (AFS; Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 1–2 m (Fowler, 1900; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b).

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to Indonesia, Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, French Polynesia, and the Pitcairn Group. Engybenthic near rocks of the surge zone and in tidepools at 1–3 m (Hobson, 1974; Randall, 1985a; Myers, 1989; Randall *et al.*, 1990a, 1997b; Allen, 1991a; Hoover, 1993).

***Abudefduf vaigiensis*** (Quoy & Gaimard)

*Glyphisodon vaigiensis* Quoy & Gaimard, 1825, p. 391, Waigeo [Waigiou], Indonesia.

*Abudefduf saxatilis* non (Linnaeus, 1758) [a valid Atlantic Ocean species]: Myers (1989).

*Abudefduf vaigiensis* (Quoy & Gaimard, 1825): Randall *et al.* (1990a), Allen (1991a), Severns & Fiene-Severns (1993), Hoover (1993), Randall (1996a), Randall *et al.* (1997a), Hoover (2003).

TAXONOMY: Allen (1991a).

COMMON NAMES: Indo-Pacific sergeant (Hoover, 1993, 2003; Randall *et al.*, 1997a; Randall, 1996a), Yellow-back sergeant.

HAWAIIAN RECORDS: This species first appeared at Molokini Island, Maui, and Kahe Point, O‘ahu, in 1991 (J.E. Randall & K. Stender, pers. comm., 1992). At approximately the same time, it was collected in association with drift nets in the central North Pacific Ocean (M. Seki, pers. comm., June 1992). It has since been seen on the Kona Coast of Hawai‘i Island, Kaua‘i, other locations on O‘ahu, Ni‘ihau, and at French Frigate (J. Naughton, pers. comm., Oct. 1993; B. Mundy, pers. observ.; M. Awai, pers. comm., June 1994; R. Boland, pers. comm., Dec. 1998). Thus, the appearance of this species seems to be a documented “natural” recruitment of a species to the Hawaiian Islands, related to an artificial medium of transport. *Abudefduf vaigiensis* have spawned at Molokini (Severns & Fiene-Severns, 1993) and O‘ahu (B. Mundy, pers. observ.). Juveniles appeared in increasing numbers on the south and west coasts of O‘ahu during 1994–2001 (B. Mundy, pers. observ.). Hybridization with *A. abdominalis* is a possibility and the fate of these two species in the Hawaiian Islands is questioned by ichthyologists here (Hoover, 2003; J. Earle & J.E. Randall, pers. comm.).

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to Indonesia, Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, the Line Islands, the Tuamotu Archipelago, and the Marquesas. Engybenthic over coral and rocky reefs at 1–12 m (Myers, 1989; Randall *et al.*, 1990a, 1997b; Allen, 1991a; Severns & Fiene-Severns, 1993).

[*Amphiprion* sp.]

TAXONOMY: Allen (1991).

COMMON NAMES: Anemonefish, Clownfish.

HAWAIIAN RECORDS: There are occasional reports of anemonefish or clownfish in the main Hawaiian Islands. Most of the reports are based on divers’ misidentifications of juvenile *Coris gaimard* (Quoy & Gaimard, 1824), which have a color pattern reminiscent of *Amphiprion percula* (Lacépède, 1802) or *A. ocellaris* Cuvier in Cuvier & Valenciennes, 1830. But some of the reports of *Amphiprion* from Kāne‘ohe Bay, O‘ahu, and perhaps other waters near urban centers, are actual sightings by knowledgeable observers of fish released from aquaria (W. Tyler, pers. comm., June 1989; D. Gulko, pers. comm., Dec. 2000). In at least one case, an aquarium-fish wholesaler has been reported to have purposefully released *Amphiprion* into the bay with the intent of establishing a breeding population that could then be “ranching” for sale. This type of release is illegal in the State of Hawai‘i but is known to have occurred for several aquarium species. Increased sightings of nonindigenous species in waters of the main islands are anticipated as a result of this illegal business activity.

GENERAL RANGE: Undetermined.

***Chromis acares*** Randall & Swerdloff

*Chromis acares* Randall & Swerdloff, 1973, p. 331, Figs. 2–3, Rarotonga, Cook Islands.

*Chromis vanderbilti* non (Fowler, 1941) [a valid species also found in the Hawaiian Islands]: Gosline (1955, in part).

*Chromis acares* Randall & Swerdloff, 1973: Randall & Swerdloff (1973), Allen (1975, 1991a), Tinker (1982), Randall (1985a, 1996a), Randall *et al.* (1985a, 1993a, 1997a), Myers (1989).

TAXONOMY: Allen (1975, 1991a).

COMMON NAMES: Midget Chromis (Randall *et al.*, 1997a; Myers, 1999), Dwarf chromis (Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to O'ahu at 6–17 m (Gosline, 1955; Randall & Swerdloff, 1973; Randall, 1985a; Randall *et al.*, 1985b, 1993a).

GENERAL RANGE: Pacific endemic from Australia, the Solomon Sea and Vanuatu to the Ogasawara Islands, Micronesia, Johnston Atoll, the Hawaiian Islands, the Society Islands, and the Australs. Engyobenthic over coral or rubble at 2–37 m (Randall & Swerdloff, 1973; Randall *et al.*, 1990a, 1997b; Allen, 1991a).

### *Chromis agilis* Smith

*Chromis agilis* Smith, 1960, p. 324, Pls. 26 (fig. A) and 32 (fig. J), Astove Island, western Indian Ocean.

*Chromis dimidiatus* non (Klunzinger, 1871) [a valid species not found in the Hawaiian Islands]: Fowler (1928, 1949, in part).

*Chromis leucurus* non Gilbert, 1905 [a valid species also found in the Hawaiian Islands]: Gosline & Brock (1960, in part).

Orange-brown form of *Chromis leucurus* non Gilbert, 1905: Hobson (1974).

*Chromis agilis* Smith, 1960: Randall & Swerdloff (1973), Allen (1975, 1991a), Randall (1976a, 1985a, 1996a), Tinker (1982), Hobson (1984), Okamoto & Kanenaka (1984), Randall *et al.* (1985a, 1990a, 1997a), Myers (1989), Godwin & Kosaki (1989), Hoover (1993, 2003).

TAXONOMY: Allen (1975, 1991a).

COMMON NAMES: Agile chromis (Hoover, 1993, 2003; Randall *et al.*, 1997a; Randall, 1996a), Reef chromis (Hoover, 1993, 2003), Bronze reef chromis (Myers, 1999), Rusty chromis.

HAWAIIAN RECORDS: Hawai'i Island to Laysan at 5–61 m (Fowler, 1928; Hobson, 1974, 1984; Okamoto & Kanenaka, 1984; Randall, 1985a; Randall *et al.*, 1985b; Godwin & Kosaki, 1989; Hoover, 1993).

GENERAL RANGE: Indo-Pacific from South Africa and the Seychelles to the Ogasawara Islands, Wake Island, Australia, Micronesia, the Hawaiian Islands, the Tuamotu Archipelago, and the Pitcairn Group. Engyobenthic in or near coral reefs at 3–65 m (Randall & Swerdloff, 1973; Hobson, 1974; Randall, 1985a; Myers, 1989; Randall *et al.*, 1990a, 1997b; Allen, 1991a).

### *Chromis hanui* Randall & Swerdloff

*Chromis hanui* Randall & Swerdloff, 1973, p. 338, Figs. 6–7, Moku Manu, O'ahu, Hawaiian Islands.

*Chromis dimidiatus* non (Klunzinger, 1871) [a valid species not found in the Hawaiian Islands]: Fowler & Ball (1925), Fowler (1928, 1949, in part).

*Chromis leucurus* non Gilbert, 1905 [a valid species also found in the Hawaiian Islands]: Gosline & Brock (1960, in part).

Bicolored form of *Chromis leucurus* non Gilbert, 1905: Hobson (1974).

*Chromis hanui* Randall & Swerdloff, 1973: Randall & Swerdloff (1973), Allen (1975, 1991a), Randall (1976a, 1985a, 1996a), Tinker (1982), Okamoto & Kanenaka (1984), Godwin & Kosaki (1989), Hoover (1993, 2003), Randall *et al.* (1993b).

TAXONOMY: Allen (1975, 1991a).

COMMON NAMES: Chocolate-dip chromis (Hoover, 1993, 2003; Randall, 1996a), Hawaiian bicolor chromis.

HAWAIIAN RECORDS: Hawai'i Island to Kure Atoll at 2–50 m (Fowler & Ball, 1925; Randall & Swerdloff, 1973; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall, 1985a; Godwin & Kosaki, 1989; Hoover, 1993; Randall *et al.*, 1993b).

GENERAL RANGE: Hawaiian Islands endemic. Engyobenthic in or near coral reefs at 2–50 m (Randall & Swerdloff, 1973; Hobson, 1974; Randall, 1985a; Allen, 1991a; Hoover, 1993).

### *Chromis leucura* Gilbert

*Chromis leucurus* Gilbert, 1905, p. 620, pl. 77, Avau Channel between Maui and Lāna'i, Hawaiian Islands.

*Chromis dimidiatus* non (Klunzinger, 1871) [a valid species not found in the Hawaiian Islands]: Fowler (1928, 1949, in part).

*Chromis leucurus* Gilbert, 1905: Gilbert (1905, in part), Gosline & Brock (1960, in part), Randall (1976a), Tinker (1982 text).

*Chromis leucura* Gilbert, 1905: Randall & Swerdloff (1973), Allen (1975, 1991a), Tinker (1982 appendix), Randall (1985a, 1996a), Severns & Fiene-Severns (1993), Chave & Mundy (1994).

TAXONOMY: Allen (1975, 1991a). Most reports of this species from the Hawaiian Islands are based on *C. agilis* and *C. hanui* (see Randall & Swerdloff, 1973).

COMMON NAMES: Whitetail chromis (AFS; Randall, 1996a).

HAWAIIAN RECORDS: Hawai'i Island to Kaua'i at 29–122 m and to 426 m fishing depths (Gilbert, 1905; Randall & Swerdloff, 1973; Severns & Fiene-Severns, 1993; Chave & Mundy, 1994).

GENERAL RANGE: Indo-Pacific from Mauritius and Réunion to the Ryukyus, the Hawaiian Islands, and the Marquesas. Engybenthic at 20–122 m and to 426 m fishing depths (Gilbert, 1905; Randall & Swerdloff, 1973; Randall, 1985a; Allen, 1991; Chave & Mundy, 1994).

### *Chromis ovalis* (Steindachner)

*Heliastes ovalis* Steindachner, 1900a, p. 176, Honolulu, O'ahu, Hawaiian Islands.

*Heliastes ovalis* Steindachner, 1900a: Steindachner (1900a).

*Chromis velox* Jenkins, 1901: Jenkins (1901), Fowler (1931).

*Thrissochromis velox* (Jenkins, 1901): Fowler (1949).

*Chromis ovalis* (Steindachner, 1900a): Jenkins (1903), Jordan & Evermann (1905), Fowler (1928), Gosline & Brock (1960), Randall & Swerdloff (1973), Hobson (1974), Allen (1975, 1991a), Randall (1985a, 1996a), Uchida & Uchiyama (1986), Tinker (1982), Randall & Follett (1989), Hoover (1993, 2003), Randall *et al.* (1993b), Chave & Mundy (1994).

TAXONOMY: Randall & Follett (1989), Allen (1991a).

COMMON NAMES: Oval chromis (Hoover, 1993, 2003; Randall, 1996a), Hawaiian chromis.

HAWAIIAN RECORDS: Hawai'i Island to Kure Atoll at 5–161 m (Steindachner, 1900a; Randall & Swerdloff, 1973; Hobson, 1974; Uchida & Uchiyama, 1986; Randall & Follett, 1989; Randall *et al.*, 1993b; Chave & Mundy, 1994).

GENERAL RANGE: Hawaiian Islands endemic. Engybenthic and benthopelagic over rocks and reefs at 5–161 m (Randall & Swerdloff, 1973; Hobson, 1974; Randall, 1985a; Randall & Follett, 1989; Allen, 1991; Hoover, 1993; Chave & Mundy, 1994).

### *Chromis struhsakeri* Randall & Swerdloff

*Chromis struhsakeri* Randall & Swerdloff, 1973, p. 344, Figs. 10–12, Haleiwa, O'ahu, Hawaiian Islands.

*Chromis* species: Struhsaker (1973a).

*Chromis struhsakeri* Randall & Swerdloff, 1973: Randall & Swerdloff (1973), Allen (1975, 1991a), Randall (1976a, 1996a), Tinker (1982), Uchida & Uchiyama (1986), Borets (1986), Chave & Mundy (1994).

TAXONOMY: Allen (1975, 1991a).

COMMON NAMES: Struhsaker's chromis.

HAWAIIAN RECORDS: Hawai'i Island to Kure Atoll and Bank 10 at 85–302 m (Struhsaker, 1973a; Randall & Swerdloff, 1973; Uchida & Uchiyama, 1986; Borets, 1986; Chave & Mundy, 1994).

GENERAL RANGE: Hawaiian Islands endemic. Engybenthic at 85–302 m (Randall & Swerdloff, 1973; Borets, 1986; Allen, 1991a; Chave & Mundy, 1994).

### *Chromis vanderbilti* (Fowler)

*Pycnochromis vanderbilti* Fowler, 1941, p. 260, Fig. 12, Waianae, O'ahu, Hawaiian Islands.

*Pycnochromis vanderbilti* Fowler, 1941: Fowler (1941, 1949).

*Chromis vanderbilti* (Fowler, 1941): Gosline & Brock (1960), Randall & Swerdloff (1973), Hobson (1974), Allen (1975, 1991a), Randall (1976a, 1985a, 1996a), Tinker (1982), Hobson (1984), Myers (1989), Godwin & Kosaki (1989), Randall *et al.* (1990a, 1993b, 1997a), Hoover (1993, 2003).

TAXONOMY: Allen (1975, 1991a).

COMMON NAMES: Blackfin chromis (Hoover, 1993, 2003; Randall, 1996a), Vanderbilt's chromis (Randall *et al.*, 1997a; Myers, 1999).

HAWAIIAN RECORDS: Hawai'i Island to Kure Atoll at 2–20 m (Fowler, 1941; Randall & Swerdloff, 1973; Hobson, 1974, 1984; Randall, 1985a; Godwin & Kosaki, 1989; Randall *et al.*, 1993b). Records of this species from Johnston Atoll are actually of *C. acares* Randall & Swerdloff, 1973 (see Randall *et al.*, 1985b).

GENERAL RANGE: Pacific endemic from Australia, Lord Howe Island, southern Japan, and the Ogasawara Islands to Micronesia, the Hawaiian Islands, French Polynesia, and the Pitcairn Group. Engybenthic

in or near coral reefs at 2–20 m (Randall & Swerdloff, 1973; Hobson, 1974; Myers, 1989; Randall *et al.*, 1990a, 1993b, 1997b; Allen, 1991a; Hoover, 1993).

***Chromis verater* Jordan & Metz**

*Chromis verater* Jordan & Metz, 1912, p. 526, pl. 72 (fig. 2), Honolulu market, O'ahu, Hawaiian Islands.

*Chromis leucurus* non Gilbert, 1905 [a valid species also found in the Hawaiian Islands]: Gilbert (1905, in part).

*Chromis verater* Jordan & Metz, 1912: Jordan & Metz (1912), Fowler (1928, 1931, 1949), Gosline & Brock (1960), Struhsaker (1973a), Randall & Swerdloff (1973), Hobson (1974), Allen (1975, 1991a), Tinker (1982), Randall (1985a, 1996a), Randall *et al.* (1985a, 1993b), Uchida & Uchiyama (1986), Godwin & Kosaki (1989), Hoover (1993, 2003), Chave & Mundy (1994).

TAXONOMY: Allen (1975, 1991a).

COMMON NAMES: Threespot chromis (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 6–199 m (Gilbert, 1905; Jordan & Metz, 1912; Randall & Swerdloff, 1973; Hobson, 1974; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Godwin & Kosaki, 1989; Hoover, 1993; Chave & Mundy, 1994).

GENERAL RANGE: Johnston Atoll and Hawaiian Islands endemic. Engybenthic and benthopelagic over rocks and reef at 6–199 m (Randall & Swerdloff, 1973; Hobson, 1974; Randall, 1985a; Allen, 1991a; Hoover, 1993; Chave & Mundy, 1994).

[*Chrysiptera taupou* (Jordan & Seale)]

*Abudefduf taupou* Jordan & Seale, 1906, p. 288, pl. 43 (fig. 3), Apia, Upolu, Samoa.

*Chrysiptera taupou* (Jordan & Seale, 1906): Allen (1991a), Scott (2003).

TAXONOMY: Allen (1991).

COMMON NAMES: South seas devil (Allen, 1991).

HAWAIIAN RECORDS: A single individual was photographed in ca. 1–2 m at Hanauma Bay, O'ahu, in late 2002 (Scott, 2003). Two more were reported from there in January 2004 (J. Hoover, pers. comm., 26 Jan. 2004). These may have been aquarium releases because the general range of this species makes it unlikely that they were waifs. Another bright blue damselfish that might have been *C. taupou* was sighted at Ala Moana Beach Park, O'ahu, in 1 m in October 2002 (R. Kern, pers. comm., 27 Oct. 2002), but no specimen or photograph was available to enable an identification. Sightings at two locations suggest the possibility that *Chrysiptera* might be established in shoreline waters of Honolulu.

GENERAL RANGE: Southwestern Pacific from the Great Barrier Reef, Australia, Vanuatu, and New Caledonia to Fiji and Samoa. Engybenthic in lagoons and on reefs at 0–5 m (Allen, 1991).

***Dascyllus albisella* Gill**

*Dascyllus albisella* Gill, 1862b, p. 149, Honolulu, O'ahu, Hawaiian Islands.

*Dascyllus trimaculatus* non (Rüppell, 1829) [a valid species not found in the Hawaiian Islands]: Günther (1875), Steindachner (1900), Fowler (1928, 1931, 1934, 1949, in part).

*Tetradrachmum trimaculatum* non (Rüppell, 1829): Fowler (1900).

*Dascyllus marginatus* non (Rüppell, 1829) [a valid Red Sea and Gulf of Oman species]: Fowler (1931, 1949, in part).

*Dascyllus edmondsoni* Pietschmann, 1934a: Pietschmann (1934a).

*Semadascyllus albisella* (Gill, 1862b): Fowler (1949).

*Dascyllus albisella* Gill, 1862b: Gill (1862b), Günther (1880, 1881), Jenkins (1903), Snyder (1904), Gilbert (1905), Jordan & Evermann (1905), Gosline & Brock (1960), Hobson (1974), Allen (1975, 1991a), Randall & Allen (1977), Tinker (1982), Okamoto & Kanenaka (1984), Randall (1985a, 1996a), Randall *et al.* (1985a, 1993b), Uchida & Uchiyama (1986), Hoover (1993, 2003), Chave & Mundy (1994).

TAXONOMY: Randall & Allen (1977), Allen (1975, 1991a).

COMMON NAMES: 'Alo'ilo'i (Hoover, 1993, 2003; Randall, 1996a), Hawaiian dascyllus (AFS; Randall, 1996a; Hoover, 2003), Hawaiian domino (Hoover, 1993), Hawaiian domino damselfish (Hoover, 2003), Onespot damselfish (Hoover, 1993).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 1–84 m (Gill, 1862b; Gilbert, 1905; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Chave & Mundy, 1994).

GENERAL RANGE: Johnston Atoll and Hawaiian Islands endemic. Engybenthic and benthopelagic over coral and rocky reefs at 1–84 m; juveniles associated with *Pocillopora* coral and *Heteractis* sea anemones (Randall & Allen, 1977; Randall, 1985a; Allen, 1991a; Hoover, 1993; Chave & Mundy, 1994).

[*Dascyllus aruanus* (Linnaeus)]

*Chaetodon aruanus* Linnaeus, 1758, p. 275, type locality given only as “Habitat in Indiis”.

*Dascyllus aruanus* (Linnaeus, 1758) [a valid species not found in the Hawaiian Islands]: Fowler (1928), Allen (1975, 1991a), Randall & Allen (1977), Myers (1989), Randall *et al.* (1990a, 1997a).

TAXONOMY: Randall & Allen (1977), Allen (1975, 1991a).

COMMON NAMES: Whitetail dascyllus (AFS), Humbug dascyllus (Randall *et al.*, 1997a; Myers, 1999).

HAWAIIAN RECORDS: Fowler’s (1928) inclusion of the Hawaiian Islands in the range of *D. aruanus* is erroneous (Allen, 1975).

GENERAL RANGE: Indo-Pacific from east Africa and the Red Sea to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Line Islands, the Tuamotu Archipelago, and the Marquesas. Engybenthic and associated with branching corals or isolated coral heads in lagoons and inshore reefs at 1–12 m (Myers, 1989; Randall *et al.*, 1990a, 1997b; Allen, 1991).

***Plectroglyphidodon imparipennis*** (Vaillant & Sauvage)

*Glyphisodon imparipennis* Vaillant & Sauvage, 1875, p. 279, Honolulu, O’ahu, Hawaiian Islands.

*Glyphisodon imparipennis* Vaillant & Sauvage, 1875: Vaillant & Sauvage (1875).

*Chromis elaphrus* Jenkins, 1903: Jenkins (1903), Jordan & Evermann (1905).

*Abudefduf imparipennis* (Vaillant & Sauvage, 1875): Jordan & Evermann (1905), Fowler (1928), Gosline & Brock (1960), Hobson (1974), Tinker (1982 text).

*Oliglyphisodon imparipennis* (Vaillant & Sauvage, 1875): Fowler (1949).

*Plectroglyphidodon imparipennis* (Vaillant & Sauvage, 1875): Allen (1975, 1991a), Okamoto & Kanenaka (1984), Randall (1985a, 1996a), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Tinker (1982 appendix), Myers (1989), Hoover (1994, 2003).

TAXONOMY: Allen (1975, 1991). The author of the species is annotated as “Sauvage” in the original description, but authorship is given as Vaillant & Sauvage in recent taxonomic authorities.

COMMON NAMES: Brighteye damselfish (AFS; Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai’i Island to Midway (but apparently rare north of French Frigate) at >1 m (Vaillant & Sauvage, 1875; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b; Hoover, 1994).

GENERAL RANGE: Indo-Pacific from South Africa, Mauritius, and Sri Lanka to Indonesia, Japan, Australia, the Ogasawara Islands, Micronesia, the Hawaiian Islands, the Society Islands, and the Marquesas. Engybenthic in or near rocks and coral of areas with surge at 1–6 m (Hobson, 1974; Myers, 1989; Randall *et al.*, 1990a, 1997b; Allen, 1991a).

***Plectroglyphidodon johnstonianus*** Fowler & Ball

*Plectroglyphidodon johnstonianus* Fowler & Ball, 1924, p. 271, Johnston Island, central North Pacific.

*Plectroglyphidodon johnstonianus* Fowler & Ball, 1924: Fowler & Ball (1924), Fowler (1928, 1949), Gosline & Brock (1960), Hobson (1974), Allen (1975, 1991a), Tinker (1982), Okamoto & Kanenaka (1984), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Randall (1985a, 1996a), Myers (1989), Godwin & Kosaki (1989), Hoover (1993, 2003).

TAXONOMY: Allen (1975, 1991a).

COMMON NAMES: Blue-eye damselfish (Hoover, 1993, 2003; Randall, 1996a), Johnston damselfish (Hoover, 1993; Randall *et al.*, 1997a), Johnston Island damselfish (Hoover, 2003).

HAWAIIAN RECORDS: Johnston Atoll and Hawai’i Island to Kure Atoll at 9–18 m (Fowler & Ball, 1924; Gosline & Brock, 1960; Hobson, 1974; Okamoto & Kanenaka, 1984; Godwin & Kosaki, 1989; Randall *et al.*, 1993b).

GENERAL RANGE: Indo-Pacific from South Africa and the Seychelles to Indonesia, Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, the Marquesas, and the Pitcairn Group. Engy-benthic in or near live *Pocillopora* and *Acropora* coral at 2–18 m (Hobson, 1974; Godwin & Kosaki, 1989; Randall *et al.*, 1990a, 1997b; Allen, 1991a; Hoover, 1993).

***Plectroglyphidodon phoenixensis*** (Schultz)

*Abudefduf phoenixensis* Schultz, 1943, p. 190, Fig. 15, Enderbury Island, Phoenix Islands, central Pacific Ocean. *Abudefduf albofasciatus* non (Hombron & Jacquinot in Jacquinot & Guichenot, 1853) [a junior synonym of *Chrysiptera brownriggi* (Bennett, 1828), a valid species not found in the Hawaiian Islands]: Fowler (1928, in part).

*Chrysiptera phoenixensis* (Schultz, 1943): Fowler (1949).

*Chrysiptera albofasciata* non (Hombron & Jacquinot, 1853): Fowler (1949, in part).

*Abudefduf phoenixensis* Schultz, 1943: Gosline & Brock (1960), Tinker (1982 text).

*Plectroglyphidodon phoenixensis* (Schultz, 1943): Allen (1975, 1991a), Tinker (1982 appendix), Randall *et al.* (1985a, 1990a, 1993a), Myers (1989), Randall (1996a).

TAXONOMY: Allen (1975, 1991a).

COMMON NAMES: Phoenix devil (AFS), Phoenix Islands damselfish (Myers, 1999), Phoenix damsel (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Johnston Atoll and Maui at 1–2 m (Fowler, 1928; Randall *et al.*, 1985b, 1993a).

GENERAL RANGE: Indo-Pacific from South Africa, Mauritius, and the Maldives to Indonesia, Japan, Australia, Micronesia, Johnston Atoll, the Hawaiian Islands, the Tuamotu Archipelago, and the Marquesas. Engy-benthic in or near rocks and coral within areas of strong surge at 1–8 m (Myers, 1989; Randall *et al.*, 1990a, 1993a; Allen, 1991a).

***Plectroglyphidodon sindonis*** (Jordan & Evermann)

*Glyphisodon sindonis* Jordan & Evermann, 1903a, p. 188, Honolulu, O'ahu, Hawaiian Islands.

*Glyphisodon sindonis* Jordan & Evermann, 1903a: Jordan & Evermann (1903a).

*Abudefduf sindonis* (Jordan & Evermann, 1903a): Jordan & Evermann (1905), Gosline & Brock (1960), Hobson (1974), Tinker (1982 text).

*Chromis sindonis* (Jordan & Evermann, 1903a): Fowler (1928).

*Procylosoma sindonis* (Jordan & Evermann, 1903a): Fowler (1949).

*Plectroglyphidodon sindonis* (Jordan & Evermann, 1903a): Allen (1975, 1991a), Tinker (1982 appendix), Hobson (1984), Randall (1985a, 1996a), Hoover (1993, 2003).

TAXONOMY: Allen (1975, 1991a).

COMMON NAMES: Hawaiian rock damselfish (Hoover, 1993, 2003), Rock damselfish (Randall, 1996a).

HAWAIIAN RECORDS: Hawai'i Island to Gardner Pinnacles at 1–3 m (Jordan & Evermann, 1903a; Hobson, 1974, 1984; Hoover, 1993).

GENERAL RANGE: Hawaiian Islands endemic. Engy-benthic in or near rocks of the surge zone at 1–3 m (Hobson, 1974; Randall, 1985a; Allen, 1991a; Hoover, 1993).

***Stegastes fasciolatus*** (Ogilby)

*Pomacentrus fasciolatus* Ogilby, 1889, p. 64, Lord Howe Island, western South Pacific.

*Eupomacentrus nigricans* non (Lacépède, 1802) [a valid *Stegastes* species not found in the Hawaiian Islands]: Fowler (1900).

*Abudefduf limbatus* non (Cuvier in Cuvier & Valenciennes, 1830) [a valid *Stegastes* species not found in the Hawaiian Islands]: Fowler (1900)? [this attribution to species needs confirmation].

*Pomacentrus nigricans* non (Lacépède, 1802): Fowler (1931, in part).

*Pomacentrus nigricans* Quoy & Gaimard, 1825 [currently a name of uncertain status]: Quoy & Gaimard (1825).

*Eupomacentrus marginatus* Jenkins, 1901: Jenkins (1901).

*Pomacentrus jenkinsi* Jordan & Evermann, 1903: Jordan & Evermann (1903a, 1905), Snyder (1904), Fowler (1949), Gosline & Brock (1960), Hobson (1974), Tinker (1982 text).

*Pomacentrus inornatus* Jordan & Seale, 1906: Fowler (1928).

*Pomacentrus vanderbilti* Fowler, 1941: Fowler (1941, 1949).

*Eupomacentrus fasciolatus* (Ogilby, 1889): Tinker (1982 appendix).

*Stegastes fasciolatus* (Ogilby, 1889): Tinker (1982 appendix), Randall (1985a, 1996a), Allen & Emery (1985), Uchida & Uchiyama (1986), Myers (1989), Godwin & Kosaki (1989), Randall *et al.* (1990a, 1993b), Allen (1991a), Hoover (1993, 2003).

TAXONOMY: Allen & Emery (1985), Allen (1991a). Eschmeyer (1998) listed *Pomacentrus nigricans* Quoy & Gaimard (1825) as an original species description not referring to a previously published name. *Pomacentrus nigricans* Quoy & Gaimard would predate *Pomacentrus fasciolatus* Ogilby, 1889, but would be secondarily preoccupied by *H. nigricans* Lacépède when both are placed in *Stegastes* as is currently accepted. *Pomacentrus fasciolatus* Ogilby is the next available name for the species col-



lected in the Hawaiian Islands by Quoy & Gaimard. See Eschmeyer's (1998) extensive comments on *Eupomacentrus marginatus* Jenkins, 1901, and *Pomacentrus jenkinsi* Jordan & Evermann, 1903, for the history of those names. This nomenclatural complexity notwithstanding, J.E. Randall (pers. comm., Mar. 2005) will recognize the Hawaiian Islands population as an endemic species, *S. marginatus* (Jenkins).

COMMON NAMES: Pacific gregory (Hoover, 1993, 2003; Randall *et al.*, 1997a; Randall, 1996a; Myers, 1999).

HAWAIIAN RECORDS: Hawai'i Island to Kure Atoll at 4–42 m (Quoy & Gaimard, 1825; Hobson, 1974; Uchida & Uchiyama, 1986; Godwin & Kosaki, 1989; Randall *et al.*, 1993b; Hoover, 1993).

GENERAL RANGE: Indo-Pacific from South Africa, Mauritius, and Sri Lanka to Indonesia, Japan, Australia, Micronesia, the Hawaiian Islands, the Society Islands, and Easter Island. Engybenthic in or near rocks and reefs at 1–42 m, usually at 1–5 m (Hobson, 1974; Allen & Emery, 1985; Uchida & Uchiyama, 1986; Myers, 1989; Randall *et al.*, 1990a; Allen, 1991a; Hoover, 1993).

### Labridae — Wrasses<sup>58</sup>

#### *Ammolabrus dicrus* Randall & Carlson

*Ammolabrus dicrus* Randall & Carlson, 1997, p. 32, Fig. 1–2, Makaha, O'ahu, Hawaiian Islands.

Undescribed *Leptojulis* species: Randall *et al.* (1994).

*Ammolabrus dicrus* Randall & Carlson, 1997: Randall & Carlson (1997), Randall & Earle (2002).

TAXONOMY: Randall & Carlson (1997), Randall & Earle (2002).

COMMON NAMES: Sand wrasse.

HAWAIIAN RECORDS: O'ahu at 7–18 m (Randall *et al.*, 1994; Randall & Carlson, 1997).

GENERAL RANGE: Perhaps a Hawaiian Islands endemic although this or a similar species has been observed but not collected in the Ogasawara Islands. Benthopelagic over sand at 7–18 m (Randall *et al.*, 1994; Randall & Carlson, 1997).

#### *Anampses chrysocephalus* Randall

*Anampses chrysocephalus* Randall, 1958a, p. 100, Fig. 3, between Kewalo Basin and Koko Head, off Honolulu, O'ahu, Hawaiian Islands.

*Anampses rubrocaudatus* Randall, 1958a [initial phase]: Randall (1958a), Gosline & Brock (1960).

*Anampses chrysocephalus* Randall, 1958a [first proposed for the terminal phase]: Randall (1958a, 1972a, 1976a, 1985a, 1996a), Gosline & Brock (1960), Tinker (1982), Okamoto & Kanenaka (1984), Hoover (1993, 2003), Randall *et al.* (1993b), Chave & Mundy (1994).

TAXONOMY: Randall (1972a).

COMMON NAMES: Psychedelic wrasse (Hoover, 1993, 2003; Randall, 1996a), Redtail wrasse (Hoover, 1993, 2003), Psych head (Hoover, 1993, 2003).

HAWAIIAN RECORDS: Hawai'i Island to Kure Atoll at 9–139 m (Randall, 1958a, 1972a; Okamoto & Kanenaka, 1984; Randall *et al.*, 1993b; Chave & Mundy, 1994).

GENERAL RANGE: Hawaiian Islands endemic. Engybenthic over reefs at 9–139 m (Randall, 1972a; Chave & Mundy, 1994).

#### *Anampses cuvier* Quoy & Gaimard

*Anampses cuvier* Quoy & Gaimard, 1824, p. 276, pl. 55 (fig. 1), Maui, Hawaiian Islands.

*Anampses godeffroyi* Günther, 1881 [terminal phase]: Günther (1881), Jordan & Evermann (1905), Fowler (1928, 1934, 1949), Gosline & Brock (1960).

*Anampses caeruleopunctatus* non Rüppell, 1829 [a valid species not found in the Hawaiian Islands]: Fowler (1900).

*Anampses evermanni* Jenkins, 1901 [terminal phase]: Jenkins (1901, 1903), Snyder (1904), Jordan & Evermann (1905).

*Anampses cuvier* Quoy & Gaimard, 1824 [first proposed for the initial phase]: Quoy & Gaimard (1824), Fowler (1900, 1928, 1931, 1934, 1949), Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Gosline & Brock (1960), Randall (1972a, 1976a, 1985a, 1996a), Hobson (1974), Tinker (1982), Okamoto & Kanenaka (1984), Randall *et al.* (1985a, 1993b), Hoover (1993, 2003).

TAXONOMY: Randall (1972a).

COMMON NAMES: ‘Ōpule (initial phase) (Hoover, 1993, 2003; Randall, 1996a), ‘Ōpule lāuli (terminal phase), Hilu (Gosline & Brock, 1960), Pearl wrasse (Hoover, 1993, 2003; Randall, 1996a), Spotted wrasse (DLNR).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to Kure Atoll at 2–24 m (Quoy & Gaimard, 1824; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall, 1985a; Randall *et al.*, 1985b, 1993b).

GENERAL RANGE: Johnston Atoll and Hawaiian Islands endemic. Engybenthic over coral, rock, and sand near rocks at 2–24 m (Randall, 1972a, 1985a; Hobson, 1974; Randall *et al.*, 1993b).

***Bodianus bilunulatus albotaeniatus* (Valenciennes)**

*Cossyphus albo-taeniatus* Valenciennes in Cuvier & Valenciennes, 1839, p. 141, “Hawaiian Islands”.

*Cossyphus albo-taeniatus* Valenciennes, 1839 [first proposed for initial phase]: Valenciennes in Cuvier & Valenciennes (1839).

*Crenilabrus modestus* Garrett, 1864 [terminal phase]: Garrett (1864).

*Harpe bilunulata* (Lacépède, 1801): Smith & Swain (1882), Steindachner (1900).

*Lepidoplois strophodes* Jordan & Evermann, 1903 [large juvenile]: Jordan & Evermann (1903a).

*Lepidaplois strophodes* Jordan & Evermann, 1903: Jordan & Evermann (1905).

*Lepidaplois albotaeniatus* (Valenciennes, 1839): Jordan & Evermann (1905).

*Lepidaplois modestus* (Garrett, 1864) [terminal phase]: Jordan & Evermann (1905), Fowler (1928, 1931, 1949), Fowler & Ball (1925).

*Lepidoplois bilunulatus* (Lacépède, 1801): Jenkins (1903).

*Lepidaplois bilunulatus* (Lacépède, 1801): Snyder (1904), Fowler (1928, 1931, 1934, 1949).

*Lepidaplois atrorubens* Jordan, 1925: E.K. Jordan (1925) [genus misspelled as *Lepidapolis* in header for species binomen].

*Lepidoplois hirsutus* non (Lacépède, 1801) [a junior synonym of *Bodianus macrourus* (Lacépède, 1801), a valid Indian Ocean species]: Fowler & Ball (1925).

*Lepidaplois macrourus* non (Lacépède, 1801): Jordan *et al.* (1927).

*Bodianus bilunulatus albotaeniatus* (Valenciennes, 1839): Gosline & Brock (1960), Hobson (1974), Randall (1976a, 1985a, 1996a), Gomon & Randall (1978), Tinker (1982), Springer (1982), Yamakawa in Okamura (1985), Randall *et al.* (1985a, 1993b, 1997b), Uchida & Uchiyama (1986), Hoover (1993, 2003), Chave & Mundy (1994), Parenti & Randall (2000).

TAXONOMY: Gomon & Randall (1978). J.E. Randall (pers. comm., Mar. 2005) will recognize the Hawaiian Islands population as an endemic species taking the name *B. albotaeniatus*.

COMMON NAMES: A‘awa (Hoover, 1993, 2003; Randall, 1996a), Hawaiian hogfish (Hoover, 1993, 2003; Randall, 1996a), Spot wrasse (DLNR), Table boss.

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to Kure Atoll at 3–177 m (Valenciennes in Cuvier & Valenciennes, 1839; Smith & Swain, 1882; Hobson, 1974; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Chave & Mundy, 1994).

GENERAL RANGE: Indo-Pacific from South Africa to western Australia, southern Japan, Taiwan, the Ogasawara Islands, the Hawaiian Islands, the Marquesas, and the Pitcairn Group. The subspecies is a Johnston Atoll and Hawaiian Islands endemic. Engybenthic at 3–200 m (Gomon & Randall, 1978; Springer, 1982; Yamakawa in Okamura *et al.*, 1985; Randall *et al.*, 1993b, 1997b; Chave & Mundy, 1994; Parenti & Randall, 2000).

***Bodianus cylindriatus* (Tanaka)**

*Verreo cylindriatus* Tanaka, 1930, p. 941, P. 187 (fig. 513), Tokyo fish market, Japan.

*Bodianus cylindriatus* (Tanaka, 1930): Yamamoto in Okamura *et al.* (1982), Yamamoto in Masuda *et al.* (1984), Randall & Chen (1985a), Randall (1985a), Chave & Mundy (1994), Parenti & Randall (2000).

TAXONOMY: Randall & Chen (1985).

HAWAIIAN RECORDS: Moloka‘i to Kanmu Seamount (30°N, 173°E) at 156–510 m (Randall & Chen, 1985; Chave & Mundy, 1994).

GENERAL RANGE: Western and central Pacific endemic from New Caledonia, Taiwan, southern Japan, the Emperor Seamounts, and the Hawaiian Islands. Engybenthic over hard substrates at 156–510 m (Yamamoto in Okamura *et al.*, 1982; Yamamoto in Masuda *et al.*, 1984; Chave & Mundy, 1994; Parenti & Randall, 2000).

***Bodianus sanguineus*** (Jordan & Evermann)

*Verriculus sanguineus* Jordan & Evermann, 1903a, p. 191, Hilo, Hawai‘i Island.

*Verriculus sanguineus* Jordan & Evermann, 1903a: Jordan & Evermann (1903a, 1905), Fowler (1928, 1949), Gosline & Brock (1960), Tinker (1982 text).

*Bodianus sanguineus* (Jordan & Evermann, 1903a): Gomon & Randall (1978), Tinker (1982 appendix), Randall (1985a, 1996a), Uchida & Uchiyama (1986), Pyle (1992), Chave & Mundy (1994).

TAXONOMY: Gomon & Randall (1978), Pyle (1992).

COMMON NAMES: Sunrise wrasse (Randall, 1996a), Neon wrasse.

HAWAIIAN RECORDS: Hawai‘i Island to Maro Reef at 32–168 m (Jordan & Evermann, 1903a; Uchida & Uchiyama, 1986; Chave & Mundy, 1994).

GENERAL RANGE: Hawaiian Islands endemic. Engybenthic at 32–168 m (Gomon & Randall, 1978; Pyle, 1992; Chave & Mundy, 1994).

***Bodianus* sp.**

*Verreo oxycephalus* non (Bleeker, 1862) [a valid northwestern Pacific species not found in the Hawaiian Islands]: Jordan & Evermann (1905).

*Lepidaplois oxycephalus* non (Bleeker, 1862): Fowler (1928).

*Bodianus oxycephalus* non (Bleeker, 1862): Gosline & Brock (1960), Tinker (1982).

*Bodianus vulpinus* non (Richardson, 1850) [a valid southwestern Australian species not found in the Hawaiian Islands]: Gomon & Randall (1978), Randall (1981a, 1985a), Humphreys *et al.* (1984), Uchida & Uchiyama (1986), Randall *et al.* (1990b), Chave & Mundy (1994).

*Bodianus* sp. 5: Parenti & Randall (2000).

*Bodianus* sp. and “an undescribed species from the Hawaiian Islands”: Gomon (2001).

TAXONOMY: Gomon (2001).

COMMON NAMES: Hawaiian Pigfish.

HAWAIIAN RECORDS: Hawai‘i Island to Kure Atoll at 146–274 m (Jordan & Evermann, 1905; Tinker, 1982; Uchida & Uchiyama, 1986; Chave & Mundy, 1994). Although Randall (1985a) stated that “*B. vulpinus*” occurs only in the northwest Hawaiian Islands within the region, it has been recorded from the main islands.

GENERAL RANGE: Hawaiian Islands endemic (Parenti & Randall, 2000; Gomon, 2001). Engybenthic at 146–274 m (Gomon & Randall, 1978; Randall, 1982; Uchida & Uchiyama, 1986; Randall *et al.*, 1990b; Chave & Mundy, 1994).

**[*Cheilinus trilobatus* Lacépède]**

*Cheilinus trilobatus* Lacépède, 1801, p. 529, 537, pl. 31 (fig. 3), Réunion and Mauritius Islands, western Indian Ocean.

*Cheilinus sinuosus* Quoy & Gaimard, 1824: Quoy & Gaimard (1824).

*Cheilinus trilobatus* Lacépède, 1801: Jordan & Evermann (1905)?, Fowler (1928)?, Gosline & Brock (1960)?, Kyushin *et al.* (1982), Randall *in* Smith & Heemstra (1986), Myers (1989), Randall *et al.* (1990a, 1997a), Westneat (1993).

TAXONOMY: Randall *in* Smith & Heemstra (1986), Westneat (1993).

COMMON NAMES: Tripletail wrasse (Myers, 1999), Tripletail Maori wrasse (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Quoy & Gaimard (1824) gave the Hawaiian Islands as one of the collection localities for their types *Cheilinus sinuosus*, now considered a junior synonym of *C. trilobatus*. Jordan & Evermann (1905) included the species in the Hawaiian fauna based on Quoy & Gaimard’s (1824) record. Gosline & Brock (1960, appendix) rejected the synonymy of the two nominal species, commenting that *C. sinuosus* could not even be assigned to genus with certainty. *Cheilinus trilobatus* has not otherwise been recorded from the archipelago. Hawaiian records of *C. trilobatus* are therefore considered false although the possibility exists that Quoy & Gaimard’s (1824) record from the Hawaiian Islands was based upon a waif.

GENERAL RANGE: Indo-Pacific from South Africa to the Ryukyu and Ogasawara Islands, Australia, Micronesia, and the Austral Islands. Engybenthic over coral reefs and adjacent areas at 1–30 m (Myers, 1989; Randall *et al.*, 1990a, 1997b).

*Cheilinus undulatus* Rüppell

*Cheilinus undulatus* Rüppell, 1835, p. 20, pl. 6 (fig. 2), Jidda, Saudi Arabia, Red Sea.

*Cheilinus undulatus* Rüppell, 1835: Myers (1989), Randall *et al.* (1990a), Hoover (1993, 2003), Westneat (1993).

TAXONOMY: Westneat (1993).

COMMON NAMES: Napoleon wrasse (Hoover, 2003), Humphead wrasse (Myers, 1999; Hoover, 2003), Humphead Maori wrasse (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: A 1-m long individual was sighted at the Kona Coast of Hawai'i Island at ca. 36 m in June 2001 (J.E. Randall, pers. comm., July 2001; Hoover, 2003). In 1967 a specimen of *C. undulatus* was found at the Honolulu fish market, O'ahu (Hoover, 1993, 2003). Prior to the Kona sighting, it was considered unlikely that the 1967 specimen was captured in the archipelago because fishes caught at other Pacific islands are sometimes marketed on O'ahu. No other records of this very conspicuous species are known from the Hawaiian Islands. The record from Kona therefore is considered to have been of a waif.

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to the Ryukyus, Australia, Micronesia, and the Tuamotu Archipelago. Known from the Hawaiian Islands as a waif. Engyberthentic over or near coral reefs at 2–60 m (Myers, 1989; Randall *et al.*, 1990a).

*Cheilio inermis* (Forsskål)

*Labrus inermis* Forsskål, 1775, p. 34, xi, Mocha, Yemen, Red Sea.

*Cheilio auratus* Lacépède, 1802 [yellow phase]: Quoy & Gaimard (1824).

*Cheilio hemichrysos Valenciennes* in Cuvier & Valenciennes, 1839: Cuvier & Valenciennes (1839).

*Cheilio inermis* (Forsskål, 1775): Streets (1877), Fowler (1900, 1928, 1931, 1934, 1949), Steindachner (1900), Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Gosline & Brock (1960), Tinker (1982), Okamoto & Kanenaka (1984), Randall (1985a, 1996a), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Randall in Smith & Heemstra (1986), Myers (1989), Hoover (1993, 2003).

TAXONOMY: Randall in Smith & Heemstra (1986). Randall *et al.* (1990a) mentioned an unpublished study by Gomon and Russell that classified *Cheilio* in the tribe Odacini within the Labridae, usually regarded as a family, Odacidae, distinct from the Labridae.

COMMON NAMES: Kūpou (Hoover, 1993, 2003), Kūpoupou (Randall, 1996a; DLNR), Cigar wrasse (Hoover, 1993, 2003; Randall, 1996a), Mongoose fish (DLNR).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 4–8 m (Quoy & Gaimard, 1824; Jordan & Evermann, 1905; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Hoover, 1993).

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to southern Japan, the Ogasawara Islands, Lord Howe Island, Micronesia, the Hawaiian Islands, and Easter Island. Engyberthentic over algae, seagrass, or reefs at 1–30 m (Myers, 1989; Randall *et al.*, 1990a, 1997b).

[*Choerodon anchorago* (Bloch)]

*Sparus anchorago* Bloch, 1791, p. 108, pl. 276, "received from the Holland Auction".

*Choerodon anchorago* (Bloch, 1791): Borodin (1930), Myers (1999), Parenti & Randall (2000), Westneat in Carpenter & Niem (2001).

TAXONOMY: Parenti & Randall (2000).

COMMON NAMES: Orange-dotted tuskfish (FAO), Anchor tuskfish (Randall *et al.*, 1997a), Yellow-cheeked tuskfish (Myers, 1999).

HAWAIIAN RECORDS: Borodin (1930) recorded this species from O'ahu. This record was most likely due to a locality error, given the great distance between the natural range of this species and the Hawaiian Islands, the timing of this record prior to the development of the trade in marine aquarium fishes and other frequent modes of introductions of nonindigenous fish species to the Hawaiian Islands, the dissimilarity between this species and those known to occur in the archipelago, and Borodin's (1930) several other unusual records from the Hawaiian Islands of species otherwise unknown from the region (i.e., *Chaetodon vagabundus*, *Chaetodontoplus mesoleucas*, and *Hologymnosus doliatus*).

GENERAL RANGE: Central Indian and Pacific Oceans, from Sri Lanka to Indonesia, the Ryukyu Islands, Palau, Yap, the Great Barrier Reef, New Caledonia, and perhaps French Polynesia. Engyberthentic over

a variety of substrates near coral reefs at 1–25 m (Randall *et al.*, 1997a; Myers, 1999; Parenti & Randall, 2000, Westneat *in* Carpenter & Niem, 2001b).

### *Cirrhilabrus jordani* Snyder

*Cirrhilabrus jordani* Snyder, 1904, p. 529, pl. 10, fig. 18, between Maui and Lānaʻi Islands, Hawaiian Islands.  
*Cirrhilabrus solorensis* non Bleeker, 1853 [a valid species not found in the Hawaiian Islands]: Fowler (1928, 1949, in part).

*Cirrhilabrus luteovittatus* non Randall, 1988 [a valid species recorded from Johnston Atoll but not the Hawaiian Islands]: Kosaki *et al.* (1991) — text in part for *C. jordani* given in reference to their fig. 14, perhaps a printer's error, but not text referring to their fig. 15 for *C. luteovittatus*.

*Cirrhilabrus jordani* Snyder, 1904: Snyder (1904), Gilbert (1905), Jordan & Evermann (1905), Gosline & Brock (1960), Hobson (1974), Tinker (1982), Randall (1985a, 1996a), Uchida & Uchiyama (1986), Kosaki *et al.* (1991 figure), Hoover (1993, 2003), Randall *et al.* (1993b).

TAXONOMY: Randall (1985a), Randall *et al.* (1993b).

COMMON NAMES: Flame wrasse (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawaiʻi Island to Midway at 12–186 m (Snyder, 1904; Gilbert, 1905; Hobson, 1974; Randall, 1985a; Uchida & Uchiyama, 1986; Kosaki *et al.*, 1991; Randall *et al.*, 1993b; Hoover, 1993).

GENERAL RANGE: Johnston Atoll and Hawaiian Islands endemic. Engyobenthic over rubble at 12–186 m (Gilbert, 1905; Randall, 1985a; Kosaki *et al.*, 1991; Randall *et al.*, 1993b; Hoover, 1993).

### *Cirrhilabrus luteovittatus* Randall

*Cirrhilabrus luteovittatus* Randall, 1988, p. 203, pl. 1, figs. a–b and pl. 3, fig. 1-c, Bogen [Rex] Island, Enewetok Atoll, Marshall Islands.

*Cirrhilabrus* sp. 2: Myers (1989).

*Cirrhilabrus luteovittatus* Randall, 1988: Randall (1988), Kosaki *et al.* (1991).

TAXONOMY: Randall (1989).

COMMON NAMES: Yellowband wrasse (Myers, 1999).

HAWAIIAN RECORDS: Johnston Atoll at 30 m; not recorded from the Hawaiian Islands (Kosaki *et al.*, 1991).

GENERAL RANGE: Central Pacific endemic from Micronesia and Johnston Atoll. Engyobenthic over coral and rubble at 8–30 m (Randall, 1989; Myers, 1989; Kosaki *et al.*, 1991).

### [*Coris aygula* Lacépède]

*Coris aygula* Lacépède, 1801, p. 96, 97, Pl. 4 (fig. 1), Mauritius, western Indian Ocean.

*Coris aygula* non Lacépède, 1801 [a valid species probably not found in the Hawaiian Islands]: Fowler (1900), Jordan & Evermann (1905).

*Julis rüppellii* non Bennett, 1831 [species name misspelled]: Steindachner (1900)?

*Coris aygula* Lacépède, 1801: Fowler (1928), Randall (1999d).

TAXONOMY: Randall (1999d).

COMMON NAMES: Clown coris (Randall *et al.*, 1997a; Myers, 1999).

HAWAIIAN RECORDS: Fowler (1900) recorded *C. aygula* from the Hawaiian Islands based on a misidentification of *C. venusta*. His record was corrected by Jordan & Evermann (1905). Fowler (1928) later reported a correctly identified specimen in Harvard University's Museum of Comparative Zoology collection as from the Hawaiian Islands, but this specimen is probably labeled with an incorrect collection locality (Randall, 1999d). The identity of the specimen identified as *Julis rueppellii* Bennett (with the species name misspelled as *rüppellii*) by Steindachner (1900) is unknown, although the size of the specimen suggests that it might have been *C. flavovittata* or *C. gaimard*. There are no confirmed records of *C. aygula* from the Hawaiian Islands.

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to northern Australia, southern Japan, Micronesia, the Line Islands, French Polynesia, and eastward to Ducie Island, but apparently absent from Indonesia. Engyobenthic over reefs, rubble, and sand near reefs at 1–30 m (Myers, 1989; Randall *et al.*, 1990a; Randall, 1999d).

***Coris ballieui*** Vaillant & Sauvage

*Coris (Hemicoris) ballieui* Vaillant & Sauvage, 1875, p. 285, "Hawaiian Islands".

*Coris (Hemicoris) rosea* Vaillant & Sauvage, 1875 [initial phase]: Vaillant & Sauvage (1875).

*Coris rosea* Vaillant & Sauvage, 1875: Jordan & Evermann (1905), Gosline & Brock (1960).

*Coris argenteo-striata* Steindachner, 1900 [initial phase]: Steindachner (1900).

*Coris schauinslandii* Steindachner, 1900 [terminal phase]: Steindachner (1900).

*Coris keleipionis* Jenkins, 1901: Jenkins (1901).

*Hemicoris argenteo-striatus* (Steindachner, 1900): Jenkins (1903).

*Hemicoris baillieui* (Vaillant & Sauvage, 1875) [*lapsus* for *ballieui*]: Jenkins (1903).

*Hemicoris rosea* (Vaillant & Sauvage, 1875): Snyder (1904).

*Hemicoris ballieui* (Vaillant & Sauvage, 1875): Snyder (1904).

*Coris ballieui* Vaillant & Sauvage, 1875 [first proposed for terminal phase]: Vaillant & Sauvage (1875), Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Randall (1976b, 1985a, 1996a, 1999d), Tinker (1982), Randall *et al.* (1985a, 1993b), Uchida & Uchiyama (1986), Hoover (1993, 2003), Chave & Mundy (1994).

TAXONOMY: Randall (1976b, 1999d).

COMMON NAMES: Mālamalama (Hoover, 1993, 2003), Malamalama (Randall, 1996a), Lined coris (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 10–146 m (Vaillant & Sauvage, 1875; Jordan & Evermann, 1905; Randall, 1976b, 1999d; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Chave & Mundy, 1994).

GENERAL RANGE: Johnston Atoll and Hawaiian Islands endemic. Records from the Line Islands were probably misidentifications of *Coris centralis* Randall, 1999, before its description (Randall, 1999d). Engyebenthic over mixed sand and rock or coral rubble at 10–146 m but usually >20 m (Randall, 1976b, 1999d; Uchida & Uchiyama, 1986; Chave & Mundy, 1994).

***Coris flavovittata*** (Bennett)

*Julis flavo-vittatus* Bennett, 1828, p. 36, "Hawaiian Islands".

*Julis flavovittatus* Bennett, 1828 [first proposed for juveniles]: Bennett (1828), Jordan & Evermann (1905).

*Julis eydouxii* Valenciennes *in* Cuvier & Valenciennes, 1839 [initial phase]: Eydoux & Souleyet (1850), Jenkins (1903), Snyder (1904), Jordan & Evermann (1905).

*Coris lepomis* Jenkins, 1901: Jenkins (1901), Fowler (1928, 1934, 1949), Gosline & Brock (1960), Tinker (1982).

*Julis lepomis* (Jenkins, 1901) [terminal phase]: Jenkins (1903), Jordan & Evermann (1905).

*Julis flavovittata* Bennett, 1828: Snyder (1904).

*Coris flavovittata* (Bennett, 1828): Fowler (1900, 1928, 1931, 1934, 1949), Gosline & Brock (1960), Hobson (1974), Randall (1976b, 1985a, 1996a, 1999d), Tinker (1982), Okamoto & Kanenaka (1984), Hoover (1993, 2003), Randall *et al.* (1993b), Chave & Mundy (1994).

TAXONOMY: Randall (1976b, 1999d).

COMMON NAMES: Hilu (Hoover, 1993, 2003; Randall, 1996a), Hilu lauwili (Gosline & Brock, 1960), Uhua, Yellowstripe coris (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Hawai'i Island to Kure Atoll at 1–98 m. More common in the Northwestern Hawaiian Islands than in the main islands (Bennett, 1828; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1993b; Chave & Mundy, 1994; Randall, 1999d).

GENERAL RANGE: Hawaiian Islands endemic. Engyebenthic at 1–98 m, usually at >15 m (Randall, 1976b, 1999d; Chave & Mundy, 1994).

***Coris gaimard*** (Quoy & Gaimard)

*Julis Gaimard* Quoy & Gaimard, 1824, p. 265, Pl. 54 (fig. 1), Maui, Hawaiian Islands.

*Julis gaimard* Quoy & Gaimard, 1824 [first proposed for initial phase]: Quoy & Gaimard (1824), Jenkins (1903), Jordan & Evermann (1905).

*Coris gaimardi* (Quoy & Gaimard, 1824): Günther (1862), Fowler (1900).

*Coris pulcherrima* Günther, 1862 [initial phase]: Steindachner (1900).

*Julis pulcherrima* (Günther, 1862): Jenkins (1903), Snyder (1904), Jordan & Evermann (1905).

*Julis greenovii* Bennett, 1828 [juvenile]: Bennett (1828), Jordan & Evermann (1905).

*Coris greenovii* (Bennett, 1828): Fowler (1928, 1949).

*Coris gaimard* (Quoy & Gaimard, 1824): Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Hobson

(1974), Randall (1976b, 1985a, 1996a, 1999d), Tinker (1982), Okamoto & Kanenaka (1984), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Randall *in* Smith & Heemstra (1986), Myers (1989), Hoover (1993, 2003), Chave & Mundy (1994).

TAXONOMY: Randall (1976b, 1999d).

COMMON NAMES: Hinālea ‘aki-lolo (Hoover, 1993, 2003; Randall, 1996a), Hinālea lolo, Lolo (Gosline & Brock, 1960), Yellowtail coris (Hoover, 1993, 2003; Randall, 1996a), Clown wrasse (juveniles), Rainbow wrasse (Hoover, 1993, 2003).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to Kure Atoll at 2–78 m (Quoy & Gaimard, 1824; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Chave & Mundy, 1994; Randall, 1999d).

GENERAL RANGE: Eastern Indian and western-central Pacific oceans from Christmas and Cocos-Keeling Islands to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, and the Tuamotu Archipelago. Replaced in the central and western Indian Ocean by *C. cuvieri* (Bennett, 1831) (a senior synonym of *C. africana* Smith, 1957) and *C. formosa* (Bennett, 1830) (mistakenly called *C. frerei* Günther, 1867, in Randall, 1999b but corrected in Parenti & Randall, 2000) and in the Marquesas Islands by *C. marquesensis* Randall, 1999. Engyebenthic over rocky substrates, rubble, or sand near rock at 1–78 m, usually at <50 m (Hobson, 1974; Randall *in* Smith & Heemstra, 1986; Myers, 1989; Randall *et al.*, 1990a, 1997b; Chave & Mundy, 1994; Randall, 1999d).

### *Coris venusta* Vaillant & Sauvage

*Coris (Hemicoris) venusta* Vaillant & Sauvage, 1875, p. 285, “Hawaiian Islands”.

*Coris aygula* non Lacépède, 1801 [a valid species not indigenous to the Hawaiian Islands]: Fowler (1900), Jordan & Evermann (1905).

*Hemicoris remediis* Jenkins, 1901: Jenkins (1901, 1903).

*Hemicoris venusta* (Vaillant & Sauvage, 1875): Snyder (1904).

*Coris varieagata* non (Rüppell, 1835) [a misspelling of *C. variegata* (Rüppell, 1835), a valid species not found in the Hawaiian Islands]: Fowler (1928, 1949).

*Coris multicolor* non (Rüppell, 1835) [a junior synonym of *C. caudimacula* (Quoy & Gaimard, 1834), a valid species not found in the Hawaiian Islands]: Steindachner (1900), Fowler (1928, 1949).

*Coris angulata* non Lacépède, 1801 [a junior synonym of *C. aygula* Lacépède, 1801, a valid species not indigenous to the Hawaiian Islands]: Fowler (1928, 1949); see Randall (1976b) for comments on Fowler’s names for *C. venusta*.

*Coris venusta* Vaillant & Sauvage, 1875: Vaillant & Sauvage (1875), Jordan & Evermann (1905), Fowler (1931, 1934), Gosline & Brock (1960), Hobson (1974), Randall (1976b, 1985a, 1996a, 1999d), Tinker (1982), Okamoto & Kanenaka (1984), Hoover (1993, 2003), Randall *et al.* (1993b).

TAXONOMY: Randall (1976b, 1999d).

COMMON NAMES: Elegant coris (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Hawai‘i Island to Kure Atoll at 2–10 m (Vaillant & Sauvage, 1875; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1993b; Randall, 1999d).

GENERAL RANGE: Hawaiian Islands endemic. Engyebenthic at 2–10 m (Randall, 1976b, 1999d; Randall *et al.*, 1993b).

### *Cymolutes lecluse* (Quoy & Gaimard)

*Xyrichthys lecluse* Quoy & Gaimard, 1824, p. 284, pl. 65 (fig. 1), Hawai‘i Island.

*Xyrichthys lecluse* Quoy & Gaimard, 1824: Quoy & Gaimard (1824).

*Xyrichthys microlepidotus* Valenciennes *in* Cuvier & Valenciennes, 1840: Cuvier & Valenciennes (1840).

*Novacula (Novacula) microlepis* Vaillant & Sauvage, 1875: Vaillant & Sauvage (1875).

*Hemipteronotus lecluse* (Quoy & Gaimard, 1824): Tinker (1982).

*Hemipteronotus leclusei* (Quoy & Gaimard, 1824): Okamoto & Kanenaka (1984).

*Cymolutes lecluse* (Quoy & Gaimard, 1824): Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Fowler (1928, in part, 1949), Gosline & Brock (1960), Schultz *et al.* (1960), Randall (1985a, 1986, 1996a), Randall *et al.* (1990a, 1993b), Chave & Mundy (1994), Hoover (1994, 2003), Randall & Earle (2002).

TAXONOMY: Schultz *et al.* (1960), Randall *et al.* (1990a), Randall & Earle (2002).

COMMON NAMES: Slender razorfish, Hawaiian knifefish (Randall, 1996a; Hoover, 2003), Slender sand wrasse (Hoover, 1993, 2003).

HAWAIIAN RECORDS: Hawai'i Island to Kure Atoll at 5–119 m (Quoy & Gaimard, 1824; Okamoto & Kanenaka, 1984; Randall *et al.*, 1993b; Chave & Mundy, 1994; Hoover, 1994).

GENERAL RANGE: Hawaiian Islands endemic. Benthic and engybenthic in and over sand at 5–119 m (Randall, 1986; Randall *et al.*, 1993b; Chave & Mundy, 1994). The *C. lecluse* of Yamakawa (*in* Masuda *et al.*, 1984), Winterbottom *et al.* (1989), and other records from outside of the Hawaiian Islands refer to other species (Randall & Earle, 2002).

### *Epibulus insidiator* (Pallas)

*Sparus insidiator* Pallas, 1770, p. 41, pl. 5 (fig. 1), Java, Indonesia.

*Epibulus insidiator* (Pallas, 1770): Gosline & Brock (1960), Hobson (1980), Tinker (1982), Hobson (1984), Okamoto & Kanemoto (1984), Randall (1985a), Randall *et al.* (1985a, 1990a, 1993b), Randall *in* Smith & Heemstra (1986), Myers (1989).

TAXONOMY: Randall *in* Smith & Heemstra (1986).

COMMON NAMES: Slingjaw wrasse (Randall *et al.*, 1997a; Myers, 1999).

HAWAIIAN RECORDS: Johnston Atoll (where it is common), Lāna'i, O'ahu, and French Frigate to Kure Atoll. In the Hawaiian Islands, found primarily in the northwestern islands where stands of *Acropora* coral exist. There were no records from the main Hawaiian Islands until waifs were sighted in 2000–2001 off Kona and Hilo on Hawai'i Island, at Lāna'i, and at 10–18 m in Hanauma Bay, south-eastern O'ahu (Gosline & Brock, 1960; Hobson, 1980, 1984; Randall *et al.*, 1985b; J. Hoover, pers. comm., May 2001; W. Walsh, pers. comm., July 2002; B. Mundy, pers. observ.).

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to southern Japan, Australia, Micronesia, Johnston Atoll, the Hawaiian Islands, and the Tuamotu Archipelago. Engybenthic over coral reefs at 1–40 m (Myers, 1989; Randall *et al.*, 1990a).

### *Gomphosus varius* Lacépède

*Gomphosus varius* Lacépède, 1801, p. 100, 104, pl. 5 (fig. 2), Tahiti, Society Islands.

*Gomphosus tricolor* Quoy & Gaimard, 1824 [terminal phase]: Quoy & Gaimard (1824), Steindachner (1900), Fowler (1900), Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949).

*Gomphosus pectoralis* Quoy & Gaimard, 1824: Quoy & Gaimard (1824).

*Gomphosus caeruleus* non Lacépède, 1801 [a valid Indian Ocean species]: Lay & Bennett (1839).

*Gomphosus fuscus* Valenciennes *in* Cuvier & Valenciennes, 1840: Cuvier & Valenciennes (1840).

*Gomphosus cepedianus* Valenciennes *in* Cuvier & Valenciennes, 1840: Cuvier & Valenciennes (1840).

*Gomphosus sandvicensis* Günther, 1862: Günther (1862).

*Gomphosus varius* Lacépède, 1801 [first proposed for initial phase]: Steindachner (1900), Fowler (1900, 1928, 1931, 1934, 1949), Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Gosline & Brock (1960), Hobson (1974), Tinker (1982), Hobson (1984), Okamoto & Kanenaka (1984), Randall (1985a, 1996a), Randall *et al.* (1985a, 1990a, 1990b, 1993b, 1997a), Hoover (1993, 2003), Myers (1989), Godwin & Kosaki (1989), Bernardi *et al.* (2004).

TAXONOMY: Randall (1985a). Bernardi *et al.* (2004) gave strong evidence that *Gomphosus* is part of a clade nested within *Thalassoma* and that these genera should be synonymized.

COMMON NAMES: Hīnālea 'i'īwi (terminal phase) (Hoover, 1993, 2003; Randall, 1996a), Hīnālea 'aki-lolo (initial phase) (Hoover, 1993, 2003), Bird wrasse (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 1–18 m (Quoy & Gaimard, 1824; Hobson, 1974, 1984; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b; Godwin & Kosaki, 1989; Randall *et al.*, 1993b).

GENERAL RANGE: Eastern Indian Ocean and Pacific Ocean from Cocos-Keeling Island and Indonesia to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, the Tuamotu Archipelago, the Marquesas, and Rapa. Engybenthic over coral reefs at 1–30 m (Hobson, 1984; Myers, 1989; Randall *et al.*, 1990a, 1990b, 1997a, 1997b).

### *Halichoeres marginatus* Rüppell

*Halichoeres marginatus* Rüppell, 1835, p. 16, Mohila and Massawa, Eritrea, Red Sea.

*Halichoeres marginatus* Rüppell, 1835: Randall (1980a, 1985a), Tinker (1982 appendix), Randall & Smith (1982), Myers (1989), Randall *et al.* (1990a).



TAXONOMY: Randall & Smith (1982).

COMMON NAMES: Dusky wrasse (Randall *et al.*, 1997a; Myers, 1999).

HAWAIIAN RECORDS: The single specimen reported by Randall (1981a) from Hawai‘i Island at 5–10 m is the only record of this species from Hawaiian waters.

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to southern Japan, Australia, Micronesia, the Hawaiian Islands as a waif, and the Tuamotu Archipelago. Engybenitic over coral reefs at 1–30 m (Randall, 1981a; Myers, 1989; Randall *et al.*, 1990a).

### *Halichoeres ornatissimus* (Garrett)

*Julis ornatissimus* Garrett, 1863, p. 63, Hawai‘i Island.

*Julis ornatissimus* Garrett, 1863: Garrett (1863).

*Halichoeres* sp.?: Fowler (1900).

*Halichoeres iridescens* Jenkins, 1901: Jenkins (1901, 1903).

*Halichoeres lao* Jenkins, 1901: Jenkins (1901, 1903), Jordan & Evermann (1905).

*Halichoeres ornatissimus* (Garrett, 1863): Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1931, 1949), Gosline & Brock (1960), Hobson (1974), Randall (1976a, 1985a, 1993b, 1996a), Tinker (1982), Randall & Smith (1982), Okamoto & Kanenaka (1984), Randall *et al.* (1985a, 1990a, 1999e), Hoover (1993, 2003), Allen & Smith-Vaniz (1994), Myers & Donaldson (1996), Parenti & Randall (2000).

TAXONOMY: Randall & Smith (1982), Randall (1985a, 1999e) Parenti & Randall (2000).

COMMON NAMES: Iā‘ō (Hoover, 1993, 2003), ‘Ōhua (Randall, 1996a), Lao (Gosline & Brock, 1960), Pa‘awela (Gosline & Brock, 1960), Ornate wrasse (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to Kure Atoll at 6–20 m (Garrett, 1863; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b).

GENERAL RANGE: Eastern Indian Ocean and Pacific from Cocos-Keeling Island, Australia, and Mariana Islands to the Hawaiian and Society Islands. Engybenitic over reefs at 6–20 m (Randall & Smith, 1982, Araga *in* Masuda *et al.*, 1984, Randall *et al.*, 1990a, 1993b, Allen & Smith-Vaniz, 1994, Myers & Donaldson, 1996). Replaced by *Halichoeres orientalis* Randall, 1999, (which prior to 1999 was misidentified as *H. ornatissimus*) in Taiwan, Japan, and the Ogasawara Islands (Randall, 1999e).

### [*Hologymnosus doliatus* (Lacépède)]

*Labrus doliatus* Lacépède, 1801, p. 429, 473, pl. 6 (fig. 3), Mauritius.

*Hologymnosus fasciatus* Lacépède, 1801: Borodin (1930).

*Hologymnosus doliatus* (Lacépède, 1801): Myers (1999), Parenti & Randall (2000), Westneat *in* Carpenter & Niem (2001).

TAXONOMY: Parenti & Randall (2000).

COMMON NAMES: Pastel ringwrasse (FAO), Longface wrasse (Myers, 1999).

HAWAIIAN RECORDS: Borodin (1930) recorded this species from Hilo. This record was most likely due to a locality error, given the great distance between the natural range of this species and the Hawaiian Islands, the timing of this record prior to the development of the trade in marine aquarium fishes and other frequent modes of introductions of nonindigenous fish species to the Hawaiian Islands, the dissimilarity between this species and most of those known to occur in the archipelago, and Borodin’s (1930) several other unusual records from the Hawaiian Islands of species otherwise unknown from the region (i.e., *Chaetodon vagabundus*, *Chaetodontoplus mesoleucas*, and *Choerodon anchorago*). *Cheilio inermis*, the species found in the Hawaiian Islands that would have been most likely misidentified by Borodin (1930) as *H. doliatus*, was also recorded by him from the archipelago, making a misidentification unlikely.

GENERAL RANGE: Indo-Pacific from East Africa, and Mauritius to southern Japan, southeastern Australia, Samoa, and the Line Islands. Engybenitic over coral reefs and adjacent habitats at 1–30 m (Myers, 1999; Parenti & Randall, 2000; Westneat *in* Carpenter & Niem, 2001b).

### *Iniistius aneitensis* (Günther)

*Novacula aneitensis* Günther, 1862, p. 176, Aneiteum Island, Vanuatu.

*Yrlichthys niveilatus* Jordan & Evermann, 1903: Jordan & Evermann (1903a, 1905), Gosline & Brock (1960), Tinker (1982).

*Hemipteronotus pentadactylus* non (Linnaeus, 1758) [a valid *Iniistius* species not found in the Hawaiian Islands]:

Fowler (1928, 1934, 1949, in part).

*Xyrichtys aneitensis* (Günther, 1862): Randall *et al.* (1985a, 1990a), Myers (1989), Randall (1992b, 1996a), Allen & Smith-Vaniz (1994).

*Iniistius aneitensis* (Günther, 1862): Fowler (1928, 1949), Randall & Earle (2002), Hoover (2003).

TAXONOMY: Randall & Earle (2002).

COMMON NAMES: Laenihi (Randall, 1996a), Yellowblotch razorfish, Whitepatch razorfish (Randall, 1996a; Myers, 1999), Whiteside razorfish (Hoover, 2003), Nabeta (DLNR).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to O'ahu at 5–92 m (Jordan & Evermann, 1905; Randall *et al.*, 1985b; Randall & Earle, 2002).

GENERAL RANGE: Indo-Pacific from Zanzibar, the Maldives and the Chagos Archipelago through Indonesia and Cocos-Keeling Island to Australia, Lord Howe Island, the Ryukyus, Samoa, Micronesia, and the Hawaiian Islands. Benthic and engy-benthic over or in sand at 4–92 m (Myers, 1989; Randall *et al.*, 1990a; Allen & Smith-Vaniz, 1994; Randall & Earle, 2002).

### *Iniistius baldwini* (Jordan & Evermann)

*Hemipteronotus baldwini* Jordan & Evermann, 1903a, p. 192, Honolulu, O'ahu, Hawaiian Islands.

*Hemipteronotus baldwini* Jordan & Evermann, 1903a: Jordan & Evermann (1903a, 1905), Gosline & Brock (1960), Tinker (1982).

*Hemipteronotus jenkinsi* Snyder, 1904: Snyder (1904), Jordan & Evermann (1905), Randall (1976a).

*Hemipteronotus melanopus* non (Bleeker, 1857) [a valid species not found in the Hawaiian Islands]: Fowler (1928, 1931, 1934, 1949, in part), Randall (1976a).

*Xyrichtys baldwini* (Jordan & Evermann, 1903a): Uchida & Uchiyama (1986), Randall (1996a), Parenti & Randall (2000).

*Iniistius baldwini* (Jordan & Evermann, 1903a): Randall & Earle (2002), Hoover (2003).

TAXONOMY: Randall & Earle (2002).

COMMON NAMES: Laenihi (Randall 1996), Baldwin's razorfish (Randall 1996), Nabeta (DLNR).

HAWAIIAN RECORDS: Hawai'i Island to Raita Bank at 15–132 m (Jordan & Evermann, 1903a, 1905; Uchida & Uchiyama, 1986).

GENERAL RANGE: Perhaps Indo-Pacific but recorded with certainty only from the Red Sea, Vietnam, Taiwan, New Guinea, and Hawai'i. Benthic and engy-benthic in or over sand at 15–132 m (Uchida & Uchiyama, 1986; Randall, 1996a; Parenti & Randall, 2000; Randall & Earle, 2002).

### *Iniistius celebicus* (Bleeker)

*Novacula celebica* Bleeker, 1856b, p. 61, Makassar [Ujung Pandang], Sulawesi [Celebes].

*Xyrichtys pavo* non Valenciennes, 1840 [a valid species also found in the Hawaiian Islands]: Hoover (1993, photograph of adult).

Undescribed *Xyrichtys* species: Hoover (1994, text).

*Xyrichtys celebicus* (Bleeker, 1856b): Myers (1999), Parenti & Randall (2000).

*Iniistius celebicus* (Bleeker, 1856b): Randall & Earle (2002), Hoover (2003).

TAXONOMY: Randall & Earle (2002).

COMMON NAMES: Bronzespot razorfish (Myers, 1999), Celebes razorfish (Hoover, 2003).

HAWAIIAN RECORDS: Hawai'i Island to O'ahu at 6–27 m (photograph of adult, identified as *X. pavo* in Hoover 1993 but not Hoover 1994; mentioned in text on *X. umbrilatus* by Hoover, 1994; B. Mundy, pers. observ., 1998; Randall & Earle, 2002).

GENERAL RANGE: Western tropical and central Pacific Ocean endemic from Sulawesi, the Moluccas, the Philippines, Taiwan, Guam, the Ogasawara Islands, Samoa, the Marshall Islands, and the Hawaiian Islands. Engy-benthic in or over sand at 6–27 m (Hoover, 1993; Myers, 1999; Parenti & Randall, 2000; Randall & Earle, 2002).

### *Iniistius pavo* (Valenciennes)

*Xyrichtys pavo* Valenciennes in Cuvier & Valenciennes, 1840a, p. 61, Pl. 394, Mauritius, western Indian Ocean.

*Xyrichtys pavoninus* Valenciennes, 1840: Cuvier & Valenciennes (1840).

*Novacula (Iniistius) nigra* Steindachner, 1900: Steindachner (1900).

*Novacula (Iniistius) pavo* (Valenciennes, 1840): Steindachner (1900).

*Novacula (Iniistius) tetrazona* Bleeker, 1859: Steindachner (1900).

*Iniistius leucozonus* Jenkins, 1901: Jenkins (1901, 1903).

*Iniistius verater* Jenkins, 1901: Jenkins (1901).

*Iniistius pavoninus* (Valenciennes, 1840): Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Gosline & Brock (1960).

*Iniistius niger* (Steindachner, 1900): Jenkins (1903), Jordan & Evermann (1905), Fowler (1928, 1934, 1949), Gosline & Brock (1960).

*Hemipteronotus niger* (Steindachner, 1900): Tinker (1982).

*Xyrichtys niger* (Steindachner, 1900): Yamakawa *in* Masuda *et al.* (1984), Uchida & Uchiyama (1986), Severns & Fiene-Severns (1993), Parenti & Randall (2000).

*Hemipteronotus pavoninus* (Valenciennes, 1840): Tinker (1982).

*Xyrichtys pavo* Valenciennes, 1840: Randall *in* Smith & Heemstra (1986), Myers (1989), Randall *et al.* (1990a, 1993b, 1997a), Kosaki *et al.* (1991), Hoover (1994), Allen & Robertson (1994), Randall (1996a), Parenti & Randall (2000), Robertson & Allen (2002).

*Iniistius pavo* (Valenciennes, 1840): Fowler (1928, 1931, 1934, 1949), Randall & Earle (2002), Hoover (2003).

TAXONOMY: Randall & Earle (2002).

COMMON NAMES: Lae-nihi (Hoover, 1993, 2003; Randall, 1996a), Laenihi (DLNR), Razorfish, Nabeta (DLNR), Indianfish, Blue razorfish (Myers, 1999), Pavo razorfish, Peacock razorfish (Hoover, 1993, 2003; Randall, 1996a), Black nabeta, Black razorfish.

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at 8–100 m (Cuvier & Valenciennes, 1840a; Steindachner, 1900; Jordan & Evermann, 1905; Uchida & Uchiyama, 1986; Kosaki *et al.*, 1991; Randall *et al.*, 1993b; Hoover, 1994 [not 1993; see *Xyrichtys celebicus* (Bleeker, 1856)]; Randall & Earle, 2002).

GENERAL RANGE: Indo-transpacific from South Africa and the Red Sea to southern Japan, the Ogasawara Islands, Australia, Lord Howe Island, Micronesia, the Hawaiian, Society, Galapagos, Cocos, and Revillagigedo Islands, and the continental eastern Pacific from central Baja California to Colombia. Benthic and eurybenthic in or over sand at 2–>100 m (Myers, 1989; Randall *et al.*, 1990a, 1997b; Allen & Robertson, 1994; Randall & Earle, 2002; Robertson & Allen, 2002).

### *Iniistius umbrilatus* (Jenkins)

*Hemipteronotus umbrilatus* Jenkins, 1901a, p. 53, Fig. 10, Honolulu, O'ahu, Hawaiian Islands.

*Hemipteronotus umbrilatus* Jenkins, 1901a: Jenkins (1901a, 1903), Jordan & Evermann (1905), Gosline & Brock (1960), Tinker (1982).

*Hemipteronotus pentadactylus* non (Linnaeus, 1758) [a valid *Iniistius* species not found in the Hawaiian Islands]: Fowler (1928, in part).

*Hemipteronotus aneitensis* non (Günther, 1862) [a valid species of *Iniistius* also found in the Hawaiian Islands]: Myers (1989).

*Xyrichtys umbrilatus* (Jenkins, 1901a): Ishihara & Zama (1978), Hoover (1994), Randall (1996a), Parenti & Randall (2000).

*Iniistius umbrilatus* (Jenkins, 1901a): Randall & Earle (2002), Hoover (2003).

TAXONOMY: Randall & Earle (2002).

COMMON NAMES: Lae-nihi (Hoover, 1993, 2003; Randall, 1996a), Blackside razorfish (Hoover, 1993, 2003; Randall, 1996a), Nabeta (DLNR).

HAWAIIAN RECORDS: Hawai'i Island to Necker Island at 6–76 m (Jenkins, 1901a; Jordan & Evermann, 1905; Hoover, 1994; Randall & Earle, 2002; NMFS PIFSC, unpubl. data April 1994).

GENERAL RANGE: Hawaiian Islands endemic. Eurybenthic or benthic in or over sand at 6–76 m (Hoover, 1994; Parenti & Randall, 2000; Randall & Earle, 2002; NMFS PIFSC, unpubl. data April 1994).

### [*Labroides dimidiatus* (Valenciennes)]

*Cossyphus dimidiatus* Valenciennes *in* Cuvier & Valenciennes, 1839, p. 136, Et Tur, Sinai coast, Egypt, Gulf of Suez.

*Labroides dimidiatus* (Valenciennes, 1839): Randall (1958b), Araga *in* Masuda *et al.* (1984, in part), Myers (1989), Randall *et al.* (1990a, 1997a).

TAXONOMY: Randall (1958b).

COMMON NAMES: Cleaner wrasse, Bluestreak cleaner wrasse (Myers, 1999), Striped cleaner wrasse (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Araga *in Masuda et al.* (1984) listed the Hawaiian Islands as within the range of this species, but this is undoubtedly based on records of *L. phthirophagus* Randall, 1958, prior to its description.

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Line Islands, the Marquesas, and Ducie. Engybenitic in or near coral reefs and rock at 1–>40 m (Myers, 1989; Randall *et al.*, 1990a, 1997b).

***Labroides phthirophagus* Randall**

*Labroides phthirophagus* Randall, 1958b, p. 337, Pl. 1, Waikiki, Honolulu, O'ahu, Hawaiian Islands.

*Labroides dimidiatus* non (Valenciennes, 1839): Günther (1881, in part), Fowler (1928, in part), Araga *in Masuda et al.* (1984, in part).

*Labroides phthirophagus* Randall, 1958b: Randall (1958b, 1985a, 1996a), Gosline & Brock (1960), Hobson (1974), Tinker (1982), Okamoto & Kanenaka (1984), Randall *et al.* (1985a, 1993a), Hoover (1993, 2003), Chave & Mundy (1994).

TAXONOMY: Randall (1958b, 1985a).

COMMON NAMES: Hawaiian cleaner wrasse (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 1–122 m (Günther, 1881; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall, 1985a; Randall *et al.*, 1985b, 1993b; Chave & Mundy, 1994).

GENERAL RANGE: Johnston Atoll and Hawaiian Islands endemic. Engybenitic over hard substrates near or in crevices or ledges at 1–122 m (Randall, 1958b, 1985a; Chave & Mundy, 1994).

***Macropharyngodon geoffroy* (Quoy & Gaimard)**

*Julis geoffroy* Quoy & Gaimard, 1824, p. 270, pl. 56 (fig. 3), "Hawaiian Islands".

*Julis geoffroy* Quoy & Gaimard, 1824: Quoy & Gaimard (1824).

*Julis geoffroyi* Quoy & Gaimard, 1824 [*lapsus* for *geoffroy*]: Wetmore (1890).

*Macropharyngodon geoffroyi* (Quoy & Gaimard, 1824): Fowler (1900), Jenkins (1903).

*Macropharyngodon aquilolo* Jenkins, 1901: Jenkins (1901).

*Macropharyngodon geoffroy* (Quoy & Gaimard, 1824): Jordan & Evermann (1905), Fowler (1928, 1931, 1949), Gosline & Brock (1960), Hobson (1974), Randall (1978, 1985a, 1996a), Tinker (1982), Okamoto & Kanenaka (1984), Randall *et al.* (1985a, 1993b), Hoover (1993, 2003).

TAXONOMY: Randall (1978).

COMMON NAMES: Hinalea 'aki-lolo (Gosline & Brock, 1960), Shortnose wrasse (Hoover, 1993, 2003; Randall, 1996a), Potter's wrasse (Hoover, 1993, 2003).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 6–32 m (Quoy & Gaimard, 1824; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall, 1978, 1985a; Randall *et al.*, 1985b, 1993b).

GENERAL RANGE: Johnston Atoll and Hawaiian Islands endemic. Engybenitic over coral and rock at 6–32 m (Hobson, 1974; Randall, 1978, 1985a).

**[*Macropharyngodon meleagris* (Valenciennes)]**

*Julis meleagris* Valenciennes *in* Cuvier & Valenciennes, 1839, p. 481, Ulea.

*Macropharyngodon meleagris* (Valenciennes, 1839): Randall (1978), Tinker (1982), Masuda *et al.* (1984, in part), Myers (1989), Randall *et al.* (1990a, 1997a), Allen & Smith-Vaniz (1994).

TAXONOMY: Randall (1978).

COMMON NAMES: Leopard wrasse (Myers, 1999), Blackspotted wrasse (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Tinker (1982) and Masuda *et al.* (1984) listed this species as occurring in Hawaiian waters but Randall (1978) did not include the Hawaiian Islands in the range of *M. meleagris*. The Hawaiian records must be regarded as false.

GENERAL RANGE: Eastern Indian Ocean and Pacific Ocean from the Cocos-Keeling Islands (but absent in Indonesia) to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Line Islands, the Marquesas, and the Pitcairn Group. Engybenitic over coral reefs, sand, or rubble at 1–30 m (Randall, 1978; Myers, 1989; Randall *et al.*, 1990a, 1997b; Allen & Smith-Vaniz, 1994).

***Novaculichthys taeniourus* (Lacépède)**

*Labrus taeniourus* Lacépède, 1801, p. 448, 518, pl. 29 (fig. 1), Madagascar.

*Julis bifer* Lay & Bennett, 1839 [based on the juvenile stage]: Lay & Bennett (1839).

*Novacula vanicolensis* (Valenciennes in Cuvier & Valenciennes, 1840): Steindachner (1900).

*Novaculichthys hemisphaerium* (Lacépède, 1802): Jenkins (1903).

*Novaculichthys kallasoma* (Bleeker, 1860) [based on juvenile stage]: Jordan & Snyder (1904b), Snyder (1904), Jordan & Evermann (1905).

*Novaculichthys bifer* (Lay & Bennett, 1839): Fowler (1928, 1949), Gosline & Brock (1960), Tinker (1982).

*Hemipteronotus taeniourus* (Lacépède, 1801): Hobson (1974), Randall (1976a), Tinker (1982), Okamoto & Kanenaka (1984).

*Novaculichthys taeniourus* (Lacépède, 1801): Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Randall (1985a, 1996a), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Randall in Smith & Heemstra (1986), Myers (1989), Winterbottom *et al.* (1989), Hoover (1993, 2003), Allen & Robertson (1994), Robertson & Allen (2002), Randall & Earle (2002).

TAXONOMY: Randall & Earle (2002).

COMMON NAMES: Rockmover (adult) (Hoover, 1993, 2003), Dragon wrasse (juveniles) (Hoover, 1993, 2003), Rockmover wrasse (Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 8–25 m (Lay & Bennett, 1839; Steindachner, 1900; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Hoover, 1993).

GENERAL RANGE: Indo-transpacific from South Africa and the Red Sea to the Ryukyu and Ogasawara Islands, Australia, Lord Howe Island, Micronesia, the Hawaiian Islands, the Tuamotus, the offshore eastern tropical Pacific islands, and the Gulf of California to Colombia. Engybenitic sand and rubble near reefs at 1–25 m (Myers, 1989; Randall, 1985a; Winterbottom *et al.*, 1989; Randall *et al.*, 1990a, 1993b, 1997b; Allen & Robertson, 1994; Robertson & Allen, 2002).

***Oxycheilinus bimaculatus* (Valenciennes)**

*Cheilinus bimaculatus* Valenciennes in Cuvier & Valenciennes, 1840a, p. 96, Honolulu, O'ahu, Hawaiian Islands.

*Cheilinus bimaculatus* Valenciennes, 1840: Valenciennes in Cuvier & Valenciennes (1840), Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1934, 1949), Gosline & Brock (1960), Tinker (1982), Okamoto & Kanenaka (1984), Randall (1985a), Uchida & Uchiyama (1986), Myers (1989), Randall *et al.* (1990a, 1993b), Hoover (1993).

*Chilinus bimaculatus* Valenciennes, 1840 [a misspelling of the genus name]: Steindachner (1900).

*Oxycheilinus bimaculatus* (Valenciennes, 1840): Westneat (1993), Chave & Mundy (1994), Randall (1996a), Hoover (2003).

TAXONOMY: Westneat (1993).

COMMON NAMES: Twospot wrasse (Hoover, 1993, 2003; Randall, 1996a), Twospot Maori wrasse (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Hawai'i Island to Kure Atoll at 9–102 m (Valenciennes in Cuvier & Valenciennes, 1840a; Jordan & Evermann, 1905; Okamoto & Kanenaka, 1984; Randall, 1985a; Uchida & Uchiyama, 1986; Hoover, 1993; Randall *et al.*, 1993b).

GENERAL RANGE: Indo-Pacific from South Africa to southern Japan, Australia, Micronesia, the Hawaiian Islands, and the Marquesas. Benthic and engybenitic in or over rubble and sand near algae at 2–110 m, usually >15 m (Myers, 1989; Hoover, 1993; Randall *et al.*, 1990a; Chave & Mundy, 1994).

***Oxycheilinus unifasciatus* (Streets)**

*Cheilinus unifasciatus* Streets, 1877, p. 82, Fanning Island, Line Islands, central Pacific Ocean.

*Cheilinus unifasciatus* Streets, 1877: Streets (1877), Fowler (1928, 1931, 1949), Randall (1985a), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Uchida & Uchiyama (1986), Myers (1989), Hoover (1993).

*Chilinus digramma* non (Lacépède, 1801) [a valid Indian Ocean *Oxycheilinus* species; genus name misspelled]: Smith & Swain (1882).

*Chilinus radiatus* non (Bloch & Schneider, 1801) [a junior synonym of *O. digramma* (Lacépède, 1801); genus name misspelled]: Steindachner (1900).

*Cheilinus hexagonatus* Günther, 1881: Snyder (1904), Jordan & Evermann (1905).

*Cheilinus zonurus* Jenkins, 1901: Jenkins (1901, 1903).

*Cheilinus digrammus* non (Lacépède, 1801): Fowler (1928, 1949, in part).

*Cheilinus rhodochrous* Günther in Playfair & Günther, 1867: Gosline & Brock (1960), Hobson (1974), Tinker (1982), Okamoto & Kanenaka (1984).

*Oxycheilinus unifasciatus* (Streets, 1877): Westneat (1993), Chave & Mundy (1994), Randall (1996a), Hoover (2003).

TAXONOMY: Randall (1985a), Westneat (1993).

COMMON NAMES: Pō'ou (Hoover, 1993, 2003), Po'ou (Randall, 1996a), Ringtail wrasse (Hoover, 1993, 2003; Randall, 1996a), Ringtail Maori wrasse (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 8–161 m (Streets, 1877a; Smith & Swain, 1882; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.* 1985a, 1993b; Uchida & Uchiyama, 1986; Chave & Mundy, 1994).

GENERAL RANGE: Eastern Indian Ocean and Pacific from Christmas and Cocos-Keeling Islands to the Ryukyu and Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, Rapa, the Tuamotu Archipelago, and the Marquesas. Engybenitic over coral, rubble, and rock at 1–161 m (Randall *et al.*, 1985b, 1990a, 1993b, 1997b; Myers, 1989; Chave & Mundy, 1994).

### *Polylepidon russelli* (Gomon & Randall)

*Bodianus russelli* Gomon & Randall, 1975, p. 444, Moku Manu, O'ahu, Hawaiian Islands.

*Bodianus russelli* Gomon & Randall, 1975: Gomon & Randall (1975), Tinker (1982 text).

*Polylepidon russelli* (Gomon & Randall, 1975): Gomon & Randall (1978), Randall (1980a, 1985a, 1992b), Tinker (1982 appendix), Yamakawa *in* Masuda *et al.* (1984), Randall *et al.* (1985a), Myers (1989), Clarke (1991), Chave & Mundy (1994), Myers & Donaldson (1996).

TAXONOMY: Gomon & Randall (1978).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to O'ahu at 92–318 m (Gomon & Randall, 1975; Randall *et al.*, 1985b; Clarke, 1991; Chave & Mundy, 1994).

GENERAL RANGE: Pacific endemic from the Ryukyus, the Marianas, the Hawaiian Islands, and French Polynesia. Engybenitic at 92–353 m (Gomon & Randall, 1978; Yamakawa *in* Masuda *et al.*, 1984; Myers, 1989; Randall, 1992b; Chave & Mundy, 1994; Myers & Donaldson, 1996).

### *Pseudocheilinus evanidus* Jordan & Evermann

*Pseudocheilinus evanidus* Jordan & Evermann, 1903a, p. 192, tidepool near Hilo, Hawai'i Island.

*Pseudocheilinus hexataenia* non (Bleeker, 1857) [a valid species not found in the Hawaiian Islands]: Streets (1877), Fowler (1928, 1949, in part).

*Pseudocheilinus evanidus* Jordan & Evermann, 1903a: Jordan & Evermann (1903a, 1905), Snyder (1904), Gilbert (1905), Gosline & Brock (1960), Hobson (1974), Shepard & Okamoto (1977), Tinker (1982), Randall (1985a, 1996a, 1999c), Myers (1989), Randall *et al.* (1990a, 1993b, 1997a), Kosaki *et al.* (1991), Hoover (1993, 2003), Chave & Mundy (1994).

TAXONOMY: Randall (1999c).

COMMON NAMES: Disappearing wrasse (Hoover, 1993, 2003; Randall, 1996a), Scarlet wrasse (Hoover, 1993, 2003), Striated Wrasse (Myers, 1999).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at 5–92 m and to 143 m fishing depths (Jordan & Evermann, 1903a; Gilbert, 1905; Hobson, 1974; Kosaki *et al.*, 1991; Randall *et al.*, 1993b; Chave & Mundy, 1994; Randall, 1999c).

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to Indonesia, southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, the Society Islands, and the Marquesas. Engybenitic over or in coral, rubble, and rock at 5–92 m and to 143 m fishing depths, usually at >20 m (Shepard & Okamoto, 1977; Myers, 1989; Randall *et al.*, 1990a, 1997b; Kosaki *et al.*, 1991; Chave & Mundy, 1994; Randall, 1999c).

### *Pseudocheilinus ocellatus* Randall

*Pseudocheilinus ocellatus* Randall, 1999c, p. 21, Fig. 3; Pls. I (H), II (A), Laura Island, Majuro Atoll, Marshall Islands.

Undescribed *Pseudocheilinus* species: Myers (1989), Randall *et al.* (1990a, 1997a), Kosaki *et al.* (1991).

*Pseudocheilinus ocellatus* Randall, 1999c: Randall (1999c).

TAXONOMY: Randall (1999c).

COMMON NAMES: Whitebarred wrasse (Myers, 1999).

HAWAIIAN RECORDS: Johnston Atoll at >30 m; not found in the Hawaiian Islands (Kosaki *et al.*, 1991; Randall, 1999c).

GENERAL RANGE: Pacific Ocean endemic from the Ryukyu and Ogasawara Islands, the Coral Sea east of Australia, Palau, the Marshall Islands, Wake Island, Johnston Atoll, the Cook Islands, French Polynesia, and Pitcairn Island. Engybenitic in coral reefs at 20–58 m (Myers, 1989; Kosaki *et al.*, 1991; Randall *et al.*, 1990a, 1997b; Randall, 1999c).

### *Pseudocheilinus octotaenia* Jenkins

*Pseudocheilinus octotaenia* Jenkins, 1901a, p. 64, Fig. 22, Honolulu, Hawaiian Islands.

*Pseudocheilinus hexataenia* non (Bleeker, 1857) [a valid species not found in the Hawaiian Islands]: Streets (1877), Fowler (1928, 1949, in part).

*Pseudocheilinus octotaenia* Jenkins, 1901a: Jenkins (1901a, 1903), Snyder (1904), Jordan & Evermann (1905), Gosline & Brock (1960), Hobson (1974), Shepard & Okamoto (1977), Tinker (1982), Okamoto & Kanenaka (1984), Randall (1985a, 1996a, 1999c), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Myers (1989), Hoover (1993, 2003).

TAXONOMY: Shepard & Okamoto (1977), Randall (1999c).

COMMON NAMES: Aleihi lakea, Eightline wrasse (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll to 6–30 m (Jenkins, 1901a; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Randall, 1999c).

GENERAL RANGE: Indo-Pacific from East Africa to Indonesia, southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, French Polynesia, Pitcairn, and Ducie. Engybenitic in or near coral reefs and rubble at 2–50 m (Randall, 1985a, 1999c; Myers, 1989; Randall *et al.*, 1990a, 1993b, 1997b).

### *Pseudocheilinus tetrataenia* Schultz

*Pseudocheilinus tetrataenia* Schultz in Schultz *et al.*, 1960, p. 167, Fig. 98, Reer Island, Bikini Atoll, Marshall Islands.

*Pseudocheilinus hexataenia* non (Bleeker, 1857) [a valid species not found in the Hawaiian Islands]: Fowler (1928, 1949, in part).

*Pseudocheilinus tetrataenia* Schultz, 1960: Schultz in Schultz *et al.* (1960), Gosline & Brock (1960), Hobson (1974), Shepard & Okamoto (1977), Tinker (1982), Randall (1985a, 1996a, 1999c), Randall *et al.* (1985a, 1993b, 1997b), Myers (1989), Hoover (1993, 2003).

TAXONOMY: Shepard & Okamoto (1977), Randall (1999c).

COMMON NAMES: Fourline wrasse (Hoover, 1993, 2003), Fourstripe wrasse (Randall, 1996a), Neon wrasse (Hoover, 1993, 2003).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at 5 m (Schultz in Schultz *et al.*, 1960; Hobson, 1974; Randall *et al.*, 1985b, 1993b; Hoover, 1993).

GENERAL RANGE: Pacific endemic from the Ogasawara Islands, Micronesia, the Hawaiian Islands, the Tuamotu Archipelago, the Australs, Pitcairn, and Ducie, but apparently antiequatorial in distribution. Benthic and engybenitic in or near coral at 5–44 m (Randall, 1985a, 1999c; Myers, 1989; Hoover, 1993; Randall *et al.*, 1997b).

### *Pseudojuloides cerasinus* (Snyder)

*Pseudojulius cerasina* Snyder, 1904, p. 528, Honolulu, O'ahu, Hawaiian Islands.

*Pseudojulius cerasina* Snyder, 1904: Snyder (1904), Jordan & Evermann (1905).

*Pseudojuloides cerasina* (Snyder, 1904): Fowler (1928).

*Pseudojuloides cerasinus* (Snyder, 1904): Fowler (1928), Gosline & Brock (1960), Hobson (1974), Randall (1976a, 1985a, 1996a), Randall & Randall (1981), Tinker (1982), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Myers (1989), Hoover (1993, 2003), Chave & Mundy (1994).

TAXONOMY: Randall & Randall (1980).

COMMON NAMES: Pencil wrasse (Hoover, 1993, 2003), Smalltail wrasse (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at 8–104 m (Snyder, 1904; Hobson, 1974; Randall *et al.*, 1985b, 1993b; Hoover, 1993; Chave & Mundy, 1994).

GENERAL RANGE: Indo-Pacific from South Africa to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, the Society Islands, and the Austral Islands. Allen & Robertson's

(1994) inclusion of this species in the eastern Pacific fauna was likely based upon the misidentification of *Halichoeres salmofasciatus* Robertson & Allen (Robertson & Allen, 2002). Engybenthic over coral and rubble at 2–104 m, usually at > 21 m (Randall & Randall, 1980; Myers, 1989; Randall *et al.*, 1990a, 1997b; Chave & Mundy, 1994).

***Stethojulis balteata*** (Quoy & Gaimard)

*Julis balteatus* Quoy & Gaimard, 1824, p. 267, Pl. 56 (fig. 1), Maui, Hawaiian Islands.

*Julis balteatus* Quoy & Gaimard, 1824 [first proposed for terminal phase]: Quoy & Gaimard (1824), Lay & Bennett (1839), Wetmore (1890).

*Julis axillaris* Quoy & Gaimard, 1824 [initial phase]: Quoy & Gaimard (1824), Lay & Bennett (1839).

*Stethojulis albovittata* non (Bonnaterre, 1788) [a valid Indian Ocean species]: Steindachner (1900), Fowler (1900), Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960).

*Hinalea albovittata* non (Bonnaterre, 1788): Jordan & Jordan (1922).

*Hinalea axillaris* (Quoy & Gaimard, 1824): Jordan & Jordan (1922).

*Stethojulis axillaris* (Quoy & Gaimard, 1824): Streets (1877), Fowler (1900), Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960).

*Stethojulis balteata* (Quoy & Gaimard, 1824): Randall & Kay (1974), Hobson (1974), Randall (1976a, 1985a, 1996a, 2000), Tinker (1982), Okamoto & Kanenaka (1984), Randall *et al.* (1985a, 1993b), Hoover (1993, 2003).

TAXONOMY: Randall & Kay (1974), Randall (2000).

COMMON NAMES: ‘Omaka (Hoover, 1993, 2003), ‘Ōmaka (Randall, 1996a), Belted wrasse (Hoover, 1993, 2003; Randall, 1996a), Orange-bar wrasse (Hoover, 1993, 2003).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to Kure Atoll at 2–22 m (Quoy & Gaimard, 1824; Randall & Kay, 1974; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Hoover 1993; Randall, 2000).

GENERAL RANGE: Johnston Atoll and Hawaiian Islands endemic. Engybenthic over reefs, sand, and algae at 2–22 m (Randall & Kay, 1974; Randall, 2000).

***Suezichthys notatus*** (Kamohara)

*Pseudolabrus notatus* Kamohara, 1958, p. 8, pl. 3 (fig. 2), Okinoshima Kochi Prefecture, Japan.

*Suezichthys tripunctatus* Randall & Kotthaus, 1977: Randall & Kotthaus (1977), Randall (1980a), Tinker (1982 appendix).

*Suezichthys notatus* (Kamohara, 1958): Russell (1985), Randall (1985a), Chave & Mundy (1994).

TAXONOMY: Russell (1985).

HAWAIIAN RECORDS: Hawai‘i Island to Brooks Bank at 119–272 m (Randall & Kotthaus, 1977; Chave & Mundy, 1994; B. Mundy, pers. observ., Sept. 2002).

GENERAL RANGE: Pacific endemic from Japan, Australia, and the Hawaiian Islands. Engybenthic at 119–272 m (Russell, 1985; Chave & Mundy, 1994).

[***Thalassoma amblycephalum*** (Bleeker)]

*Julis (Julis) amblycephalus* Bleeker, 1856c, p. 83, Ora Malang, southeastern Java, Indonesia.

*Julis melanochir* Bleeker, 1857: Steindachner (1900).

*Thalassoma melanochir* (Bleeker, 1857): Gosline & Brock (1960), Tinker (1982).

*Thalassoma amblycephalum* (Bleeker, 1856): Randall (1976a, 1985a), Randall *in* Smith & Heemstra (1986), Myers (1989), Winterbottom *et al.* (1989), Randall *et al.* (1990a, 1997a).

TAXONOMY: Randall *in* Smith & Heemstra (1986).

COMMON NAMES: Twotone wrasse, Bluntheaded wrasse (Randall *et al.*, 1997a; Myers, 1999).

HAWAIIAN RECORDS: Records of this species from Hawaiian waters (Steindachner, 1900; Gosline & Brock, 1960; Tinker, 1982) are probably errors (Randall, 1985a).

GENERAL RANGE: Indo-Pacific from South Africa to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Line Islands, the Tuamotu Archipelago, and the Marquesas. Engybenthic over coral reefs at 1–24 m (Randall *in* Smith & Heemstra, 1986; Myers, 1989; Winterbottom *et al.*, 1989; Randall *et al.*, 1990a, 1997b).



***Thalassoma ballieui*** (Vaillant & Sauvage)

*Julis ballieui* Vaillant & Sauvage, 1875, p. 284, “Hawaiian Islands”.

*Julis ballieui* Vaillant & Sauvage, 1875: Vaillant & Sauvage (1875).

*Julis obscura* Günther, 1880: Günther (1880), Steindachner (1900).

*Julis verticalis* Smith & Swain, 1882: Smith & Swain (1882).

*Thalassoma obscurus* (Günther, 1880): Jenkins (1903).

*Thalassoma ballieui* (Vaillant & Sauvage, 1875): Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Hobson (1974), Randall (1976a, 1985a, 1996a), Tinker (1982), Randall *et al.* (1985a, 1993b), Uchida & Uchiyama (1986), Hoover (1993, 2003), Bernardi *et al.* (2004).

**TAXONOMY:** Randall (1985a). Eschmeyer’s (1998) citation of Randall (1976) as referring *Julis ballieui* Vaillant & Sauvage, 1875, to the synonymy of *Coris ballieui* Vaillant & Sauvage, 1875, is incorrect; these taxa are distinct, both are valid, and Randall (1976) did not include *Julis ballieui* Vaillant & Sauvage, 1875, as a synonym of *Coris ballieui* Vaillant & Sauvage, 1875. This error was not perpetuated in the website for Eschmeyer’s (1998) catalog. Bernardi *et al.* (2004) found that *T. ballieui*, together with the western Australian *T. septemfasciata*, is the sister taxon to all other *Thalassoma* species, having diverged from the common ancestor of the more recent clades at ca. 8–10 ma. *Thalassoma ballieui* is thus one of the only endemic species whose status as a relict species has been corroborated.

**COMMON NAMES:** Hinālea luahine (Hoover, 1993, 2003), Hinālea lauhine [a *lapsus* in spelling] (Randall, 1996a), Blacktail wrasse (Hoover, 1993, 2003; Randall, 1996a), Old woman wrasse (Hoover, 1993, 2003).

**HAWAIIAN RECORDS:** Johnston Atoll and Hawai‘i Island to Kure Atoll at 1–60 m. Common throughout the archipelago, but more common at Midway than in main Hawaiian Islands (Vaillant & Sauvage, 1875; Smith & Swain, 1882; Hobson, 1974; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986).

**GENERAL RANGE:** Johnston Atoll and Hawaiian Islands endemic. Ephybenthic over coral and rocks at 1–60 m (Randall, 1985a; Uchida & Uchiyama, 1986).

***Thalassoma duperrey*** (Quoy & Gaimard)

*Julis duperrey* Quoy & Gaimard, 1824, p. 268, pl. 56 (fig. 2), “Hawaiian Islands”.

*Julis caeruleocephalus* Cuvier, 1829: Cuvier (1829).

*Julis duperrey* Quoy & Gaimard, 1824: Quoy & Gaimard (1824).

*Julis clepsydralis* Smith & Swain, 1882: Smith & Swain (1882).

*Thalassoma hebraica* non (Lacépède, 1801) [a valid western Indian Ocean species]: Fowler (1900)?

*Thalassoma pyrrovinctum* Jenkins, 1901: Jenkins (1901).

*Julis duperrei* Quoy & Gaimard, 1824 [*lapsus* for of *duperrey*]: Steindachner (1900).

*Thalassoma duperrey* (Quoy & Gaimard, 1824): Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Hobson (1974), Randall (1976a, 1980a, 1985a, 1995a, 1996a), Tinker (1982), Okamoto & Kanenaka (1984), Randall *et al.* (1985a, 1993b), Godwin & Kosaki (1989), Hoover (1993, 2003), Bernardi *et al.* (2004).

**TAXONOMY:** Randall (1985a). Bernardi *et al.* (2004) found that *T. duperrey* is a very recent peripherally isolated species within a clade containing *T. lutescens* and three other species, with the southwestern Indian Ocean endemic *T. genivittatum* as its sister species.

**COMMON NAMES:** Hinālea lau-wili (Hoover, 1993, 2003; Randall, 1996a), A‘ala‘īhi (Gosline & Brock, 1960), Saddle wrasse (Hoover, 1993, 2003; Randall, 1996a).

**HAWAIIAN RECORDS:** Johnston Atoll and Hawai‘i Island to Kure Atoll at 1–21 m. Abundant throughout the archipelago but less common to the north than in the main islands (Quoy & Gaimard, 1824; Smith & Swain, 1882; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall, 1985a; Randall *et al.*, 1985b, 1993b; Godwin & Kosaki, 1989). This species hybridizes with *T. lutescens* (Lay & Bennett, 1839) at Johnston Atoll and *T. quinquevittatum* (Lay & Bennett, 1839) at Johnston Atoll and Hawai‘i Island (Randall, 1981a; Randall *et al.*, 1985a).

**GENERAL RANGE:** Johnston Atoll and Hawaiian Islands endemic. Ephybenthic over coral, rock, and rubble at 1–21 m (Hobson, 1974; Randall, 1985a, 1995a).

*[Thalassoma lunare* (Linnaeus)]

*Labrus lunaris* Linnaeus, 1758, p. 283, "Habitat in Indiis".

*Thalassoma lunaris* (Linnaeus, 1758): Jordan & Evermann (1905).

*Thalassoma lunare* (Linnaeus, 1758): Gosline & Brock (1960, with reservation), Randall (1976a, 1985a), Tinker (1982), Randall *in* Smith & Heemstra (1986), Myers (1989), Randall *et al.* (1990a, 1997a).

TAXONOMY: Randall *in* Smith & Heemstra (1986).

COMMON NAMES: Crescent wrasse (Myers, 1999), Moon wrasse (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Recorded from O'ahu with reservations by Jordan & Evermann (1905), but records of this species from Hawaiian waters are probably errors (Randall, 1985a).

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to southern Japan, the Ogasawara Islands, Australia, Micronesia, and the Line Islands. Engybenitic over coral reefs and rubble at 1–20 m (Myers, 1989; Randall *et al.*, 1990a, 1997b).

*Thalassoma lutescens* (Lay & Bennett)

*Julis lutescens* Lay & Bennett, 1839, p. 65, pl. 19 (fig. 2), Mauritius, western Indian Ocean.

*Thalassoma aneitensis* (Günther, 1862): Fowler (1900).

*Thalassoma aneitense* (Günther, 1862): Jordan & Snyder (1904a), Jordan & Evermann (1905).

*Thalassoma lutescens* (Lay & Bennett, 1839): Fowler (1928, 1931, 1949), Gosline & Brock (1960), Hobson (1974), Tinker (1982), Okamoto & Kanenaka (1984), Randall (1985a, 1995a, 1996a), Randall *et al.* (1985a, 1990a, 1997a), Myers (1989), Hoover (1993, 2003).

TAXONOMY: Myers (1989), Randall (1995a).

COMMON NAMES: Sunset wrasse (Hoover, 1993, 2003; Randall, 1996a), Lime green wrasse (Hoover, 1993, 2003).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Laysan at 3–6 m (Fowler, 1900; Jordan & Snyder, 1904b; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b; Hoover, 1993).

GENERAL RANGE: Indo-Pacific from east Africa and the Arabian Peninsula to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, French Polynesia, and Easter Island, but apparently absent from Indonesia and the Philippines. Reports of *T. lutescens* from the eastern tropical Pacific are misidentifications of the eastern Pacific endemic *T. grammaticum* Gilbert, 1890. Engybenitic over coral reefs, rubble, and sand at 1–30 m (Myers, 1989; Randall *et al.*, 1990a, 1997b; Randall, 1995a).

*Thalassoma purpureum* (Forsskål)

*Scarus purpureus* Forsskål, 1775, p. 27, x, Jidda, Saudi Arabia, Red Sea.

*Thalassoma purpurea* (Forsskål, 1775) [first proposed for the terminal phase]: Fowler (1900).

*Julis purpureus* (Forsskål, 1775): Steindachner (1900).

*Julis umbrostigma* (Rüppell, 1835) [a misspelling of *umbrostygma*, proposed for the initial phase]: Steindachner (1900).

*Thalassoma berendti* Seale, 1901: Seale (1901).

*Thalassoma quadricolor* (Lesson, 1828): Jenkins (1903), Snyder (1904).

*Thalassoma umbrostigma* (Rüppell, 1835): Jordan & Evermann (1905), Fowler (1928), Gosline & Brock (1960).

*Thalassoma umbrostygma* (Rüppell, 1835): Fowler (1931, 1934, 1949), Tinker (1982).

*Thalassoma purpureum* (Forsskål, 1775): Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Randall (1976a, 1985a, 1996a, 1995a), Tinker (1982), Okamoto & Kanenaka (1984), Randall & Edwards (1984), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Uchida & Uchiyama (1986), Myers (1989), Winterbottom *et al.* (1989), Hoover (1993, 2003), Robertson & Allen (2002).

TAXONOMY: Randall & Edwards (1984), Randall (1995a).

COMMON NAMES: Hou (large) (Hoover, 1993, 2003; Randall, 1996a), 'Awela (small), Palae'a (very small) (Gosline & Brock, 1960), 'Olani (Gosline & Brock, 1960), 'Olali, Surge wrasse (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 1–2 m (Fowler, 1900; Jordan & Evermann, 1905; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Hoover, 1993).

GENERAL RANGE: Indo-transpacific from South Africa and the Red Sea to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, the Marquesas, Easter Island, the Galapagos,

Cocos, and Clipperton Islands, and western Panama. Engybenitic over coral and rocks in the surge zone at 1–3 m (Randall & Edwards, 1984; Uchida & Uchiyama, 1986; Myers, 1989; Winterbottom *et al.*, 1989; Randall *et al.*, 1990a, 1997; Hoover, 1993; Randall, 1995a; Robertson & Allen, 2002).

***Thalassoma quinquevittatum*** (Lay & Bennett)

*Scarus? quinque-vittatus* Lay & Bennett, 1839, p. 66, pl. 19 (fig. 3), Ryukyu Islands, Japan.

*Thalassoma guentheri* (Bleeker, 1862): Fowler & Ball (1925).

*Thalassoma quinquevittatus* (Lay & Bennett, 1839): Fowler (1928, 1931).

*Thalassoma quinquevittata* (Lay & Bennett, 1839): Tinker (1982 text).

*Thalassoma quinquevittatum* (Lay & Bennett, 1839): Fowler (1949), Gosline & Brock (1960), Hobson (1974), Randall (1976a, 1980a, 1985a, 1996a), Tinker (1982 appendix), Randall & Edwards (1984), Randall *et al.* (1985a, 1990a, 1997a), Myers (1989), Hoover (1993, 2003).

TAXONOMY: Randall & Edwards (1984).

COMMON NAMES: Fivestripe wrasse (Hoover, 1993, 2003; Randall, 1996a), Redribbon wrasse (Myers, 1999).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to French Frigate at 3 m (Fowler & Ball, 1925; Hobson, 1974; Randall, 1985a; Randall *et al.*, 1985b; Hoover, 1993). *Thalassoma quinquevittatum* (Lay & Bennett, 1839) hybridizes with *T. duperrey* (Quoy & Gaimard, 1824) at Hawai‘i Island and Johnston Atoll (Randall, 1981a; Randall *et al.*, 1985a).

GENERAL RANGE: Indo-Pacific from South Africa to the Ryukyu and Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, the Tuamotu Archipelago, and the Marquesas. Engybenitic over shallow reef flats near the surge zone at 1–40 m, usually <12 m (Randall & Edwards, 1984; Myers, 1989; Randall *et al.*, 1990a, 1997b; Hoover, 1993).

***Thalassoma trilobatum*** (Lacépède)

*Labrus trilobatus* Lacépède, 1801, p. 454, 526, Pl. 4 (fig. 3), “Indo-Pacific Ocean”.

*Julis souleyetii* Valenciennes *in* Cuvier & Valenciennes, 1839: Valenciennes *in* Cuvier & Valenciennes (1839), Eydoux & Souleyet (1850).

*Thalassoma purpureum* non (Forsskål, 1775) [a valid species also found in the Hawaiian Islands]: Jordan & Evermann (1905, plate 34 only; printer’s error?).

*Thalassoma fuscum* (Lacépède, 1801) [proposed for the initial phase]: Jordan & Evermann (1905), Gosline & Brock (1960), Tinker (1982), Randall (1976a).

*Thalassoma fuscus* (Lacépède, 1801): Hobson (1974).

*Thalassoma trilobata* (Lacépède, 1801): Fowler (1928, 1931, 1934).

*Thalassoma trilobatum* (Lacépède, 1801) [first proposed for the terminal phase]: Fowler (1949), Randall & Edwards (1984), Randall (1985a, 1996a), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Myers (1989), Hoover (1993, 2003).

TAXONOMY: Randall & Edwards (1984).

COMMON NAMES: ‘Awela (Hoover, 1993, 2003; Randall, 1996a), Hou (Hoover, 2003), Christmas wrasse (Hoover, 1993, 2003; Randall, 1996a), Ladder wrasse (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to Midway at 1–5 m (Valenciennes *in* Cuvier & Valenciennes, 1839; Jordan & Evermann, 1905; Hobson, 1974; Randall *et al.*, 1985b, 1993b).

GENERAL RANGE: Indo-Pacific from South Africa to the Ryukyu and Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, Tonga, and the Pitcairn Group. Engybenitic over coral, rock, and rubble in the surge zone at 1–10 m (Hobson, 1974; Randall & Edwards, 1984; Myers, 1989; Randall *et al.*, 1990a, 1997b; Hoover, 1993).

***Wetmorella albofasciata*** Schultz & Marshall

*Wetmorella albofasciata* Schultz & Marshall, 1954, p. 446, pl. 12, Mabul Island, Philippines.

*Wetmorella albofasciata* Schultz & Marshall, 1954: Gosline & Brock (1960), Tinker (1982), Randall (1983b, 1985a, 1996a), Myers (1989), Randall *et al.* (1990a), Kosaki *et al.* (1991).

TAXONOMY: Randall (1983b).

COMMON NAMES: White-barred pigmy wrasse (Myers, 1999), Whitebanded sharpnose wrasse (Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to O‘ahu at 30 m (Gosline & Brock, 1960; Randall, 1983b; Kosaki *et al.*, 1991).

GENERAL RANGE: Indo-Pacific from east Africa to the Philippines, Australia, Micronesia, the Hawaiian Islands, and the Society Islands. Benthic and engyenthic deep within caves or under coral ledges at 8–42 m, usually at >30 m (Randall, 1983b; Myers, 1989; Randall *et al.*, 1990a).

[*Xyrichtys copei* (Fowler)]

*Hemipteronotus copei* Fowler, 1900, p. 508, P. 20, O'ahu, Hawaiian Islands [an erroneous type locality].

*Hemipteronotus copei* Fowler, 1900 [a junior synonym of *Xyrichtys novacula* (Linnaeus, 1758), a valid Atlantic Ocean species]: Fowler (1900, 1928), Jordan & Evermann (1905).

*Xyrichtys novacula* (Linnaeus, 1758): Randall (1965), Parenti & Randall (2000), Randall & Earle (2002).

TAXONOMY: Randall (1965), Parenti & Randall (2000), Randall & Earle (2002).

COMMON NAMES: Pearly razorfish (AFS for *X. novacula*).

HAWAIIAN RECORDS: Randall (1965) stated that *Hemipteronotus copei*, Fowler, 1900, described from O'ahu, is a junior synonym of *X. novacula* (Linnaeus, 1758). The type locality of *H. copei* was incorrect and the specimen probably came from the Atlantic Ocean (Fowler, 1928).

*Xyrichtys woodi* (Jenkins)

*Novaculichthys woodi* Jenkins, 1901a, p. 52, Fig. 8, Honolulu, O'ahu, Hawaiian Islands.

*Novaculichthys entargyreus* Jenkins, 1901a: Jenkins (1901a).

*Novaculichthys tattoo* Seale, 1901: Seale (1901).

*Xyrichtys virens* Valenciennes in Cuvier & Valenciennes, 1840: Fowler (1928, 1949).

*Hemipteronotus woodi* (Jenkins, 1901a): Tinker (1982), Yamakawa in Masuda *et al.* (1984), Uchida & Uchiyama (1986).

*Novaculops woodi* (Jenkins, 1901a): Gosline & Brock (1960), Randall (1985a), Eschmeyer (1990), Severns & Fiene-Severns (1993).

*Novaculichthys woodi* Jenkins, 1901a: Jenkins (1901a, 1903), Jordan & Evermann (1905), Randall (1981a, 1996a), Randall & Carlson (1996), Randall *et al.* (1997b), Parenti & Randall (2000).

*Xyrichtys woodi* (Jenkins, 1901): Randall & Earle (2002), Randall & Lobel (2003), Randall & Allen (2004).

TAXONOMY: Randall & Earle (2002), Randall & Allen (2004).

COMMON NAMES: Wood's wrasse (Randall, 1996a).

HAWAIIAN RECORDS: Hawai'i Island to Nihoa at 48 m (Jenkins, 1901a; Jordan & Evermann, 1905; Uchida & Uchiyama, 1986; Severns & Fiene-Severns, 1993).

GENERAL RANGE: Western North and central Pacific endemic from Japan, the Ogasawara Islands, Taiwan, and the Hawaiian Islands. Engyenthic, recorded from 48 m (Randall, 1982; Yamakawa in Masuda *et al.*, 1984; Uchida & Uchiyama, 1986; Randall *et al.*, 1997b). Records from Easter Island are based upon *X. koteamea* Randall & Allen, 2004 (Parenti & Randall, 2000; Randall & Allen, 2004).

## Scaridae — Parrotfishes<sup>59</sup>

*Calotomus carolinus* (Valenciennes)

*Callyodon carolinus* Valenciennes in Cuvier & Valenciennes, 1840a, p. 291, Caroline Island, central Pacific Ocean.

*Callyodon carolinus* Valenciennes, 1840 [first proposed for the initial phase]: Valenciennes in Cuvier & Valenciennes (1840).

*Callyodon sandwicensis* (Valenciennes in Cuvier & Valenciennes, 1840) [proposed for the initial phase]: Valenciennes in Cuvier & Valenciennes (1840).

*Callyodon genistratus* Valenciennes in Cuvier & Valenciennes, 1840 [a misspelling of the species name *genistriatus*]: Steindachner (1900).

*Callyodon spinidens* non (Quoy & Gaimard, 1824) [a valid *Calotomus* species not found in the Hawaiian Islands]: Steindachner (1900).

*Scarichthys auritus* non (Valenciennes in Cuvier & Valenciennes, 1840) [a junior synonym of *Leptoscarus vaigiensis* (Quoy & Gaimard, 1824), a valid species not found in the Hawaiian Islands]: Fowler (1900)?

*Cryptotomus sandwicensis* (Valenciennes, 1840): Fowler (1900).

*Calotomus sandwicensis* (Valenciennes, 1840) [a misspelling of *sandwicensis*]: Jenkins (1903), Jordan & Evermann (1905), Gosline & Brock (1960).

*Calotomus irradians* Jenkins, 1901 [proposed for the terminal phase]: Jenkins (1901, 1903), Jordan & Evermann (1905).

*Calotomus snyderi* Jenkins, 1903 [proposed for the initial phase]: Jenkins (1903), Jordan & Evermann (1905).

*Leptoscarus viridescens* non (Rüppell, 1835) [a valid Red Sea *Calotomus* species]: Fowler (1928, 1949, in part).

*Leptoscarus vaigiensis* non (Quoy & Gaimard, 1824): Fowler (1928, 1949, in part).

*Leptoscarus carolinus* (Valenciennes, 1840): Fowler (1928, 1949).

*Leptoscarus vaigiensis* non (Quoy & Gaimard, 1824) [a *lapsus* for *vaigiensis*]: Fowler (1931, in part).

*Calotomus spinidens* non (Quoy & Gaimard, 1824): Hobson (1974), Struhsaker (1973a), Tinker (1982), Okamoto & Kanenaka (1984).

*Calotomus carolinus* (Valenciennes, 1840): Randall (1985a, 1996a), Randall *et al.* (1985a, 1990a, 1997a), Bruce & Randall (1985), Uchida & Uchiyama (1986), Myers (1989), Hoover (1993, 2003), Bellwood (1994), Allen & Robertson (1994), Robertson & Allen (2002).

TAXONOMY: Bruce & Randall (1985), Bellwood (1991).

COMMON NAMES: Pōnuhuu (Randall, 1996a), Uhu (Hoover, 1993, 2003), Star-eye parrotfish (Hoover, 1993, 2003; Randall, 1996a), Bucktooth parrotfish.

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to Laysan at 1–71 m (Valenciennes *in* Cuvier & Valenciennes, 1840a; Hobson, 1974; Struhsaker, 1973a; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b; Uchida & Uchiyama, 1986).

GENERAL RANGE: Indo-transPacific from South Africa and the Seychelles to the Ryukyu and Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, the Pitcairn Group, the Galapagos and Revillagigedo Islands, and southernmost Baja California. Engy-benthic over sand, rock, coral, algae, and seagrass at 1–71 m (Bruce & Randall, 1985; Uchida & Uchiyama, 1986; Myers, 1989; Randall *et al.*, 1990a, 1997b; Allen & Robertson, 1994; Robertson & Allen, 2002).

#### [*Calotomus japonicus* (Valenciennes)]

*Callyodon japonicus* Valenciennes *in* Cuvier & Valenciennes, 1840a, p. 294, pl. 406, “Japan”.

*Calotomus cyclurus* Jenkins, 1903: Jenkins (1903), Jordan & Evermann (1905).

*Calotomus japonicus* (Valenciennes, 1840): Tinker (1982), Randall (1985a), Bruce & Randall (1985), Bellwood (1994), Randall *et al.* (1997b), Parenti & Randall (2000).

TAXONOMY: Bruce & Randall (1985), Bellwood (1991).

HAWAIIAN RECORDS: The type specimen of *C. cyclurus* Jenkins, 1903, described from Honolulu, is a specimen of *C. japonicus* (Valenciennes, 1840). Bruce & Randall (1985) suggested that the locality for this specimen was erroneous, that the specimen actually came from Japan, and that *C. japonicus* does not occur in the Hawaiian Islands. Despite this (although mentioning it in their synonymy), Parenti & Randall (2000) included the Hawaiian Islands within the range of *Calotomus japonicus*.

GENERAL RANGE: Western North Pacific endemic from Korea, Japan and the Ogasawara Islands. Engy-benthic (Bruce & Randall, 1985; Randall *et al.*, 1997b).

#### *Calotomus zonarchus* (Jenkins)

*Scaridea zonarcha* Jenkins, 1903, p. 468, Fig. 26, Honolulu, O‘ahu, Hawaiian Islands.

*Scaridea zonarcha* Jenkins, 1903: Jenkins (1903), Jordan & Evermann (1905), Jordan *et al.* (1927), Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960).

*Scaridea balia* Jenkins, 1903: Jenkins (1903), Jordan & Evermann (1905), Fowler (1928, 1949).

*Scaridea aërosa* Jordan & Snyder, 1907: Jordan & Snyder (1907), E.K. Jordan (1925).

*Scaridea farrandi* Jordan, 1925: E.K. Jordan (1925).

*Calotomus zonarcha* (Jenkins, 1903): Tinker (1982), Okamoto & Kanenaka (1984), Uchida & Uchiyama (1986).

*Calotomus zonarchus* (Jenkins, 1903): Randall (1985a, 1996a), Bruce & Randall (1985), Hoover (1993, 2003), Randall *et al.* (1993b), Bellwood (1994).

TAXONOMY: Bruce & Randall (1985), Bellwood (1991).

COMMON NAMES: Uhu (Hoover, 1993, 2003), Yellowbar parrotfish (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: O‘ahu to Kure Atoll at 12–71 m (Jenkins, 1903; Jordan & Evermann, 1905; Okamoto & Kanenaka, 1984; Bruce & Randall, 1985; Uchida & Uchiyama, 1986; Hoover, 1993; Randall *et al.*, 1993b).

GENERAL RANGE: Hawaiian Islands endemic. Engy-benthic over reefs and rubble at 12–93 m (Bruce & Randall, 1985; Randall, 1985a; Hoover, 1993).

***Chlorurus perspicillatus*** (Steindachner)

*Scarus perspicillatus* Steindachner, 1879b, p. 32, "Hawaiian Islands".

*Scarus perspicillatus* Steindachner, 1879b [first proposed for terminal phase]: Steindachner (1879b), Smith & Swain (1882), Jenkins (1903), Snyder (1904), Fowler (1949), Schultz (1958), Gosline & Brock (1960), Schultz (1969), Hobson (1974), Randall (1980a, 1985a), Tinker (1982), Okamoto & Kanenaka (1984), Randall *et al.* (1985a, 1993b), Uchida & Uchiyama (1986), Hoover (1993).

*Scarus miniatus* Jenkins, 1901 [proposed for the initial phase]: Jenkins (1901a, 1903).

*Scarus ahula* Jenkins, 1901 [proposed for the initial phase]: Jenkins (1901a, 1903), Snyder (1904), Jordan *et al.* (1927), Fowler (1949).

*Scarus barborus* Jordan & Evermann, 1903 [proposed for the initial phase]: Jordan & Evermann (1903a).

*Callyodon miniatus* (Jenkins, 1901): Jordan & Evermann (1905).

*Callyodon perspicillatus* (Steindachner, 1879b): Jordan & Evermann (1905), Fowler (1928, 1931, 1934).

*Callyodon borborus* (Jordan & Evermann, 1905) [an unjustified emendation of *Scarus barborus* Jordan & Evermann, 1903]: Jordan & Evermann (1905), Fowler (1928).

*Callyodon ahula* (Jenkins, 1901): Jordan & Evermann (1905), Fowler (1928).

*Scarus kraussi* Jordan, 1925: E.K. Jordan (1925).

*Scarus leucostigma* Jordan, Evermann & Tanaka, 1927 [probably based on a specimen in transition from female to male]: Jordan *et al.* (1927).

*Scarus boraborus* (Jordan & Evermann, 1905) [*lapsus* for *borborus*]: Fowler (1949).

*Chlorurus perspicillatus* (Steindachner, 1879b): Bellwood (1994), Randall (1996a), Hoover (2003).

TAXONOMY: Schultz (1958, 1969), Randall (1985a), Bellwood (1991).

COMMON NAMES: Uhu 'ahu'ula (initial phase) (Hoover, 1993, 2003; Randall, 1996a), Uhu-uliuli (terminal phase) (Hoover, 1993, 2003; Randall, 1996a), Spectacled parrotfish (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 1–71 m (Steindachner, 1879b; Smith & Swain, 1882; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986).

GENERAL RANGE: Johnston Atoll and Hawaiian Islands endemic. Engybenitic over reefs at 1–71 m (Randall, 1985a; Randall *et al.*, 1985b; Uchida & Uchiyama, 1986).

***Chlorurus sordidus*** Forsskål

*Scarus sordidus* Forsskål, 1775, p. 30, x, Red Sea at 27°17'23"N, 33°48'52" E [neotype designated by Schultz (1969)].

*Pseudoscarus sumbawensis* (Bleeker, 1848): Steindachner (1900).

*Callyodon erythrodon* (Valenciennes *in* Cuvier & Valenciennes, 1840) [proposed for initial phase]: Jordan & Evermann (1905), Fowler (1928).

*Pseudoscarus vitriolinus* Bryan, 1906: Bryan (1906), E.K. Jordan (1925).

*Callyodon sordidus* (Forsskål, 1775): Fowler (1928).

*Scarus erythrodon* Valenciennes *in* Cuvier & Valenciennes, 1840: Fowler (1949).

*Scarus sordidus* Forsskål, 1775: Fowler (1949), Schultz (1958), Gosline & Brock (1960), Schultz (1969), Hobson (1974), Randall (1980a, 1985a), Tinker (1982), Randall & Bruce (1983), Okamoto & Kanenaka (1984), Randall *et al.* (1985a, 1990a, 1993b), Myers (1989), Hoover (1993).

*Chlorurus sordidus* (Forsskål, 1775): Bellwood (1994), Randall (1996a), Randall *et al.* (1997a), Hoover (2003).

TAXONOMY: Schultz (1958, 1969), Randall & Bruce (1983), Randall (1985a), Bellwood (1991).

COMMON NAMES: Uhu (Hoover, 1993, 2003; Randall, 1996a), Bullethead parrotfish (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 1–9 m (Steindachner, 1900; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b; Hoover, 1993).

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to the Ryukyu and Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, the Line Islands, Rapa, and Ducie. Engybenitic over reefs and rubble at 1–25 m (Hobson, 1974; Myers, 1989; Randall *et al.*, 1990a, 1997b).

***Scarus dubius*** Bennett

*Scarus dubius* Bennett, 1828, p. 37, "Hawaiian Islands".

*Scarus formosus* Valenciennes *in* Cuvier & Valenciennes, 1840: Cuvier & Valenciennes (1840), Eydoux &

Souleyet (1850), Fowler (1949), Tinker (1982).

*Scarus bennetti* Valenciennes in Cuvier & Valenciennes, 1840 [proposed for initial phase]: Cuvier & Valenciennes (1840), Jenkins (1903).

*Scarus lauia* Jordan & Evermann, 1903 [proposed for the terminal phase]: Jordan & Evermann (1903a), Tinker (1982).

*Callyodon dubius* (Bennett, 1828): Jordan & Evermann (1905), Fowler (1928, 1931, 1934).

*Callyodon bennetti* (Valenciennes, 1840): Jordan & Evermann (1905).

*Callyodon formosus* (Valenciennes, 1840): Jordan & Evermann (1905), Fowler (1928).

*Callyodon lauia* (Jordan & Evermann, 1903): Jordan & Evermann (1905).

*Callyodon janthochir* non (Bleeker, 1853) [a junior synonym of *Scarus prasiognathos* Valenciennes, 1840, a valid species not found in the Hawaiian Islands]: Fowler (1928) in part?

*Callyodon hypselopterus* non (Bleeker, 1853) [a valid *Scarus* species not found in the Hawaiian Islands]: Fowler (1928).

*Scarus dubius* Bennett, 1828 [first proposed for initial phase]: Bennett (1828), Fowler (1949), Schultz (1958, 1969), Gosline & Brock (1960), Hobson (1974), Randall (1980a, 1985a, 1996a), Randall & Choat (1980), Tinker (1982), Okamoto & Kanenaka (1984), Randall *et al.* (1985a, 1993b), Uchida & Uchiyama (1986), Hoover (1993, 2003), Bellwood (1994).

TAXONOMY: Schultz (1958, 1969), Randall & Choat (1980), Randall (1985a), Bellwood (1991).

COMMON NAMES: Lauia (Hoover, 1993, 2003; Randall, 1996a), Regal parrotfish (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 1–20 m; more abundant at Midway than in main Hawaiian Islands (Bennett, 1828; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Hoover, 1993).

GENERAL RANGE: Johnston Atoll and Hawaiian Islands endemic. Engyebenthic at 1–20 m (Randall, 1985a; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986).

### *Scarus psittacus* Forsskål

*Scarus psittacus* Forsskål, 1775, p. 29, x, north of Jidda, Saudi Arabia, Red Sea.

*Pseudoscarus bataviensis* (Bleeker, 1857) [proposed for terminal phase]: Steindachner (1900).

*Scarus oviceps* non Valenciennes in Cuvier & Valenciennes, 1840 [a valid species not found in the Hawaiian Islands]: Fowler (1900)?

*Scarus gilberti* Jenkins, 1901 [proposed for the terminal phase]: Jenkins (1901a, 1903), Jordan *et al.* (1927).

*Scarus brunneus* Jenkins, 1901 [proposed for the initial phase]: Jenkins (1901a, 1903), Fowler (1949).

*Scarus jenkinsi* Jordan & Evermann, 1903: Jordan & Evermann (1903a).

*Callyodon gilberti* (Jenkins, 1901): Jordan & Evermann (1905).

*Callyodon brunneus* (Jenkins, 1901): Jordan & Evermann (1905), Fowler (1928, 1931).

*Callyodon jenkinsi* (Jordan & Evermann, 1903) [proposed for the terminal phase]: Jordan & Evermann (1903a, 1905).

*Callyodon bataviensis* (Bleeker, 1857): Jordan & Evermann (1905).

*Scarus galena* Jordan, 1925: E.K. Jordan (1925).

*Callyodon forsteri* (Valenciennes in Cuvier & Valenciennes, 1840): Fowler (1928, 1931, 1934).

*Callyodon hornbosteli* Fowler, 1925: Fowler (1928).

*Scarus forsteri* Valenciennes in Cuvier & Valenciennes, 1840: Fowler (1949), Tinker (1982).

*Scarus hornbosteli* (Fowler, 1925): Fowler (1949).

*Scarus taeniurus* Valenciennes in Cuvier & Valenciennes, 1840: Hobson (1974), Tinker (1982).

*Scarus psittacus* Forsskål, 1775: Randall & Ormond (1978), Randall (1980a, 1985a, 1996a), Randall & Bruce (1983), Randall *et al.* (1985, 1990a, 1993b), Myers (1989), Hoover (1993, 2003), Bellwood (1994).

TAXONOMY: Randall & Ormond (1978), Randall & Bruce (1983), Bellwood (1991). Eschmeyer (1998) noted that although Randall & Ormond (1978) attempted to resolve a problem in the status of *Scarus psittacus* by designation of a neotype, their action was not valid according to the Rules of Zoological Nomenclature because Schultz (1969) had already done so. Although Randall & Ormond (1978) made a convincing argument that Schultz's neotype was not the same species described by Forsskål, resolution of this problem would depend upon a ruling by the International Commission for Zoological Nomenclature.

COMMON NAMES: Uhu (Hoover, 1993, 2003), Palenose parrotfish (Hoover, 1993, 2003; Randall *et al.*, 1997a; Myers, 1999).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at 1–5 m (Steindachner, 1900; Jenkins,

1901a; Hobson, 1974; Randall *et al.*, 1985b, 1993b; Hoover, 1993).

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to southern Japan, Australia, Micronesia, the Hawaiian Islands, the Tuamotu Archipelago, and the Marquesas. Engybenitic over rock and reef at 1–25 m (Hobson, 1974; Myers, 1989; Randall *et al.*, 1990a).

***Scarus rubroviolaceus* Bleeker**

*Scarus rubroviolaceus* Bleeker, 1847, p. 162, Batavia [Jakarta], Java, Indonesia.

*Pseudoscarus troschelii* non (Bleeker, 1853) [a valid *Chlorurus* species not found in Hawai`i]: Steindachner (1900), Jordan & Evermann (1905)?, E.K. Jordan (1925)?

*Scarus paluca* Jenkins, 1901 [proposed for the initial phase]: Jenkins (1901a, 1903), Snyder (1904), Gosline & Brock (1960).

*Pseudoscarus jordani* Jenkins, 1901 [proposed for the terminal phase]: Jenkins (1901a, 1903), Jordan & Evermann (1905).

*Callyodon paluca* (Jenkins, 1901): Jordan & Evermann (1905).

*Pseudoscarus heliotropinus* Bryan, 1906: Bryan (1906), E.K. Jordan (1925).

*Callyodon jordani* (Jenkins, 1901): Fowler (1928).

*Callyodon rubroviolaceus* (Bleeker, 1847): Fowler (1928, 1931).

*Scarus jordani* (Jenkins, 1901): Fowler (1949).

*Scarops rubroviolaceus* (Bleeker, 1847): Tinker (1982).

*Scarus rubroviolaceus* (Bleeker, 1847): Fowler (1949), Schultz (1958, 1969), Hobson (1974), Randall (1980a, 1985a, 1994, 1996a), Okamoto & Kanenaka (1984), Randall & Bruce (1983), Randall *et al.* (1985a, 1990a, 1997a), Myers (1989), Hoover (1993, 2003), Bellwood (1994), Allen & Robertson (1994), Robertson & Allen (2002).

TAXONOMY: Schultz (1958, 1969), Randall & Bruce (1983), Randall (1985a), Bellwood (1991).

COMMON NAMES: Uhu pālulaluka (initial phase) (Hoover, 1993, 2003; Randall, 1996a), Uhu ‘ele‘ele (terminal phase) (Hoover, 1993, 2003), Redlip parrotfish (Hoover, 1993, 2003; Randall, 1996a), Ember parrotfish (Randall *et al.*, 1997a), Bicolor parrotfish (initial phase).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to Kure Atoll at 4–6 m (Steindachner, 1900; Jenkins, 1900; Jordan & Evermann, 1905; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b; Hoover, 1993).

GENERAL RANGE: Indo-transPacific from east Africa and the Red Sea to the Ryukyu and Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, the Tuamotu Archipelago, the offshore eastern tropical Pacific islands, and the southernmost Gulf of California to Ecuador. Engybenitic over rock and reef at 1–30 m (Hobson, 1974; Randall & Bruce, 1983; Myers, 1989; Randall *et al.*, 1990a, 1997b; Randall, 1994; Allen & Robertson, 1994; Robertson & Allen, 2002).

[*Sparisoma radians* (Valenciennes)]

*Scarus radians* Valenciennes in Cuvier & Valenciennes, 1840a, p. 206, “Mexico”.

*Scaridea octodon* Fowler, 1928 [a junior synonym of *Sparisoma radians* (Valenciennes, 1840), a valid Atlantic species]: Fowler (1928).

*Sparisoma radians* (Valenciennes, 1840): Fowler (1949), Schultz (1958), Robins *et al.* (1980), Bellwood (1994), Parenti & Randall (2000).

TAXONOMY: Schultz (1958), Robins *et al.* (1980), Bellwood (1991), Parenti & Randall (2000).

COMMON NAMES: Bucktooth parrotfish (AFS).

HAWAIIAN RECORDS: A specimen of this species was described as *Scaridea octodon* by Fowler (1928), who gave the type locality as Hawai‘i. This is undoubtedly incorrect; the specimen came from the Atlantic (Schultz, 1958; Parenti & Randall, 2000).

## Trachinoidei

### Chiasmodontidae — Black swallows

***Chiasmodon niger* Johnson**

*Chiasmodon niger* Johnson, 1864, p. 408, Madeira, eastern North Atlantic.

*Chiasmodon* species: Miller *et al.* (1979)?

Chiasmodontidae type A (poss. *Chiasmodon niger* Johnson, 1864): Loeb (1979)?



Unidentified Chiasmodontidae: Boehlert & Mundy (1992, in part).

*Chiasmodon niger* Johnson, 1864; Norman (1929), Amesbury (1975), Johnson & Keene in Whitehead *et al.* (1984), Johnson & Keene in Quéro *et al.* (1990), Cowles & Childress (1995).

TAXONOMY: Norman (1929). This genus is greatly in need of worldwide revision (Johnson & Keene in Quéro *et al.*, 1990).

COMMON NAMES: Black swallower.

HAWAIIAN RECORDS: O'ahu at 700–925 m (Amesbury, 1975; Cowles & Childress, 1995). Larval *Chiasmodon* from the Hawaiian Islands were not identified to species (Miller *et al.*, 1979). Loeb (1979) tentatively identified larvae from 28°N, 155°W.

GENERAL RANGE: Circumglobal in the tropical and subtropical Atlantic, Indian, and Pacific oceans. Meso- and bathypelagic at 700–925 m (Amesbury, 1975; Johnson & Keene in Whitehead *et al.*, 1984; Johnson & Keene in Quéro *et al.*, 1990).

### *Dysalotus alcocki* MacGilchrist

*Dysalotus alcocki* MacGilchrist, 1905, p. 268, Bay of Bengal, south of Andaman Island, at 10°06'N, 92°29'E.

*Dysalotus alcocki* MacGilchrist, 1905; Johnson & Cohen (1974), Johnson & Keene in Quéro *et al.* (1990).

TAXONOMY: Johnson & Cohen (1974).

HAWAIIAN RECORDS: Larvae have been collected off O'ahu (B. Mundy, unpubl. data, Sept. 1988).

GENERAL RANGE: Nearly circumglobal in the tropical and subtropical Atlantic, Indian, and Pacific oceans except the eastern Pacific. Meso- and bathypelagic at 700–>1000 m (Johnson & Cohen, 1974; Johnson & Keene in Quéro *et al.*, 1990).

### [*Dysalotus oligoscolus* Johnson & Cohen]

*Dysalotus oligoscolus* Johnson & Cohen, 1974, p. 32, Fig. 11, eastern Pacific at 31°06'N, 119°34'W.

*Dysalotus oligoscolus* Johnson & Cohen, 1974; Johnson & Cohen (1974), Johnson & Keene in Quéro *et al.* (1990).

TAXONOMY: Johnson & Cohen (1974).

HAWAIIAN RECORDS: None but *D. oligoscolus* has been collected at 14°52'N, 151°26'W at 0–2100 m fishing depths (Johnson & Cohen, 1974) and is expected to occur in Hawaiian waters.

GENERAL RANGE: Nearly circumglobal in the tropical and subtropical Atlantic, Indian, and Pacific oceans except the North Atlantic. Bathypelagic at >1500 m (Johnson & Cohen, 1974; Johnson & Keene in Quéro *et al.*, 1990).

### [*Kali indica* Lloyd]

*Kali indica* Lloyd, 1909, p. 154, Bay of Bengal at 16°56'15"N, 92°33'E.

*Kali indica* Lloyd, 1909; Johnson (1969), Johnson & Cohen (1974), Novikov *et al.* (1981), Johnson & Keene in Quéro *et al.* (1990).

TAXONOMY: Johnson & Cohen (1974).

HAWAIIAN RECORDS: *Kali indica* has been collected from 10°09.0'–35.5'N, 147°08.0–29.6'W at 0–2100 m fishing depths (Johnson, 1969) and at the southern Emperor Seamounts (Novikov *et al.* 1980) so it can be expected in Hawaiian waters. Tinker's (1982) record was based on the *K. normani* (Parr, 1931) reported by Struhsaker (1973a). The occurrence of *K. indica* within the 200-nmi EEZ is thus unverified.

GENERAL RANGE: Circumglobal in the tropical through temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans. Bathypelagic at > 1500 m (Johnson & Cohen, 1974; Johnson & Keene in Quéro *et al.*, 1990).

### *Kali normani* (Parr)

*Dolichodon normani* Parr, 1931, p. 46, Fig. 18, Pacific coast of Mexico at 16°14'00"N, 99°36'30"W.

*Kali* species: Struhsaker (1973a).

"Possibly *Kali indica*" non Lloyd, 1909; Tinker (1982).

*Kali normani* (Parr, 1931): Johnson & Cohen (1974), Johnson & Keene in Quéro *et al.* (1990).

TAXONOMY: Johnson & Cohen (1974).

HAWAIIAN RECORDS: Hawai'i Island at 823 m (Struhsaker, 1973a; Johnson & Cohen, 1974). *Kali* larvae collected in Hawaiian waters (Miller *et al.*, 1979) and at Johnston Atoll (Boehlert *et al.*, 1992) were not identified to species.

GENERAL RANGE: Circumglobal in the tropical and subtropical Gulf of Mexico, Atlantic, Indian, and Pacific oceans. Meso- and bathypelagic at 500–>1000 m (Johnson & Cohen, 1974; Johnson & Keene in Quéro *et al.*, 1990).

### ***Pseudoscopelus sagamiensis* Tanaka**

*Pseudoscopelus scriptus sagamianus* Tanaka, 1908b, p. 13, pl. 1 (fig. 2), Sagami Sea, Japan.

*Pseudoscopelus sagamiensis* Tanaka, 1908b: Mooi & Paxton in Carpenter & Niem (2001), Nakabo in Nakabo (2002).

TAXONOMY: Mooi & Paxton in Carpenter & Niem (2001b), Nakabo in Nakabo (2002).

HAWAIIAN RECORDS: A 142 mm SL specimen (BPBM 38945) collected northeast of Maui at 22°10'N, 153°10'W was tentatively identified as this species (A. Suzumoto, pers. comm., Jan. 2004).

GENERAL RANGE: Western and central Pacific endemic from Japan to the Hawaiian Islands. Mesopelagic (Nakabo in Nakabo, 2002).

### ***Pseudoscopelus* spp.**

*Pseudoscopelus* species: Miller *et al.* (1979), Novikov *et al.* (1981), Johnson & Keene in Whitehead *et al.* (1984). Unidentified Chiasmodontidae: Boehlert & Mundy (1992, in part).

TAXONOMY: No recent revision. At least two undescribed *Pseudoscopelus* species occur in the central North Pacific (R. Lavenberg, pers. comm., Sept. 1988) and the circumglobal species *P. scriptus* Lütken, 1892, has been reported from the western North Pacific (Parin *et al.*, 1995). This genus was omitted from important regional faunal reviews (i.e., Smith & Heemstra, 1986; Quéro *et al.*, 1990) because of disagreements about its inclusion in the Chiasmodontidae, but more recent reviews (Mooi & Paxton in Carpenter & Niem, 2001b; Nakabo in Nakabo, 2002) have corrected this neglect.

HAWAIIAN RECORDS: More than one species of *Pseudoscopelus* larvae have been collected from O'ahu to the Hancock Seamounts (Miller *et al.*, 1979; Boehlert & Mundy, 1992).

GENERAL RANGE: The genus is circumglobal in the tropical and subtropical Atlantic, Indian, and Pacific oceans. Meso- and bathypelagic (Johnson & Keene in Whitehead *et al.*, 1984).

## **Champsodontidae<sup>60</sup>**

### ***Champsodon fimbriatus* Gilbert**

*Champsodon fimbriatus* Gilbert, 1905, p. 648, pl. 88, Pailolo Channel between Maui and Moloka'i, Hawaiian Islands.

*Champsodon fimbriatus* Gilbert, 1905: Gilbert (1905), Fowler (1928), Gosline & Brock (1960), Matsubara *et al.* (1964), Struhsaker (1973a), Tinker (1982), Nemeth (1994).

TAXONOMY: Matsubara *et al.* (1964), Nemeth (1994).

HAWAIIAN RECORDS: Maui to O'ahu at 199–262 m (Gilbert, 1905; Struhsaker, 1973a; Nemeth, 1994).

*Champsodon* larvae collected at Johnston Atoll were not identified to species (Boehlert *et al.*, 1992) but may have been *C. fimbriatus*.

GENERAL RANGE: Hawaiian Islands endemic. Benthic and benthopelagic at 199–262 m (Nemeth, 1994).

## **Pinguipedidae — Sandperches<sup>61</sup>**

### ***Parapercis roseoviridis* (Gilbert)**

*Neopercis roseoviridis* Gilbert, 1905, p. 643, pl. 83, off the northeast coast of Maui, Hawaiian Islands.

*Neopercis roseoviridis* Gilbert, 1905: Gilbert (1905), Fowler (1928), Gosline & Brock (1960), Clarke (1972), Tinker (1982), Humphreys *et al.* (1984).

*Parapercis multifasciata* non Döderlein in Steindachner & Döderlein, 1884 [a valid species not found in the Hawaiian Islands]: Humphreys *et al.* (1984).

*Parapercis roseoviridis* (Gilbert, 1905): Struhsaker (1973a), Yamakawa in Okamura (1982), Randall (1984),

Randall *et al.* (1985a), Uchida & Uchiyama (1986), Borets (1986), Grigg *et al.* (1987), Chave & Mundy (1994).

TAXONOMY: Randall (1984).

HAWAIIAN RECORDS: Johnston Atoll, Cross Seamount, and Hawai'i Island to the Hancock Seamounts at 150–500 m (Gilbert, 1905; Clarke, 1972; Struhsaker, 1973a; Humphreys *et al.*, 1984; Randall *et al.*, 1985b; Uchida & Uchiyama, 1986; Borets, 1986; Grigg *et al.*, 1987; Chave & Mundy, 1994).

GENERAL RANGE: Central and Northwestern Pacific endemic known from the Kyushu-Palau Ridge and the Hawaiian Archipelago. Benthic on sand at 150–500 m (Yamakawa *in* Okamura *et al.*, 1982; Borets, 1986; Grigg *et al.*, 1987; Chave & Mundy, 1994).

### *Parapercis schauinslandii* (Steindachner)

*Percis schauinslandii* Steindachner, 1900a, p. 175, Honolulu, O'ahu, Hawaiian Islands.

*Percis schauinslandii* Steindachner, 1900a: Steindachner (1900a).

*Parapercis pterostigma* Jenkins, 1901: Jenkins (1901).

*Osurus schauinslandii* (Steindachner, 1900a): Jenkins (1903), Snyder (1904), Gilbert (1905), Jordan & Evermann (1905).

*Parapercis schauinslandii* (Steindachner, 1900a): Fowler (1928, 1934, 1949), Gosline & Brock (1960), Cantwell (1964), Struhsaker (1973a), Tinker (1982), Yoshino *in* Masuda *et al.* (1984), Randall *et al.* (1985a, 1990a, 1993b), Heemstra *in* Smith & Heemstra (1986), Hoover (1993, 2003), Chave & Mundy (1994), Randall (1996a).

TAXONOMY: Cantwell (1964).

COMMON NAMES: Redspotted sandperch (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at 9–141 m, and to 512 m fishing depths (Steindachner, 1900a; Gilbert, 1905; Jordan & Evermann, 1905; Randall *et al.*, 1985b, 1993b; Hoover, 1993; Chave & Mundy, 1994).

GENERAL RANGE: Indo-Pacific from South Africa and the Seychelles to southern Japan, Australia, and the Hawaiian Islands. Benthic on rubble or sand next to rocks or coral at 9–170 m (Yoshino *in* Masuda *et al.*, 1984; Heemstra *in* Smith & Heemstra, 1986; Randall *et al.*, 1990a, 1993b; Hoover, 1993; Chave & Mundy, 1994).

## Creediidae — Sandburrowers

### *Crystallodytes cookei cookei* Fowler

*Crystallodytes cookei* Fowler, 1923, p. 391, Laie Beach, O'ahu, Hawaiian Islands.

*Crystallodytes cookei* Fowler, 1923: Fowler (1923, 1928, 1949), Gosline & Brock (1960), Nelson (1978b), Tinker (1982), Leis (1982), Nelson (1985), Clarke (1991), Randall *et al.* (1993b).

TAXONOMY: Nelson (1978b), Nelson & Randall (1985), Leis (1982).

HAWAIIAN RECORDS: O'ahu to Midway at 1–3 m (Fowler, 1923, 1928; Leis, 1982; Clarke, 1991; Randall *et al.*, 1993b).

GENERAL RANGE: Central Pacific endemic with two subspecies, *C. cookei cookei* Fowler, 1923, which is a Hawaiian Islands endemic and *C. cookei enderburyensis* Schultz, 1943, from the Phoenix Islands, Samoa, and the Pitcairn Group. J.E. Randall (pers. comm., Mar. 2005) recognizes these as distinct species. Benthic in sand along shorelines at 1–3 m (Gosline & Brock, 1960; Nelson & Randall, 1985; Randall *et al.*, 1993b).

### *Limnichthys nitidus* Smith

*Limnichthys nitidus* Smith, 1958, p. 247, Fig. 1, Pinda, Mozambique.

*Limnichthys donaldsoni* Schultz *in* Schultz *et al.*, 1960: Schultz *in* Schultz *et al.* (1960), Gosline & Brock (1960), Nelson (1978b), Tinker (1982), Leis (1982), Nelson (1985), Myers (1989), Clarke (1991), Boehlert *et al.* (1992), Randall *et al.* (1993b, 1997b), Greenfield (2003).

*Limnichthys nitidus* Smith, 1958: Yoshino *et al.* (1999).

TAXONOMY: Yoshino *et al.* (1999) suggested that *L. donaldsoni* Schultz, 1960, is a junior synonym of *L. nitidus* Smith, 1958. Greenfield (2003) questioned the inclusion of *Limnichthys donaldsoni* in synonymy with *L. nitidus*, continuing use of *L. donaldsoni* as the name for the Hawaiian population.

COMMON NAMES: Donaldson's sandburrer (Myers, 1999).

HAWAIIAN RECORDS: Johnston Atoll and O'ahu to Midway at 8–9 m (Schultz *in* Schultz *et al.*, 1960; Gosline & Brock, 1960; Clarke, 1991; Boehlert *et al.*, 1992; Randall *et al.*, 1993b).

GENERAL RANGE: Indo-Pacific from east Africa and Red Sea to western Australia, Taiwan, the Ogasawara Islands, Micronesia, the Hawaiian Islands, the Cook Islands and the Pitcairn group. Benthic in sand of surge zones at 8–9 m (Gosline & Brock, 1960; Nelson, 1978b; Nelson & Randall, 1985; Myers, 1989; Randall *et al.*, 1993b, 1997b; Yoshino *et al.*, 1999).

### Percophidae — Duckbills

#### *Bembrops filifera* Gilbert

*Bembrops filifera* Gilbert, 1905, p. 643, pl. 84, off the northeast coast of Maui, Hawaiian Islands.

*Bembrops filodorsalis* Okada & Suzuki, 1952: Okamura *in* Okamura *et al.* (1982).

*Bembrops filifera* Gilbert, 1905: Thompson & Suttkus (2002).

*Bembrops filifera* Gilbert, 1905: Gilbert (1905), Fowler (1928), Gosline & Brock (1960), Struhsaker (1973a), Nelson (1978a), Tinker (1982), Humphreys *et al.* (1984), Okamura *in* Masuda *et al.* (1984), Okamura *in* Okamura (1985), Borets (1986), Chave & Mundy (1994).

TAXONOMY: Nelson (1978a), Thompson and Suttkus (2002).

HAWAIIAN RECORDS: Hawai'i Island to Milwaukee Seamount at 226–450 m (Gilbert, 1905; Struhsaker, 1973a; Humphreys *et al.*, 1984; Borets, 1986; Chave & Mundy, 1994).

GENERAL RANGE: Eastern Indian and western-central Pacific from the Andaman Sea and western Australia to southern Japan, the East China Sea, the Kyushu-Palau Ridge, Okinawa Trough, southern Emperor Seamounts, and the Hawaiian Islands. Benthic on sand at 226–450 m (Okamura *in* Okamura *et al.*, 1982; Okamura *in* Masuda *et al.*, 1984; Okamura *in* Okamura *et al.*, 1985; Borets, 1986; Chave & Mundy, 1994; Thompson & Suttkus, 2002).

#### *Chironema chryseres* Gilbert

*Chironema chryseres* Gilbert, 1905, p. 645, pl. 85, off the south coast of O'ahu, Hawaiian Islands.

*Chironema chryseros* Gilbert, 1905 [*lapsus* for *chryseres*]: Parin (1991).

*Chironema chryseres* Gilbert, 1905: Gilbert (1905), Fowler (1928, in part), Gosline & Brock (1960), Struhsaker (1973a), Iwamoto & Staiger (1976), Tinker (1982), Okamura & Yamachi *in* Okamura *et al.* (1982), Okamura *in* Masuda *et al.* (1984), Randall *et al.* (1985a), Uchida & Uchiyama (1986), Grigg *et al.* (1987), Chave & Mundy (1994).

TAXONOMY: Iwamoto & Staiger (1976).

HAWAIIAN RECORDS: Johnston Atoll, Cross Seamount, and Hawai'i Island to Necker at 238–500 m (Gilbert, 1905; Struhsaker, 1973a; Iwamoto & Staiger, 1976; Randall *et al.*, 1985b; Uchida & Uchiyama, 1986; Grigg *et al.*, 1987; Chave & Mundy, 1994).

GENERAL RANGE: Pacific endemic from Japan, the Hawaiian Islands, and the Sala-y-Gomez and Nazca Ridges of the southeastern Pacific. Benthic on sand and rock at 234–500 m (Okamura & Yamachi *in* Okamura *et al.*, 1982; Okamura *in* Masuda *et al.*, 1984; Parin, 1991; Chave & Mundy, 1994).

#### *Chironema squamiceps* Gilbert

*Chironema squamiceps* Gilbert, 1905, p. 646, pl. 86, off the north coast of Maui, Hawaiian Islands.

*Chironema chryseres* non Gilbert, 1905 [a valid species also found in the Hawaiian Islands]: Fowler (1928, in part).

*Chironema squamiceps* Gilbert, 1905: Gilbert (1905), Gosline & Brock (1960), Struhsaker (1973a), Iwamoto & Staiger (1976), Tinker (1982), Randall *et al.* (1985a), Grigg *et al.* (1987), Chave & Mundy (1994).

TAXONOMY: Iwamoto & Staiger (1976).

HAWAIIAN RECORDS: Johnston Atoll, Cross Seamount, and Hawai'i Island to Maui at 174–600 m (Gilbert, 1905; Struhsaker, 1973a; Randall *et al.*, 1985b; Grigg *et al.*, 1987; Chave & Mundy, 1994).

GENERAL RANGE: Johnston Atoll and Hawaiian Islands endemic. Benthic on sand at 174–600 m (Iwamoto & Staiger, 1976; Chave & Mundy, 1994).

#### *Osopsaron incisum* (Gilbert)

*Pteropsaron incisum* Gilbert, 1905, p. 647, pl. 87, off Laysan Island, Northwestern Hawaiian Islands.

*Pteropsaron incisum* Gilbert, 1905: Gilbert (1905), Fowler (1928), Gosline & Brock (1960), Struhsaker (1973a), Tinker (1982).

Undescribed percophidid species: Parin (1985).

*Osopsaron incisum* (Gilbert, 1905): Nelson (1982), Parin (1985).

TAXONOMY: Nelson (1982). Parin (1985) suggested that *O. incisum* (Gilbert, 1905) specimens in the Bishop Museum were an undescribed species that could not be easily assigned to genus. *Osopsaron incisum* is probably sexually dimorphic and it is likely that the specimens discussed by Parin (1985) were males of that species (B. Mundy, pers. observ.; D.G. Smith, pers. comm., Aug. 2002). Some of the generic characters used within this family (i.e., fin ray lengths) may be sexually dimorphic, indicating a need for a careful generic revision of the Hemeroctoetinae. *Osopsaron* is likely a junior synonym of *Pteropsaron* and there is evidence that an undescribed *Pteropsaron* species, different from the male *O. incisum* discussed by Parin (1985), occurs at Moloka'i (D.G. Smith, pers. comm., Aug. 2003).

HAWAIIAN RECORDS: Maui to Laysan at 183–402 m (Gilbert, 1905; Struhsaker, 1973a).

GENERAL RANGE: Hawaiian Islands endemic. Benthic at 183–402 m (Gilbert, 1905; Struhsaker, 1973a; Nelson, 1982; Parin, 1985).

### Ammodytidae — Sand lances

#### *Ammodytoides pylei* Randall, Ida, & Earle

*Ammodytoides pylei* Randall, Ida & Earle, 1994, p. 81, Figs. 1, 2a, & 3, Kahe Point, O'ahu, Hawaiian Islands.

*Bleekeria gillii* non Bean, 1895 [a valid species of *Ammodytoides* not found in the Hawaiian Islands]: Fowler & Ball (1925), Fowler (1928), Gosline & Brock (1960), Struhsaker (1973a), Tinker (1982).

*Bleekeria* sp.?: Humphreys *et al.* (1984)?

*Ammodytoides pylei* Randall, Ida & Earle, 1994: Ida & Randall (1993), Randall *et al.* (1994), Ida *et al.* (1994), Randall (1996a).

TAXONOMY: Randall *et al.* (1994), Ida *et al.* (1994).

COMMON NAMES: Pyle's sand lance (Randall, 1996a).

HAWAIIAN RECORDS: Maui to Nero Seamount at 7–220 m (Fowler & Ball, 1925; Fowler, 1928; Struhsaker, 1973a; Humphreys *et al.*, 1984?; Ida & Randall, 1993; Randall *et al.*, 1994; Ida *et al.*, 1994).

GENERAL RANGE: Hawaiian Islands endemic. Benthopelagic over sand at 7–220 m (Struhsaker, 1973a; Randall *et al.*, 1994; Ida *et al.*, 1994).

#### *Lepidammydites macrophthalmus* Ida, Sirimontaporn, & Monkolprasit

*Lepidammydites macrophthalmus* Ida, Sirimontaporn & Monkolprasit, 1994, p. 255, Fig. 2, unspecified location in the Hawaiian Islands.

*Embolichthys* sp.: Uchida & Uchiyama (1986)?

*Lepidammydites macrophthalmus* Ida, Sirimontaporn & Monkolprasit, 1994: Ida *et al.* (1994).

TAXONOMY: Ida *et al.* (1994).

HAWAIIAN RECORDS: Maro Reef at 194–230 m (Uchida & Uchiyama, 1986?; Ida *et al.*, 1994; J.E. Randall, pers. comm., Mar. 2005).

GENERAL RANGE: Hawaiian Islands endemic. Benthopelagic at 194–200 m (Uchida & Uchiyama, 1986?; Ida *et al.*, 1994).

#### *Protammydites brachistos* Ida, Sirimontaporn, & Monkolprasit

*Protammydites brachistos* Ida, Sirimontaporn & Monkolprasit, 1994, p. 254, Fig. 1, Taiwan.

*Protammydites brachistos* Ida, Sirimontaporn & Monkolprasit, 1994: Ida *et al.* (1994).

TAXONOMY: Ida *et al.* (1994).

HAWAIIAN RECORDS: O'ahu at 0–300 m fishing depths (Ida *et al.*, 1994).

GENERAL RANGE: Perhaps a Pacific endemic, known only from single specimens collected at Taiwan and Hawai'i. Habits unknown, perhaps benthopelagic, taken at 0–300 m fishing depths (Ida *et al.*, 1994).

**Blennioidei****Tripterygiidae — Triplefins, Triplefin blennies*****Enneapterygius atriceps* (Jenkins)**

*Tripterygium atriceps* Jenkins, 1903, p. 505, Fig. 46, Honolulu, O'ahu, Hawaiian Islands.

*Tripterygium atriceps* Jenkins, 1903: Jenkins (1903).

*Tripterygion atriceps* Jenkins, 1903: Jordan & Evermann (1905), Strasburg (1956), Gosline & Brock (1960), Tinker (1982).

*Enneapterygius hemimelas* non (Kner & Steindacher, 1867) [a valid species not found in the Hawaiian Islands, although once reported as introduced here (see next species)]: Fowler (1928, 1934, 1949, in part).

*Enneapterygius atriceps* (Jenkins, 1903): Matarese *et al.* (1984), Randall *et al.* (1993b), Randall (1996a), Fricke (1997).

TAXONOMY: Fricke (1997).

COMMON NAMES: Hawaiian triplefin (Randall, 1996a), Hawaiian blackhead triplefin (Fricke, 1997).

HAWAIIAN RECORDS: Hawai'i Island to Midway at 1–23 m. Recorded from Johnston Atoll but the occurrence of this species there needs confirmation (Jenkins, 1903; Jordan & Evermann, 1905; Fowler, 1928; Strasburg, 1956; Randall *et al.*, 1993b; Fricke, 1997).

GENERAL RANGE: Hawaiian Islands endemic. Benthic in dead coral, rubble, or rock at 1–23 m (Fowler, 1928; Gosline & Brock, 1960; Randall *et al.*, 1993b; Fricke, 1997).

**[?]*Enneapterygius bahasa* Fricke]**

*Enneapterygius bahasa* Fricke, 1997, p. 170, Fig. 29, Heron I., Queensland, Australia, 23°26'S, 151°55'E.

*Tripterygion hemimelas* non Kner & Steindachner, 1867 [a valid *Enneapterygius* species that does not occur in the Hawaiian Islands nor in Guam from which specimens introduced to the Hawaiian Islands originated]: Strasburg (1959).

*Enneapterygius hemimelas* non (Kner & Steindachner, 1867): Myers (1989), Randall *et al.* (1997a).

*Enneapterygius bahasa* Fricke, 1997: Fricke (1997).

*Enneapterygius nigricauda* Fricke, 1997: Fricke (1997).

TAXONOMY: According to J. Williams (pers. comm., Sept. 1999), *Enneapterygius hemimelas* (Kner & Steindachner, 1867), the species that Strasburg (1959) reported as introduced from Guam to the Hawaiian Islands does not occur in Guam (*vide* Fricke, 1997). Instead, two species described as closely related to *E. hemimelas* by Fricke (1997), *E. bahasa* and *E. nigricauda* are found there. The *E. hemimelas* reported from O'ahu by Strasburg (1959) and subsequent authors could be one of these species. A problem with this interpretation is that Strasburg (1959) commented that the specimens collected at O'ahu resembled *Enneapterygius hemimelas* specimens from Samoa more than specimens from Guam, and on that basis questioned the reported route of the barge prior to its arrival in Honolulu.

COMMON NAMES: Blacktail triplefin and Pacific blacktail triplefin.

HAWAIIAN RECORDS: A single specimen was collected from a barge towed to Pearl Harbor, O'ahu, from Guam; *Ecsenius bicolor* (Day (*ex* Tickell), 1888) and other introduced species were also found on this barge (Strasburg, 1956). None of these have been collected at O'ahu since 1956.

GENERAL RANGE: *Enneapterygius bahasa* occurs from Japan and Papua New Guinea to Guam and Palau; it is benthic in vertical rock walls of reef flats and reef crests at 1–18 m. *Enneapterygius nigricauda* occurs from the Ogasawara Islands, Taiwan and Vanuatu to Guam, Wake Island, the Line Islands, and the Society Islands; it is benthic in reefs at 2–11 m (Fricke, 1997).

**Blenniidae — Combtooth blennies*****Blenniella gibbifrons* (Quoy & Gaimard)**

*Salarias gibbifrons* Quoy & Gaimard, 1824, p. 253, "Hawaiian Islands".

*Salarias gibbifrons* Quoy & Gaimard, 1824: Quoy & Gaimard (1824), Fowler (1900, 1928, 1934, 1949), Snyder (1904).

*Salarias saltans* Jenkins, 1903: Jenkins (1903).

*Salarias rutilus* Jenkins, 1903: Jenkins (1903).

*Alticus gibbifrons* (Quoy & Gaimard, 1824): Jordan & Evermann (1905).

*Salarias periophthalmus* non Valenciennes in Cuvier & Valenciennes, 1836 [a valid *Blenniella* species not found in the Hawaiian Islands]: Fowler (1928, 1934).

*Blenniella rhesodon* Reid, 1943: Reid (1943), Fowler (1949).

*Istiblennius gibbifrons* (Quoy & Gaimard, 1824): Gosline & Brock (1960), Tinker (1982), Randall (1985a), Randall *et al.* (1985a, 1993b), Springer in Smith & Heemstra (1986), Myers (1989).

*Blenniella gibbifrons* (Quoy & Gaimard, 1824): Springer & Williams (1994), Randall (1996a).

**TAXONOMY:** Although subspecies of *B. gibbifrons* have been described in earlier works, Springer & Williams (1994) found that the geographic distribution of morphological variability does not justify their recognition.

**COMMON NAMES:** Bullethead rockskipper (Randall, 1996a), Picture rockskipper (Myers, 1999).

**HAWAIIAN RECORDS:** Johnston Atoll and Hawai'i Island to Midway at 1–2 m (Quoy & Gaimard, 1824; Jordan & Evermann, 1905; Gosline & Brock, 1960; Randall *et al.*, 1985b, 1993b).

**GENERAL RANGE:** Indo-Pacific but with a disjunct distribution, primarily confined to oceanic islands. In the Indian Ocean from South and east Africa to Mauritius and the Chagos Archipelago. Absent from a region bounded by Indonesia, the Ryukyus, and the Solomon Islands. In the Pacific from Marcus, Micronesia, and Kapingamarangi to the Hawaiian Islands, the Marquesas, and Ducie. Benthic in coral on subtidal reef flats at 1–2 m (Gosline & Brock, 1960; Randall *et al.*, 1985b; Springer in Smith & Heemstra, 1986; Myers, 1989; Springer & Williams, 1994).

### *Cirripectes obscurus* (Borodin)

*Exallias obscurus* Borodin, 1927, p. 1, Fig. 1, O'ahu, Hawaiian Islands.

*Exallias obscurus* Borodin, 1927: Borodin (1927).

*Cirripectes alboapicalis* non (Ogilby, 1899) [a valid species not found in the Hawaiian Islands]: Fowler (1928, in part).

*Cirripectes obscurus* (Borodin, 1927): Gosline & Brock (1960), Hobson (1974), Tinker (1982), Okamoto & Kanenaka (1984), Randall (1985a, 1996a in text, but photograph is of *C. quagga* (Fowler & Ball, 1924) — J.E. Randall, pers. comm., Dec. 1996), Williams (1988), Randall *et al.* (1993b), Hoover (1994, 2003).

**TAXONOMY:** Williams (1988).

**COMMON NAMES:** Pāo'o (Hoover, 1993, 2003), Gargantuan blenny (Hoover, 1993, 2003; Randall, 1996a).

**HAWAIIAN RECORDS:** Hawai'i Island to Kure Atoll at 1–6 m (Borodin, 1927; Gosline & Brock, 1960; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1993b; Hoover, 1994).

**GENERAL RANGE:** Hawaiian Islands endemic. Benthic in rocks of the surge zone at 1–6 m (Gosline & Brock, 1960; Hobson, 1974; Randall, 1985a; Williams, 1988; Randall *et al.*, 1993b; Hoover, 1994).

### *Cirripectes polyzona* (Bleeker)

*Salarias (Cirripectes) polyzona* Bleeker, 1868, p. 278, Ambon Island, Moluccas Islands, Indonesia.

*Cirripectes polyzona* (Bleeker, 1868): Williams (1988), Myers (1989), Randall *et al.* (1990a, 1997a).

**TAXONOMY:** Williams (1988).

**COMMON NAMES:** Barred blenny (Randall *et al.*, 1997a; Myers, 1999).

**HAWAIIAN RECORDS:** Johnston Atoll but not the Hawaiian Islands (Williams, 1988).

**GENERAL RANGE:** Indo-Pacific from South Africa and the Gulf of Aden to southern Japan, the Ogasawara Islands, Australia, Micronesia, Samoa, Johnston Atoll, and the Line Islands. Benthic on reef crests in surge at 1–3 m (Williams, 1988; Myers, 1989; Randall *et al.*, 1990a, 1997b).

### *Cirripectes quagga* (Fowler & Ball)

*Rupiscartes quagga* Fowler & Ball, 1924, p. 273, Wake Island, western-central North Pacific.

*Salarias quagga* (Fowler & Ball, 1924): Fowler (1928).

*Cirripectes lineopunctatus* Strasburg, 1956: Strasburg (1956), Gosline & Brock (1960), Tinker (1982).

*Cirripectes quagga* (Fowler & Ball, 1924): Randall (1985a, 1996a), Williams (1988), Myers (1989), Randall *et al.* (1990a).

**TAXONOMY:** Williams (1988).

**COMMON NAMES:** Dotted-line blenny (Randall, 1996a), Squiggly blenny (Myers, 1999), Zebra blenny (Randall *et al.*, 1997a).

**HAWAIIAN RECORDS:** Johnston Atoll and O'ahu at 1–3 m (Strasburg, 1956; Gosline & Brock, 1960; Williams, 1988).

GENERAL RANGE: Indo-Pacific from South Africa and the Chagos Archipelago to Taiwan, Australia, Micronesia, the Hawaiian Islands, the Marquesas, and the Pitcairn Group. Benthic in rocks along shores and reef crests with strong surge at 1–19 m (Gosline & Brock, 1960; Williams, 1988; Myers, 1989; Randall *et al.*, 1990a).

***Cirripectes vanderbilti*** (Fowler)

*Ophioblennius vanderbilti* Fowler, 1938b, p. 242, pl. 11 (figs. 26–27), Diamond Head, O‘ahu, Hawaiian Islands.  
*Salarias variolosus* non Valenciennes in Cuvier & Valenciennes, 1836 [a valid *Cirripectes* species found at Johnston Atoll but not in the Hawaiian Islands]: Fowler (1900), Jenkins (1903).

*Alticus variolosus* non (Valenciennes, 1836): Jordan & Evermann (1905).

*Ophioblennius vanderbilti* Fowler, 1938b: Fowler (1938, 1949).

*Ophioblennius capillus* Reid, 1943: Reid (1943), Fowler (1949).

*Cirripectes variolosus* non (Valenciennes, 1836): Gosline & Brock (1960, in part), Hobson (1974), Tinker (1982, in part), Okamoto & Kanenaka (1984).

*Cirripectes vanderbilti* (Fowler, 1938b): Randall (1985a, 1996a), Randall *et al.* (1985a, 1993b), Williams (1988), Hoover (1993, 2003).

TAXONOMY: Williams (1988).

COMMON NAMES: Pāo‘o (Hoover, 1993, 2003), Scarface blenny (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to Kure Atoll at 1–11 m (Fowler, 1900; Gosline & Brock, 1960; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b).

GENERAL RANGE: Johnston Atoll and Hawaiian Islands endemic. *Cirripectes vanderbilti* replaces the similar *C. variolosus* in the Hawaiian Islands but both occur at Johnston Atoll (Williams, 1988). Records of *C. variolosus* from the Hawaiian Islands refer to *C. vanderbilti*. Benthic in coral and rock at 1–11 m (Gosline & Brock, 1960; Randall, 1985a; Williams, 1988; Hoover, 1993).

***Cirripectes variolosus*** (Valenciennes)

*Salarias variolosus* Valenciennes in Cuvier & Valenciennes, 1836, p. 317, Guam, Mariana Islands, western North Pacific.

*Salarias variolosus* Valenciennes, 1836: Fowler (1900, in part).

*Cirripectes variolosus* (Valenciennes, 1836): Fowler (1928, 1949, in part), Gosline & Brock (1960, in part), Tinker (1982, in part), Randall *et al.* (1985a, 1997b), Williams (1988), Myers (1989).

TAXONOMY: Williams (1988).

COMMON NAMES: Red-speckled blenny (Myers, 1999).

HAWAIIAN RECORDS: Johnston Atoll but not the Hawaiian Islands (Fowler, 1900; Randall *et al.*, 1985b). See *C. vanderbilti*.

GENERAL RANGE: Central Pacific endemic from the Ogasawara (Bonin) Islands and Micronesia to Johnston Atoll, the Line Islands, the Marquesas, and the Pitcairn group. Benthic in seaward reefs at 1–31 m, usually at 1–5 m (Williams, 1988; Myers, 1989; Randall *et al.*, 1997b).

[*Ecsenius bicolor* (Day)]

*Salarias bicolor* Day, 1888, p. 798, Saddle Island, off Kyoukphyoo, Arracan, Myanmar.

*Ecsenius hawaiiensis* Chapman & Schultz, 1952: Chapman & Schultz (1952), Strasburg (1956), Gosline & Brock (1960), Tinker (1982).

*Ecsenius bicolor* (Day, 1888): Springer (1971), Randall (1976a), Springer (1988), Myers (1989), Randall *et al.* (1990a).

TAXONOMY: Springer (1988).

COMMON NAMES: Bicolor blenny (Randall *et al.*, 1997a; Myers, 1999).

HAWAIIAN RECORDS: Chapman & Schultz (1952) described a specimen of *E. bicolor* from O‘ahu as *E. hawaiiensis*, suggesting that it was an endemic species. The species was introduced on a barge from Guam; it did not become established in the Hawaiian Islands and has not been collected here since (Springer, 1971, 1988).

GENERAL RANGE: Central Indian and western Pacific oceans from the Maldives and Sri Lanka to the Ryukyus, Australia, Micronesia, Samoa, and the Phoenix Islands. Benthic and engyenthic in or over coral or algae-covered rocks at 1–25 m (Springer, 1988; Myers, 1989; Randall *et al.*, 1990a).



***Enchelyurus brunneolus* (Jenkins)**

*Aspidontus brunneolus* Jenkins, 1903, p. 510, Fig. 50, Honolulu, O‘ahu, Hawaiian Islands.

*Aspidontus brunneolus* Jenkins, 1903: Jenkins (1903), Snyder (1904).

*Enchelyurus ater* non (Günther, 1877) [a valid species not found in the Hawaiian Islands]: Jordan & Evermann (1905), Fowler (1928, 1934, 1949, in part).

*Enchelyurus edmondsoni* Fowler, 1923: Fowler (1923, 1928, 1949).

*Enchelyurus brunneolus* (Jenkins, 1903): Gosline & Brock (1960), Springer (1972), Tinker (1982), Springer (1982).

TAXONOMY: Springer (1972, 1982).

HAWAIIAN RECORDS: O‘ahu to Lisianski (Jenkins, 1903; Jordan & Evermann, 1905; Fowler, 1928; Springer, 1982).

GENERAL RANGE: Hawaiian Islands endemic. Benthic in dead coral; depths unrecorded (Gosline & Brock, 1960; Springer, 1982).

***Entomacrodus marmoratus* (Bennett)**

*Blennius marmoratus* Bennett, 1828, p. 35, “Hawaiian Islands”.

*Blennius marmoratus* Bennett, 1828: Bennett (1828).

*Salarias marmoratus* (Bennett, 1828): Günther (1861, 1877), Jenkins (1903), Snyder (1904), Fowler (1928, 1934, 1949).

*Alticus marmoratus* (Bennett, 1828): Jordan & Evermann (1905).

*Salarias meleagris* non Valenciennes *in* Cuvier & Valenciennes, 1836 [a valid *Istiblennius* species not found in the Hawaiian Islands]: Fowler (1928, 1949).

*Entomacrodus marmoratus* (Bennett, 1828): Gosline & Brock (1960), Springer (1967b), Tinker (1982), Springer (1982), Randall (1985a, 1996a), Hoover (1993), Randall *et al.* (1993b).

TAXONOMY: Springer (1967b).

COMMON NAMES: Pāo‘o (Randall, 1996a), Marbled blenny (Randall, 1996a), Rockskipper.

HAWAIIAN RECORDS: Hawai‘i Island to Midway at <0–1 m (Bennett, 1828; Jordan & Evermann, 1905; Gosline & Brock, 1960; Springer, 1967b; Randall, 1985a; Randall *et al.*, 1993b).

GENERAL RANGE: Hawaiian Islands endemic. Benthic in rocks along coasts with surf at <0–1 m (Gosline & Brock, 1960; Springer, 1982; Randall, 1985a; Hoover, 1993).

***Entomacrodus strasburgi* Springer**

*Entomacrodus strasburgi* Springer, 1967b, p. 88, pl. 14, Makapu‘u Point, O‘ahu, Hawaiian Islands.

*Entomacrodus strasburgi* Springer, 1967b: Springer (1967b), Randall (1976a, 1985a, 1996a), Tinker (1982), Springer (1982).

TAXONOMY: Springer (1967b, 1982).

COMMON NAMES: Strasburg’s blenny (Randall, 1996a).

HAWAIIAN RECORDS: Moloka‘i to O‘ahu at <0–1 m (Springer, 1967b).

GENERAL RANGE: Hawaiian Islands endemic. Benthic in rocks along coasts with surf at <0–1 m (Springer, 1967b, 1982; Randall, 1985a).

***Exallias brevis* (Kner)**

*Salarias brevis* Kner, 1868, p. 29, Savay [Savai‘i], [western] Samoa.

*Salarias brevis* Kner, 1868: Günther (1877), Fowler (1900), Jenkins (1903).

*Cirripectes brevis* (Kner, 1868): Fowler (1928, 1949).

*Leoblennius schultzi* Reid, 1943: Reid (1943), Fowler (1949).

*Cirripectes leopardus* (Day, 1870) [a nominal taxon of unknown identity]: Fowler (1949) listed the Hawaiian Islands with the type locality for this taxon, but Eschmeyer (1998) gave the type locality as only Galle Harbor, Sri Lanka.

*Exallias brevis* (Kner, 1868): Jordan & Evermann (1905), Gosline & Brock (1960), Smith-Vaniz & Springer (1971), Hobson (1974), Tinker (1982), Randall (1985a, 1996a), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Springer *in* Smith & Heemstra (1986), Myers (1989), Hoover (1993, 2003).

TAXONOMY: Smith-Vaniz & Springer (1971).

COMMON NAMES: Pāo‘o kauila (Hoover, 1993, 2003; Randall, 1996a), ‘O‘opu pao‘o (Gosline & Brock,

1960), Shortbodied blenny (Hoover, 1993, 2003; Randall, 1996a), Leopard blenny (Hoover, 1993, 2003; Myers, 1999), Spotted coral blenny (Hoover, 1993, 2003).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at 1–11 m (Günther, 1877; Gosline & Brock, 1960; Hobson, 1974; Randall *et al.*, 1985b, 1993b).

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to the Ryukyu and Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, the Society Islands, the Marquesas, and Rapa. Benthic in coral at 1–24 usually at 3–8 m (Randall, 1985a; Springer *in* Smith & Heemstra, 1986; Myers, 1989; Randall *et al.*, 1990a, 1997b).

[*Hypsoblennius brevipinnis* (Günther)]

*Blennius brevipinnis* Günther, 1861, p. 226, “Sandwich Islands” [false locality record], “West coast of Central America” [= Pacific coast of Panama].

*Blennius brevipinnis* Günther, 1861: Günther (1861).

*Hypsoblennius brevipinnis* (Günther, 1861): Thomson *et al.* (1979), Springer (1991), Allen & Robertson (1994).

TAXONOMY: Allen & Robertson 1994).

COMMON NAMES: Barnaclebill blenny.

HAWAIIAN RECORDS: Although the “Sandwich Islands” were given as the collection locality for a paratype in the original description of this eastern Pacific species (Günther, 1861), no specimens have been collected in the archipelago since. Günther had several specimens from “the Haslar collection” from the eastern tropical Pacific that had erroneous collection localities of “the Sandwich Islands” (e.g., *Arius dasycephalus*, *Fodiator acutus rostratus*, *Chaetodon humeralis*). In a note on their page 504, Jordan & Evermann (1905) included Günther’s (1861) Hawaiian Islands record of *H. brevipinnis* in the synonymy with *Exallias brevis*. The Hawaiian locality for *H. brevipinnis* (Günther) is false (Springer, 1991).

GENERAL RANGE: Eastern Pacific endemic from the Gulf of California to Peru and the Galapagos Islands. Benthic in empty barnacle tests, usually at 1–3 m (Thomson *et al.*, 1979; Allen & Robertson, 1994).

[*Hypsoblennius sordidus* (Bennett)]

*Blennius sordidus* Bennett, 1828, p. 34, “Hawaiian Islands”.

*Blennius sordidus* Bennett, 1828: Bennett (1828), Günther (1861, 1877), Jordan & Evermann (1905), Fowler (1928).

*Hypsoblennius sordidus* (Bennett, 1828): Springer (1967a, 1991).

TAXONOMY: Springer (1967a, 1991).

HAWAIIAN RECORDS: Although this species was originally described from the Hawaiian Islands (Bennett, 1828), Springer (1967a) has given evidence that the type locality was erroneous, with the specimen probably originating from the coast of South America. Reports by later authors were repetitions of Bennett’s record. The species has not been found in Hawai'i since the original description.

GENERAL RANGE: Endemic to Chile. Benthic in tidepools, the intertidal and shallow subtidal areas (Springer, 1967a).

*Istiblennius zebra* (Vaillant & Sauvage)

*Salarias zebra* Vaillant & Sauvage, 1875, p. 281, “Hawaiian Islands”.

*Salarias zebra* Vaillant & Sauvage, 1875: Vaillant & Sauvage (1875), Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1934, 1949).

*Salarias edentulus* non (Schneider & Forster *in* Bloch & Schneider, 1801) [a valid *Istiblennius* species not found in the Hawaiian Islands]: Steindachner (1900), Fowler (1900), Jordan & Evermann (1905), Fowler (1928, 1934, 1949).

*Salarias cypho* Jenkins, 1903: Jenkins (1903).

*Salarias lineatus* non Valenciennes *in* Cuvier & Valenciennes, 1836 [a valid *Istiblennius* species not found in the Hawaiian Islands]: Fowler (1928).

*Istiblennius zebra* (Vaillant & Sauvage, 1875): Strasburg (1956), Gosline & Brock (1960), Smith-Vaniz & Springer (1971), Tinker (1982), Randall (1985a, 1996a), Hoover (1993, 2003), Springer & Williams (1994).

TAXONOMY: Springer & Williams (1994).

COMMON NAMES: Pāo'ō (Hoover, 1993, 2003; Randall, 1996a), Panao (Gosline & Brock, 1960), Zebra blenny (Hoover, 1993, 2003), Jumping jack (Hoover, 1993, 2003), Zebra rock skipper (Randall, 1996a; Hoover, 2003), Rockskipper (Gosline & Brock, 1960), Gori (Gosline & Brock, 1960).

HAWAIIAN RECORDS: Hawai'i Island to Lisianski at 1 m (Vaillant & Sauvage, 1875; Jordan & Evermann, 1905; Fowler, 1928; Gosline & Brock, 1960).

GENERAL RANGE: Hawaiian Islands endemic. Benthic in rocks of the intertidal and tidepools to 1 m; occurs out of water at night on rocks splashed by surf (Strasburg, 1956; Gosline & Brock, 1960; Randall, 1985a; Hoover, 1993; Springer & Williams, 1994).

### *Omobranchus ferox* (Herre)

*Petroscirtes ferox* Herre, 1927, p. 277, Pl. 3 (figs. 2–3), Lake Bombon [Lake Taal], Philippines.

*Omobranchus ferox* (Herre, 1927): Springer & Gomon (1975), Springer in Smith & Heemstra (1986), Kottelat *et al.* (1993), Englund *et al.* (2000b), Englund & Baumgartner (2000), Yamamoto & Tagawa (2000), Englund & Eldredge (2001).

TAXONOMY: Springer & Gomon (1975), Englund & Baumgartner (2000).

COMMON NAMES: Gossamer blenny, Fang-toothed blenny (Englund *et al.*, 2000a, b; Yamamoto & Tagawa, 2000; Englund & Eldredge, 2001).

HAWAIIAN RECORDS: Nine specimens of *O. ferox*, 18.5–56 mm SL, were collected during 1998 at the mouth of Hālawā Stream in Pearl Harbor, O'ahu, near a large, floating drydock that had been moved to O'ahu from the Philippines a few years earlier. Another was captured in 2000 in the Ala Wai Canal. This species was most likely introduced to O'ahu on the hull of the drydock. The species is reproducing and becoming established here (Englund *et al.*, 2000a, b; Englund & Baumgartner, 2000; Yamamoto & Tagawa, 2000; Englund & Eldredge, 2001).

GENERAL RANGE: An Indo-West Pacific species known from East Africa and Sri Lanka to Indonesia, the Philippines and the South China Sea. Benthic in shallow, brackish waters of mangrove swamps, riverine estuaries and estuarine oyster beds, with at least one record from a slightly brackish-water lake (Springer & Gomon, 1975; Springer in Smith & Heemstra, 1986; Kottelat *et al.*, 1993; Englund & Baumgartner, 2000).

### *Omobranchus rotundiceps obliquus* (Garman)

*Petroscirtes obliquus* Garman, 1903, p. 237, pl. 4 (fig. 3), Suva Island, Fiji.

*Omobranchus elongatus* non (Peters, 1855) [a valid species not found in the Hawaiian Islands]: Strasburg (1956), Gosline & Brock (1960), Tinker (1982 text).

*Omobranchus rotundiceps obliquus* (Garman, 1903): Strasburg (1966), Watson (1974), Springer & Gomon (1975), Tinker (1982 appendix), Springer (1982), Myers (1989), Randall (1996a), Englund & Baumgartner (2000).

TAXONOMY: Springer & Gomon (1975).

COMMON NAMES: Roundhead blenny (Randall, 1996a), Mangrove blenny (Myers, 1999).

HAWAIIAN RECORDS: O'ahu, with larvae very common in Kāne'ohe Bay (Strasburg, 1956; Gosline & Brock, 1960; Watson, 1974). Strasburg (1956) and Gosline & Brock (1960) suggested that this species was introduced to the Hawaiian Islands from Samoa in 1951 among *Tridacna* clams that were imported to Coconut Island, Kāne'ohe Bay, for research. Later, Strasburg (1966) concluded that the species was indigenous. Springer & Gomon (1975) and Springer (1982) did not mention the possibility that *O. rotundiceps obliquus* was introduced to Hawai'i but Myers (1989) stated that it is introduced in the Line and Hawaiian Islands. Englund & Baumgartner (2000) argued that the species is introduced to the Hawaiian Islands, given that it has only been found in the islands at Kāne'ohe Bay, O'ahu.

GENERAL RANGE: Eastern Indian and western-central Pacific oceans from the Nicobar Islands, Indonesia, and western Australia to the Philippines, southeastern Australia, Micronesia, Samoa, the Line Islands, and the Hawaiian Islands. *Omobranchus rotundiceps rotundiceps* (Macleay, 1881) is an Australian endemic; *O. r. obliquus* is found elsewhere throughout the species' range. Benthic in coral, rocks, and rubble of shallow estuaries and coastal waters (Springer & Gomon, 1975; Springer, 1982; Myers, 1989).

***Parablennius thysanius*** (Jordan & Seale)

*Blennius thysanius* Jordan & Seale, 1907, p. 47, Fig. 19, Cavite, Luzon Island, Philippines.

*Blennius* species: Watson (1974), Miller *et al.* (1979).

*Pictiblennius* species: Leis & Rennis (1983).

*Parablennius thysanius* (Jordan & Seale, 1907): Springer (1991), Randall (1996a).

TAXONOMY: Springer (1991).

COMMON NAMES: Tasseled blenny (Randall, 1996a).

HAWAIIAN RECORDS: O'ahu at 1–10 m; introduced to Pearl Harbor and Kāne'ohe Bay, probably from the Philippines via shipping transport (Watson, 1974; Miller *et al.*, 1979; Leis & Rennis, 1983; Springer, 1991).

GENERAL RANGE: Indo-west-Pacific from Oman and Sri Lanka to Thailand and the Philippines, introduced to Hawai'i and perhaps elsewhere in its range. Benthic in algae and fouling communities in estuaries at 1–10 m (Springer, 1991).

***Plagiotremus ewaensis*** (Brock)

*Petroscirtes ewaensis* Brock, 1948a, p. 125, Fig., off Ewa Beach, O'ahu, Hawaiian Islands.

*Petroscirtes filamentosus* non (Valenciennes in Cuvier & Valenciennes, 1836) [a junior synonym of *Aspidontus taeniatus* (Quoy & Gaimard, 1834), a valid species not found in the Hawaiian Islands, with the genus name misspelled]: Fowler (1900)?

*Petroscirtes filamentosus* non (Valenciennes, 1836): Fowler (1928) in part?

*Aspidontus taeniatus* non (Quoy & Gaimard, 1834) [a valid species not found in the Hawaiian Islands]: Fowler (1949, in part).

*Petroscirtes ewaensis* Brock, 1948a: Brock (1948a).

*Runula ewaensis* (Brock, 1948a): Gosline & Brock (1960).

*Plagiotremus rhinorhynchus* non (Bleeker, 1852) [*lapsus* for *rhinorhynchos*; a valid species not found in the Hawaiian Islands; see below]: Tinker (1982), Okamoto & Kanenaka (1984).

*Plagiotremus ewaensis* (Brock, 1948a): Hobson (1974), Smith-Vaniz (1976), Randall (1985a, 1996a), Hoover (1993, 2003), Randall *et al.* (1993b).

TAXONOMY: Smith-Vaniz (1976) noted that this species probably deserves only subspecific status within *P. rhinorhynchus*, a widespread Indo-Pacific species, but chose to recognize it as a distinct species according to tradition.

COMMON NAMES: Ewa blenny (Hoover, 1993), Ewa fangblenny (Randall, 1996a), Ewa fang blenny (Hoover, 2003).

HAWAIIAN RECORDS: Hawai'i Island to Kure Atoll at 4–55 m (Fowler, 1900?, Brock, 1948a; Gosline & Brock, 1960; Okamoto & Kanenaka, 1984; Hobson, 1974; Randall, 1985a; Randall *et al.*, 1993b).

GENERAL RANGE: Hawaiian Islands endemic. Benthic and engybenthic in or over coral at 4–55 m (Gosline & Brock, 1960; Smith-Vaniz, 1976; Randall, 1985a; Hoover, 1993).

***Plagiotremus goslinei*** (Strasburg)

*Runula goslinei* Strasburg, 1956, p. 260, Fig. 4, Pupukea, north shore of O'ahu, Hawaiian Islands.

*Runula goslinei* Strasburg, 1956: Strasburg (1956), Gosline & Brock (1960).

*Plagiotremus goslinei* (Strasburg, 1956): Hobson (1974), Smith-Vaniz (1976), Tinker (1982), Okamoto & Kanenaka (1984), Randall (1985a, 1996a), Hoover (1993, 2003).

TAXONOMY: Smith-Vaniz (1976) suggested that this species could be considered a subspecies of *P. tapeinosoma* (Bleeker, 1857), but chose to continue to recognize it as a distinct Hawaiian endemic species.

COMMON NAMES: Scale-eating blenny (Hoover, 1993), Gosline's fangblenny (Randall, 1996a), Scale-eating fang blenny (Hoover, 2003).

HAWAIIAN RECORDS: Hawai'i Island to Pearl and Hermes at 1–15 m (Strasburg, 1956; Gosline & Brock, 1960; Hobson, 1974; Okamoto & Kanenaka, 1984).

GENERAL RANGE: Hawaiian Islands endemic. Benthic or engybenthic in or over coral at 1–15 m (Gosline & Brock, 1960; Smith-Vaniz, 1976; Randall, 1985a; Hoover, 1993).

**Callionymoidei****Callionymidae — Dragonets<sup>62</sup>*****Callionymus caeruleonotatus* Gilbert**

*Callionymus caeruleonotatus* Gilbert, 1905, p. 648, pl. 89, east coast of Maui, Hawaiian Islands.

*Calliurichthys caeruleonotatus* (Gilbert, 1905): Nakabo (1982a).

*Callionymus caeruleonotatus* Gilbert, 1905: Gilbert (1905), Fowler (1928, 1949), Gosline & Brock (1960), Clarke (1972), Struhsaker (1973a), Tinker (1982), Fricke (1983), Randall (1999b).

TAXONOMY: Randall (1999b).

COMMON NAMES: Bluespotted dragonet.

HAWAIIAN RECORDS: Hawai'i Island to Kaua'i at 42–325 m (Gilbert, 1905; Clarke, 1972; Struhsaker, 1973a; Randall, 1999b).

GENERAL RANGE: Hawaiian Islands endemic. Benthic at 42–325 m (Gilbert, 1905; Clarke, 1972; Struhsaker, 1973a; Fricke, 1983; Randall, 1999b).

***Callionymus comptus* Randall**

*Callionymus comptus* Randall, 1999b, p. 190, Pl. IA,B, O'ahu, Hawaiian Islands.

*Callionymus comptus* Randall, 1999b: Randall (1999b).

TAXONOMY: Randall (1999b).

COMMON NAMES: Ornamented dragonet.

HAWAIIAN RECORDS: Maui to O'ahu at 3–27.5 m (Randall, 1999b).

GENERAL RANGE: Hawaiian Islands endemic. Benthic on sand near outer ocean coral reefs at 3–27.5 m (Randall, 1999b).

***Callionymus decoratus* (Gilbert)**

*Calliurichthys decoratus* Gilbert, 1905, p. 651, pl. 90, Penguin Bank of Moloka'i, Hawaiian Islands.

*Calliurichthys decoratus* Gilbert, 1905: Gilbert (1905), Fowler (1928, 1934, 1949), Nakabo (1982a).

*Callionymus decoratus* (Gilbert, 1905): Gosline & Brock (1960), Struhsaker (1973a), Tinker (1982), Fricke (1983), Uchida & Uchiyama (1986), Randall (1996a, 1999b).

TAXONOMY: Randall (1999b).

COMMON NAMES: Longtail dragonet (Randall, 1996a), Decorated dragonet.

HAWAIIAN RECORDS: Maui to Pearl and Hermes Reef at 1–134 m (Gilbert, 1905; Fowler, 1934a; Struhsaker, 1973a; Fricke, 1983; Uchida & Uchiyama, 1986; Randall, 1999b).

GENERAL RANGE: Hawaiian Islands endemic. Benthic on sand at 1–134 m (Gilbert, 1905; Struhsaker, 1973a; Fricke, 1983; Uchida & Uchiyama, 1986; Randall, 1999b).

**[*Callionymus enneactis* Bleeker]**

*Callionymus enneactis* Bleeker, 1879, p. 95, Singapore.

*Paradiplogrammus enneactis* (Bleeker, 1879) [a valid species not found in Hawaiian Islands]: Nakabo (1982a).

*Paradiplogrammus parvus* (Nakabo, 1984) [a valid species not found in the Hawaiian Islands]: Nakabo (1984)?

*Callionymus enneactis* Bleeker, 1879: Fricke (1983, 2000), Myers (1989), Randall *et al.* (1997a).

TAXONOMY: Fricke (1983).

COMMON NAMES: Mangrove dragonet (Myers, 1999), Common dragonet (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: In his text Fricke (1983) mentioned specimens of this or a related species from “Hawaii Islands, Irian, East Indonesia”, an older spelling used for Waihee, Ceram. Nakabo (1984) described the related species as *Paradiplogrammus parvus*. Fricke's (1983) reference to “Hawaii” was misinterpreted as the Hawaiian Islands by Myers (1989). *Callionymus enneactis* does not occur in the Hawaiian Islands.

GENERAL RANGE: Eastern Indian and western Pacific oceans from Thailand, Indonesia, and western Australia to southern Japan, the Ogasawara Islands, northeastern Australia, New Caledonia, the Solomon Islands, and Micronesia. Benthic on sand, mud, and rubble in the vicinity of coral reefs from 1–20 m (Fricke, 1983, 2000; Myers, 1989; Randall *et al.*, 1997b).

***Draculo pogognathus*** (Gosline)

*Pogonymus pogognathus* Gosline, 1959, p. 72, Fig. 4, west of Hanalei Bay, Kaua'i, Hawaiian Islands.

*Pogonymus pogognathus* Gosline, 1959: Gosline (1959), Gosline & Brock (1960), Tinker (1982).

*Eleutherochir pogognathus* (Gosline, 1959): Nakabo (1982a).

*Draculo pogognathus* (Gosline, 1959): Fricke (1983), Randall (1999b).

TAXONOMY: Randall (1999b).

HAWAIIAN RECORDS: Moloka'i to Kaua'i at 1–4 m (Gosline, 1959; Fricke, 1983; Randall, 1999b).

GENERAL RANGE: Hawaiian Islands endemic. Benthic on or in sand at 1–4 m (Gosline & Brock, 1960; Fricke, 1983; Randall, 1999b).

***Synchiropus corallinus*** (Gilbert)

*Callionymus corallinus* Gilbert, 1905, p. 649, Fig. 251, Avau Channel between Maui and Lana'i, Hawaiian Islands.

*Callionymus corallinus* Gilbert, 1905: Gilbert (1905), Fowler (1928), Fricke (1983 addendum, 1993), Randall *et al.* (1993b), Fricke & Zaiser Brownell (1993), Fricke (2000).

*Callionymus decoratus* non (Gilbert, 1905) [a valid species that also occurs in the Hawaiian Islands]: Gosline & Brock (1960, in part), Tinker (1982, in part).

*Paradiplogrammus corallinus* (Gilbert, 1905): Nakabo (1982a, 1991).

*Synchiropus corallinus* (Gilbert, 1905): Randall (1996a, 1999b), Randall *et al.* (1997b).

TAXONOMY: Randall's (1999b). Fricke (2000) commented that this species has characters intermediate between *Callionymus* and *Synchiropus*.

COMMON NAMES: Exclamation point dragonet (Randall, 1996a).

HAWAIIAN RECORDS: Maui to Midway at 11–122 m (Gilbert, 1905; Fricke, 1983 addendum; Nakabo, 1991; Randall *et al.*, 1993b; Randall, 1999b).

GENERAL RANGE: Pacific endemic from northeastern Australia, New Caledonia, Japan, the Ogasawara Islands, the Marianas, the Hawaiian Islands, and Tonga. Benthic on sand and rubble at 11–122 m (Gilbert, 1905; Fricke, 1983 addendum, 1993, 2000; Nakabo, 1991; Randall *et al.*, 1993b, 1997b; Fricke & Zaiser Brownell, 1993; Randall, 1999b).

***Synchiropus hawaiiensis*** Fricke

*Synchiropus hawaiiensis* Fricke, 2000, p. 71, Fig. 34, between Lāna'i, Maui, and Kaho'olawe, Hawaiian Islands, at 20°38'18"–41°06"N, 156°40'36"–41°18"W.

*Synchiropus kinmeiensis* (Nakabo, Yamamoto & Chen, 1983): Randall (1999b, in part).

*Synchiropus hawaiiensis* Fricke, 2000: Fricke (2000).

TAXONOMY: Fricke (2000). The recognition of this species as one distinct from *S. kinmeiensis* needs reevaluation (J.E. Randall, pers. comm., Feb. 2003).

HAWAIIAN RECORDS: Maui to Moloka'i at 75–318 m (Fricke, 2000).

GENERAL RANGE: Hawaiian Islands endemic. Benthic at 75–318 m (Fricke, 2000).

***Synchiropus kinmeiensis*** (Nakabo, Yamamoto, & Chen)

*Foetorepus kinmeiensis* Nakabo, Yamamoto & Chen, 1983, p. 349, Figs. 1–2, Kinmei Seamount, Emperor Seamount chain, central North Pacific, at 35°20.2'N, 171°24.1'E.

*Synchiropus* species: Novikov *et al.* (1981).

*Foetorepus* species 1: Nakabo (1982a).

*Foetorepus* species: Nakabo (1982a).

*Foetorepus altivelis* non (Temminck & Schlegel, 1845) [a valid species not found in the Hawaiian Islands]: Nakabo (1982a, 1987).

*Foetorepus kinmeiensis* Nakabo, Yamamoto & Chen, 1983: Nakabo *et al.* (1983), Nakabo (1987).

*Foetorepus kanmuensis* Nakabo, Yamamoto & Chen, 1983: Nakabo *et al.* (1983), Nakabo (1987).

*Foetorepus kammuensis* Nakabo, Yamamoto & Chen, 1983 [*lapsus* for *kanmuensis*]: Humphreys *et al.* (1984).

Undescribed *Synchiropus* species: Fricke (1993).

*Synchiropus altivelis* non (Temminck & Schlegel, 1845): Fricke (1981, 1983, 1993 all in part), Uchida & Uchiyama (1986), Borets (1986).

*Synchiropus kinmeiensis* (Nakabo, Yamamoto & Chen, 1983): Randall (1999b, in part).

TAXONOMY: Randall (1999b), Fricke (2000).

HAWAIIAN RECORDS: Maro Reef to the Milwauke and Koko seamounts at 88–532 m (Novikov *et al.*, 1981; Humphreys *et al.*, 1984; Fricke, 1981, 1983; Uchida & Uchiyama, 1986; Borets, 1986; Randall, 1999b; Fricke, 2000).

GENERAL RANGE: An Emperor Seamounts and Hawaiian Islands endemic. Benthic at 88–593 m (Fricke, 1981, 1983; Randall, 1999b).

### *Synchiropus rosulentus* Randall

*Synchiropus rosulentus* Randall, 1999b, p. 200, Pl. IG,H, O‘ahu, Hawaiian Islands.

Undescribed *Callionymus* species: Randall *et al.* (1993b).

*Synchiropus rubrovinctus* non (Gilbert, 1905) [a valid species also found in the Hawaiian Islands]: Gosline & Brock (1960, in part).

*Synchiropus rosulentus* Randall, 1999b: Randall (1999b).

TAXONOMY: Randall (1999b).

COMMON NAMES: Rosy dragonet.

HAWAIIAN RECORDS: Johnston Atoll and Maui to Midway at 5–24.5 m (Randall *et al.*, 1993b; Randall, 1999b).

GENERAL RANGE: Johnston Atoll and Hawaiian Islands endemic. Benthic on sand or rubble at 5–24.5 m (Randall *et al.*, 1993b; Randall, 1999b).

### *Synchiropus rubrovinctus* (Gilbert)

*Callionymus rubrovinctus* Gilbert, 1905, p. 650, Fig. 252, Avau Channel between Maui and Lāna‘i, Hawaiian Islands.

*Callionymus rubrovinctus* Gilbert, 1905: Gilbert (1905), Fowler (1928).

*Neosynchiropus rubrovinctus* (Gilbert, 1905): Nakabo (1982a), Nakabo & Aizawa (1991).

*Synchiropus rubrovinctus* (Gilbert, 1905): Gosline & Brock (1960, in part), Fricke (1981, 1983), Tinker (1982), Randall (1999b).

TAXONOMY: Randall (1999b).

HAWAIIAN RECORDS: Maui to Moloka‘i at 52–79 m (Gilbert, 1905; Fricke, 1983; Randall, 1999b).

GENERAL RANGE: Western and central North Pacific endemic known from southern Japan and the Hawaiian Islands. Benthic at 1–79 m (Gilbert, 1905; Fricke, 1981, 1983; Nakabo & Aizawa, 1991; Randall, 1999b).

## Draconettidae

### *Centrodraco rubellus* Fricke, Chave, & Suzumoto

*Centrodraco rubellus* Fricke, Chave & Suzumoto *in* Fricke, 1992, p. 185, Fig. 11, Barbers Point, southwest O‘ahu, Hawaiian Islands.

*Centrodraco rubellus* Fricke, Chave & Suzumoto, 1992: Fricke (1992), Chave & Mundy (1994).

TAXONOMY: Fricke (1992).

HAWAIIAN RECORDS: O‘ahu at 363–367 m (Fricke, 1992).

GENERAL RANGE: Eastern Indian Ocean and central Pacific endemic known only from Bali in Indonesia and O‘ahu in Hawai‘i. Benthic on sand at 150–367 m (Fricke, 1992; Chave & Mundy, 1994).

### *Draconetta xenica* Jordan & Fowler

*Draconetta xenica* Jordan & Fowler, 1903a, p. 939, Fig. 1, Suruga Bay off Namazu, Japan.

*Draconetta hawaiiensis* Gilbert, 1905: Gilbert (1905), Fowler (1928), Gosline & Brock (1960), Struhsaker (1973a), Tinker (1982).

*Draconetta xenica* Jordan & Fowler, 1903a: Nakabo (1982b), Fricke (1992), Chave & Mundy (1994).

TAXONOMY: Nakabo (1982b), Fricke (1992).

HAWAIIAN RECORDS: Maui to O‘ahu at 201–367 m (Gilbert, 1905; Struhsaker, 1973a; Chave & Mundy, 1994).

GENERAL RANGE: Indo-Pacific from South Africa to the Philippines, southern Japan, and the Hawaiian

Islands. Benthic on sand at 128–367 m (Gilbert, 1905; Nakabo, 1982b; Fricke, 1992; Chave & Mundy, 1994).

## Gobioidei

### Eleotridae — Sleepers

#### *Eleotris sandwicensis* Vaillant & Sauvage

*Eleotris sandwicensis* Vaillant & Sauvage, 1875, p. 280, “Hawaiian Islands”.

*Culius fuscus* non (Forster in Bloch & Schneider, 1801) [a valid *Eleotris* species not found in the Hawaiian Islands]: Streets (1877).

*Eleotris fusca* non (Forster in Bloch & Schneider, 1801): Günther (1880).

*Eleotris fuscus* non (Forster in Bloch & Schneider, 1801): Fowler (1900, 1928, 1931, 1934, 1949, in part).

*Eleotris sandwicensis* Vaillant & Sauvage, 1875, and *Eleotris sandwicensis* [a *lapsus* in spelling]: Miller (1998).

*Eleotris sandwicensis* Vaillant & Sauvage, 1875: Vaillant & Sauvage (1875), Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Fowler (1928), Gosline & Brock (1960), Tinker (1982), Fitzsimons & Nishimoto (1990), Yamamoto & Tagawa (2000).

**TAXONOMY:** There is no recent revision of this family. The separation of this species from *E. fuscus* (Forster, 1801), a widespread Indo-Pacific species, has been questioned (Fowler, 1928) and needs investigation. Miller (1998) included *E. sandwicensis* as distinct in his revision of West African *Eleotris* but stated that his paper was “not intended to be a systematic revision of *Eleotris*, and species from other areas are treated as nominally distinct.”

**COMMON NAMES:** ‘O‘opu akupa (Yamamoto & Tagawa, 2000), Hawaiian sleeper.

**HAWAIIAN RECORDS:** Hawai‘i Island to Kaua‘i in estuaries and lower reaches of streams; abundant on O‘ahu (Vaillant & Sauvage, 1875; Jordan & Evermann, 1905; Fitzsimons & Nishimoto, 1990; Yamamoto & Tagawa, 2000).

**GENERAL RANGE:** Main Hawaiian island freshwater endemic. Benthic in the lower reaches of streams and brackish waters (Jordan & Evermann, 1905; Fitzsimons & Nishimoto, 1990).

### Gobiidae — Gobies

#### *Asterropteryx semipunctata* Rüppell

*Asterropteryx semipunctatus* Rüppell, 1830, p. 138, pl. 34 (fig. 4), Massawa, Eritrea, Red Sea.

*Brachyleotris cyanostigma* (Bleeker, 1855): Streets (1877).

*Asterropteryx cyanostigma* (Bleeker, 1855): Snyder (1904).

*Asterropteryx semipunctatus* Rüppell, 1830 [*lapsus* for *Asterropteryx*]: Fowler (1928, 1949), Greenfield & Randall (2004).

*Asterropteryx eumeces* Pietschmann, 1934a: Pietschmann (1934a).

*Gobiomorphus hypselepteryx* Pietschmann, 1934b: Pietschmann (1934b).

*Gobiomorphus robustus* Pietschmann, 1934b: Pietschmann (1934b).

*Asterropteryx semipunctatus* Rüppell, 1830: Jenkins (1903), Jordan & Evermann (1905), Gosline & Brock (1960), Tinker (1982), Akihito in Masuda *et al.* (1984), Randall (1985a, 1996a), Winterbottom & Emery (1986), Hoese in Smith & Heemstra (1986), Myers (1989), Randall *et al.* (1990a, 1993b, 1997a), Kuitert (1993), Hoover (1993, 2003).

*Asterropteryx semipunctata* Rüppell, 1830: Privitera (2001).

**TAXONOMY:** Greenfield & Randall (2004). In his original description, Rüppell (1830) spelled the genus *Asterropteryx* in the text on p. 138, and *Asterropteryx* in the caption for fig. 4 on plate 34. In a later publication, Rüppell (1838) consistently used *Asterropteryx* as the spelling, thereby acting as first reviser for the spelling of this genus (according to Article 32.2.1 of the ICZN Code). Privitera (2001) pointed out that the species name should be spelled *semipunctata* instead of *semipunctatus*, to be in agreement with the gender of *Asterropteryx*.

**COMMON NAMES:** Halfspotted goby (Hoover, 1993, 2003; Randall, 1996a), Bluespotted goby (Randall, 1985), Starryfin goby, Starry goby (Randall *et al.*, 1997a; Myers, 1999).

**HAWAIIAN RECORDS:** Maui to Midway (probably throughout the archipelago) at 1–10 m (Streets, 1877a; Jordan & Evermann, 1905; Fowler, 1928; Gosline & Brock, 1960; Randall *et al.*, 1993b; Greenfield & Randall (2004)).



GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to southern Japan, the Ogasawara Islands, Australia, Lord Howe Island, Micronesia, the Hawaiian Islands, the Tuamotu Archipelago, and Rapa. Benthic in holes in silt or sand among coral rubble of embayments or lagoons at 1–15 m (Gosline & Brock, 1960; Akihito *in* Masuda *et al.*, 1984; Randall, 1985a; Winterbottom & Emery, 1986; Hoese *in* Smith & Heemstra, 1986; Myers, 1989; Randall *et al.*, 1990a, 1993b, 1997b; Kuiter, 1993; Greenfield & Randall, 2004).

***Awaous guamensis*** (Valenciennes)

*Gobius guamensis* Valenciennes *in* Cuvier & Valenciennes, 1837, p. 103, Guam, Mariana Islands, western North Pacific.

*Gobius stamineus* Eydoux & Souleyet, 1850: Eydoux & Souleyet (1850), Günther (1880).

*Awaous crassilabrus* (Günther, 1861): Streets (1877), Fowler (1900).

*Gobius papuensis* non Valenciennes *in* Cuvier & Valenciennes, 1837 [a valid *Oxyurichthys* species not found in the Hawaiian Islands]: Fowler (1900, in part).

*Awaous stamineus* (Eydoux & Souleyet, 1850): Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Fitzsimons & Nishimoto (1990).

*Chonophorus guamensis* (Valenciennes, 1837): Fowler (1928, 1934).

*Awaous ocellaris* non (Broussonet, 1782) [a valid species not found in the Hawaiian Islands]: Fowler (1949, in part).

*Chonophorus stamineus* (Eydoux & Souleyet, 1850): Jordan *et al.* (1927), Gosline & Brock (1960), Tinker (1982).

*Awaous guamensis* (Valenciennes, 1837): Watson (1992), Yamamoto & Tagawa (2000), Greenfield & Randall (2004).

TAXONOMY: Watson (1992).

COMMON NAMES: ‘O‘opu nākea (Yamamoto & Tagawa, 2000).

HAWAIIAN RECORDS: Hawai‘i Island to Kaua‘i in the lower and middle reaches of freshwater streams at 1 m to 300 m (usually <150 m) above sea level (Eydoux & Souleyet, 1850; Jordan & Evermann, 1905; Fitzsimons & Nishimoto, 1990; Watson, 1992; Yamamoto & Tagawa, 2000).

GENERAL RANGE: Freshwater Pacific endemic known from the Marianas, Vanuatu, the Loyalty Islands, New Caledonia, and the Hawaiian Islands. Benthic in the lower and middle reaches of streams from 1–1000 m above sea level (Watson, 1992).

***Bathygobius coalitus*** (Bennett)

*Gobius coalitus* Bennett, 1832, p. 166, Mauritius, western Indian Ocean.

*Gobius albopunctatus* Valenciennes *in* Cuvier & Valenciennes, 1837: Günther (1877), Fowler (1900), Jenkins (1903), Snyder (1904).

*Bathygobius cyclopterus* non (Valenciennes *in* Cuvier & Valenciennes, 1837) [a valid species that does not occur in the Hawaiian Islands]: Randall & Goren (1993).

*Bathygobius albopunctatus* (Valenciennes, 1837): Hoese *in* Smith & Heemstra (1986), Winterbottom & Emery (1986).

*Bathygobius coalitus* (Bennett, 1831): Randall *et al.* (1997a), Winterbottom & Anderson (1997), Greenfield & Randall (2004).

TAXONOMY: Greenfield & Randall (2004). The taxonomy of *Bathygobius* in the Pacific Ocean needs clarification. Although Greenfield & Randall (2004) provided this clarification for the Hawaiian Islands, synonymies for names used in literature prior to their review are uncertain and need verification. Almost all of the names used in the earlier literature have been either of species that do not occur here or are junior synonyms of valid species. Most of these junior synonyms were thought at their times of publication to refer to species other than those to which those synonyms are now thought to apply. It is therefore impossible to determine the true identities of earlier Hawaiian records of *Bathygobius* without examination of voucher specimens.

COMMON NAMES: Whitespotted frillgoby (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: O‘ahu to Necker in tidepools and intertidal shoreline areas (Günther, 1877; Randall & Goren, 1993; Greenfield & Randall, 2004).

GENERAL RANGE: Indo-Pacific from east Africa, Mauritius, the Maldives and the Chagos Archipelago to Indonesia, southern Japan, Samoa, the Hawaiian Islands, and the Marquesas. Benthic in tidepools

and tidal flats, but also from seaward reefs, at 0–>0.5 m (Hoese *in* Smith & Heemstra, 1986; Winterbottom & Emery, 1986; Randall & Goren, 1993; Randall *et al.*, 1997a; Greenfield & Randall, 2004).

***Bathygobius cocosensis*** (Bleeker)

*Gobius cocosensis* Bleeker, 1854c, p. 47, originally from Nova Selma, Cocos-Keeling Island, Indonesia [neotype designated from “Indonesia” but apparently now lost].

*Gobius homocyanus* Vaillant & Sauvage, 1875: Vaillant & Sauvage (1875)? [considered a junior synonym of *B. fuscus* (Rüppell, 1830) by Eschmeyer (1998) but that species is unknown from the Hawaiian Islands, the type locality of *G. homocyanus*].

*Glossogobius giurus* non (Hamilton, 1822) [a valid species unknown from the Hawaiian Islands]: Streets (1877).  
*Gobius sandvicensis* Günther, 1880: Günther (1880).

*Mapo fuscus* non (Rüppell, 1830) [a valid species not found in the Hawaiian Islands]: Jordan & Evermann (1905).

*Bathygobius fuscus* non (Rüppell, 1830): Fowler (1928, 1934, 1949, in part), Gosline & Brock (1960), Tinker (1982), Myers (1989 in part), Randall *et al.* (1990a, in part).

*Bathygobius cocosensis* (Bleeker, 1854c): Akihito & Meguro (1980), Akihito *in* Masuda *et al.* (1984), Randall *et al.* (1985a, 1990a, 1990b, 1993a, 1997a), Hoese *in* Smith & Heemstra (1986), Winterbottom & Emery (1986), Myers (1989), Randall & Goren (1993), Randall (1996a), Hoover (2003), Greenfield & Randall (2004).

TAXONOMY: Randall (1996a), Greenfield & Randall (2004).

COMMON NAMES: ‘O‘opu-‘ohune (Hoover, 1993, 2003; Randall, 1996a), Common goby (Hoover, 1993), Tidepool goby, Cocos frillgoby (Randall, 1996a; Myers, 1999; Hoover, 2003), Cocos goby (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to Pearl and Hermes Reef in tidepools, shallow reef flats, and sheltered patch reefs (Günther, 1877; Jordan & Evermann, 1905; Fowler, 1928, 1949; Randall *et al.*, 1985b; Greenfield & Randall, 2004).

GENERAL RANGE: Indo-Pacific from South Africa and the Chagos Archipelago to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, the Tuamotu Archipelago, the Marquesas, Rapa, and the Pitcairn Group. Benthic in tide pools of rocky coasts and silty intertidal flats at 1 m (Gosline & Brock, 1960; Akihito & Meguro, 1980; Akihito *in* Masuda *et al.*, 1984; Hoese *in* Smith & Heemstra, 1986; Winterbottom & Emery, 1986; Myers, 1989; Randall *et al.*, 1990a, b, 1997b; Randall & Goren, 1993; Greenfield & Randall, 2004).

***Bathygobius cotticeps*** (Steindachner)

*Gobius cotticeps* Steindachner, 1879a, p. 137 [19], pl. 1 (figs. 2–2a), Society Islands.

*Chlamydes laticeps* Jenkins, 1903: Jenkins (1903), Jordan & Evermann (1905).

*Chlamydes cotticeps* (Steindachner, 1879a): Fowler (1928).

*Bathygobius laticeps* (Jenkins, 1903): Fowler (1949).

*Bathygobius cotticeps* (Steindachner, 1879a): Fowler (1949), Gosline & Brock (1960), Akihito & Meguro (1980), Tinker (1982), Akihito *in* Masuda *et al.* (1984), Hoese *in* Smith & Heemstra (1986), Myers (1989), Randall *et al.* (1997a, 1997b), Greenfield & Randall (2004).

TAXONOMY: Greenfield & Randall (2004). Some records of *B. fuscus* (Rüppell, 1830) from the Hawaiian Islands may be of this species, rather than *B. cocosensis* (Bleeker, 1854), but it is not possible to specify which these are at this time (Randall *et al.*, 1997a).

COMMON NAMES: Cheekscaled frillgoby (Myers, 1999; Randall *et al.*, 1997a).

HAWAIIAN RECORDS: O‘ahu in tidepools and along rocky shores at 1 m and deeper (Jenkins, 1903; Jordan & Evermann, 1905; Greenfield & Randall, 2004).

GENERAL RANGE: Indo-Pacific from South Africa to Taiwan, southern Japan, the Ogasawara Islands, Micronesia, the Hawaiian Islands, the Tuamotu Archipelago, the Marquesas, and Pitcairn Islands. Benthic in rocks and coral of shallow waters (Jordan & Evermann, 1905; Gosline & Brock, 1960; Akihito & Meguro, 1980; Akihito *in* Masuda *et al.*, 1984; Hoese *in* Smith & Heemstra, 1986; Myers, 1989; Randall *et al.*, 1997a, 1997b; Greenfield & Randall, 2004).

***Bryaninops amplus* Larson**

*Bryaninops amplus* Larson, 1985, p. 66, Figs. 5–6, Palfrey Island, Lizard Island, Great Barrier Reef, Australia.

*Bryaninops ampulus* Larson, 1985 [*lapsus* for *amplus*]: Randall *et al.* (1990a).

*Bryaninops amplus* Larson, 1985: Larson (1985), Myers (1989), Randall (1996a), Randall *et al.* (1997a), Hoover (2003), Greenfield & Randall (2004).

TAXONOMY: Larson (1985), Greenfield & Randall (2004).

COMMON NAMES: Gorgonian goby (Randall, 1996a), Large whip goby (Randall *et al.*, 1997a; Myers, 1999).

HAWAIIAN RECORDS: Hawai‘i Island to Ni‘ihau at 30 m (Larson, 1985; Greenfield & Randall, 2004).

GENERAL RANGE: Indo-Pacific from Madagascar and the Seychelles to southern Japan, the Ogasawara Islands, Australia, Micronesia, and the Hawaiian Islands. Benthic, commensal on soft and branching hard corals, particularly seawhips in the genus *Juncella*, but also on mooring lines, at 1–30 m (Larson, 1985; Myers, 1989; Randall *et al.*, 1990a, 1997b; Greenfield & Randall, 2004).

***Bryaninops tigris* Larson**

*Bryaninops tigris* Larson, 1985, p. 70, Figs. 7–8, between Bird and South Islands, Lizard Island, Great Barrier Reef, Australia.

*Bryaninops tigris* Larson, 1985: Larson (1985), Randall *et al.* (1990a), Randall (1996a), Hoover (2003), Greenfield & Randall (2004).

TAXONOMY: Larson (1985), Greenfield & Randall (2004).

COMMON NAMES: Black coral goby (Randall *et al.*, 1997a; Myers, 1999).

HAWAIIAN RECORDS: Hawai‘i Island to Kaua‘i at 53 m (Larson, 1985; Greenfield & Randall, 2004).

GENERAL RANGE: Indo-Pacific from the Chagos Archipelago to Thailand, Australia, the Solomon Islands, the Hawaiian Islands, and the Society Islands. Benthic, commensal on soft corals, particularly black corals of the genus *Antipathes*, at 14–53 m (Larson, 1985; Randall *et al.*, 1990a; Greenfield & Randall, 2004).

***Bryaninops yongei* (Davis & Cohen)**

*Cottogobius yongei* Davis & Cohen, 1969, p. 752, Figs. 1, 4–6, Darvel Bay, Borneo.

*Cottogobius yongei* Davis & Cohen, 1969: Davis & Cohen (1969).

*Bryaninops yongei* (Davis & Cohen, 1969) [*lapsus* for *yongei*]: Myers (1989).

*Bryaninops yongei* (Davis & Cohen, 1969): Tinker (1982), Akihito *in* Masuda *et al.* (1984), Randall (1985a, 1996a, 1990a), Larson (1985), Myers (1989), Okiyama & Tsukamoto (1989), Hoover (1993, 2003), Greenfield & Randall (2004).

TAXONOMY: Larson (1985), Greenfield & Randall (2004).

COMMON NAMES: Whip-coral goby (Hoover, 1993; Randall, 1996a), Whip goby (Randall *et al.*, 1997a), Wire-coral goby (Hoover, 2003).

HAWAIIAN RECORDS: Hawai‘i Island to O‘ahu at 9–34 m (Davis & Cohen, 1969; Hoover, 1993; Greenfield & Randall, 2004).

GENERAL RANGE: Indo-Pacific from the Red Sea and Seychelles to Indonesia, southern Japan, Australia, Micronesia, the Hawaiian Islands, and Rapa. Benthic, commensal on whip corals (particularly *Cirripathes anguina* Dana) at 1–158 m (Akihito *in* Masuda *et al.*, 1984; Larson, 1985; Myers, 1989; Okiyama & Tsukamoto, 1989; Randall *et al.*, 1990a; Hoover, 1993; Greenfield & Randall, 2004).

***Cabillus caudimacula* Greenfield & Randall**

*Cabillus caudimacula* Greenfield & Randall, 2004, p. 514, Fig. 40, 41, 56, 57, Kane‘ohe Bay, O‘ahu, Hawaiian Islands.

*Ctenogobius tongarevae* non (Fowler, 1927) [a valid *Cabillus* species not found in the Hawaiian Islands]: Gosline & Brock (1960).

*Cabillus tongarevae* non (Fowler, 1927): Tinker (1982), Akihito *in* Masuda *et al.* (1984), Winterbottom & Emery (1986), Myers (1989), Allen & Smith-Vaniz (1994).

Undescribed *Cabillus* species: Randall & Goren (1993), Randall (1996a).

*Cabillus caudimacula* Greenfield & Randall, 2004: Greenfield & Randall (2004).

TAXONOMY: Greenfield & Randall (2004).

HAWAIIAN RECORDS: O'ahu at 9–17 m (Gosline & Brock, 1960; Randall & Goren, 1993; Greenfield & Randall, 2004).

GENERAL RANGE: Hawaiian Islands endemic. Benthic on sand near reefs at 9–17 m (Randall & Goren, 1993; Randall & Greenfield, 1994).

***Discordipinna griessingeri* Hoese & Fourmanoir**

*Discordipinna griessingeri* Hoese & Fourmanoir, 1978, p. 21, Figs. 1–4, El Himeira, Israel, Gulf of Aqaba.

*Discordipinna griessingeri* Hoese & Fourmanoir, 1978: Hoese & Fourmanoir (1978), Randall (1980a, 1996a), Winterbottom & Emery (1986), Randall *et al.* (1990a), Allen & Smith-Vaniz (1993), Greenfield & Randall (2004).

TAXONOMY: Hoese & Fourmanoir (1978), Greenfield & Randall (2004).

COMMON NAMES: Spikefin goby (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: O'ahu at 3–27 m (Randall, 1981a; Greenfield & Randall, 2004).

GENERAL RANGE: Indo-Pacific from the Red Sea and Chagos Archipelago to the Cocos-Keeling Islands, southern Japan, Australia, the Hawaiian Islands, the Society Islands, and the Marquesas. Benthic in coral and on rubble or sand at 3–37 m (Hoese & Fourmanoir, 1978; Randall, 1981a; Winterbottom & Emery, 1986; Randall *et al.*, 1990a; Allen & Smith-Vaniz, 1993; Greenfield & Randall, 2004).

***Eviota epiphanes* Jenkins**

*Eviota epiphanes* Jenkins, 1903, p. 501, Fig. 42, Honolulu, Hawaiian Islands.

*Eviota epiphanes* Jenkins, 1903: Jenkins (1903), Jordan & Evermann (1905), Fowler (1928), Gosline & Brock (1960), Lachner & Karnella (1980), Tinker (1982), Randall *et al.* (1985a, 1993b, 1997b), Randall (1996a), Greenfield & Randall (1999, 2004).

TAXONOMY: Lachner & Karnella (1980), Greenfield & Randall (1999, 2004).

COMMON NAMES: Divine dwarf goby (Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and O'ahu to Midway at <1–25 m. (Jenkins, 1903; Jordan & Evermann, 1905; Gosline & Brock, 1960; Lachner & Karnella, 1980; Randall *et al.*, 1985b, 1993b; Greenfield & Randall, 1999, 2004). Records of this species prior to 1999 could also refer to specimens of *E. rubra* Greenfield & Randall, 1999, and *E. susanae* Greenfield & Randall, 1999. This last comment includes the reference by Fowler (1928) to Hawaiian specimens that he identified as “*Eviota viridis* (Waite, 1904)”, a combination of names not otherwise used (Eschmeyer, 1998).

GENERAL RANGE: Western and central Pacific endemic known from southern Japan and the Ogasawara Islands to the Line Islands, Johnston Atoll, and the Hawaiian Islands. Benthic in coral, crevices, and under ledges at <1–25 m (Gosline & Brock, 1960; Lachner & Karnella, 1980; Akihito *in* Masuda *et al.*, 1984; Randall *et al.*, 1997b; Greenfield & Randall, 1999, 2004).

***Eviota rubra* Greenfield & Randall**

*Eviota rubra* Greenfield & Randall, 1999, p. 442, Figs. 3C, 4C, 5, Kāne'ōhe Bay, O'ahu, Hawaiian Islands.

*Eviota rubra* Greenfield & Randall, 1999: Greenfield & Randall (1999, 2004).

TAXONOMY: Greenfield & Randall (1999, 2004).

HAWAIIAN RECORDS: O'ahu at 9–29 m (Greenfield & Randall, 1999, 2004).

GENERAL RANGE: Hawaiian Islands endemic. Benthic in crevices and under ledges and corals on reef faces at 9–29 m (Greenfield & Randall, 1999, 2004).

***Eviota susanae* Greenfield & Randall**

*Eviota susanae* Greenfield & Randall, 1999, p. 439, Figs. 2, 3A, 4A, Kāne'ōhe Bay, O'ahu, Hawaiian Islands.

*Eviota susanae* Greenfield & Randall, 1999: Greenfield & Randall (1999, 2004).

TAXONOMY: Greenfield & Randall (1999, 2004).

HAWAIIAN RECORDS: O'ahu at <1–5 m (Greenfield & Randall, 1999, 2004).

GENERAL RANGE: Hawaiian Islands endemic. Benthic in patch reefs and on fouling communities of docks in areas with little wave energy at <1–5 m (Greenfield & Randall, 1999, 2004).

***Favonigobius* sp.**

*Favonigobius* sp.: Greenfield & Randall (2004).

TAXONOMY: Greenfield & Randall (2004).

HAWAIIAN RECORDS: Several specimens of a goby tentatively identified as in the genus *Favonigobius* were collected in Kahana Bay, O'ahu, at <1 m. The species was not identified. It was suggested that this taxon was an introduced species to the Hawaiian Islands, possibly from "bilge" [sic, = ballast] water (Greenfield & Randall, 2004).

GENERAL RANGE: Unknown because the species has not been identified.

***Fusigobius duospilus* Hoese & Reader**

*Fusigobius duospilus* Hoese & Reader, 1985, p. 2, Fig. 1–2, Escape Reef, Great Barrier Reef, Australia.

*Fusigobius neophytus* non (Günther, 1877) [a valid species not found in the Hawaiian Islands]: Gosline & Brock (1960), Tinker (1982).

*Coryphopterus* sp.: Randall (1996a), Randall *et al.* (1997a).

Undescribed *Fusigobius* species: Randall & Goren (1993), Randall *et al.* (1993b).

*Fusigobius duospilus* Hoese & Reader, 1985: Randall *et al.* (1997a), Myers (1999).

*Coryphopterus duospilus* (Hoese & Reader, 1985): Greenfield & Randall (2004).

TAXONOMY: The Hawaiian Islands population of *Fusigobius* usually identified as *F. neophytus* (Günther, 1877) has been reidentified as *F. duospilus* (see Greenfield & Randall, 2004). Differences between the Hawaiian Islands population and those elsewhere were initially thought to be great enough to recognize the Hawaiian Islands population as a distinct, undescribed species, but a new analysis has shown that this separation would be unjustified (Greenfield & Randall, 2004; J.E. Randall, pers. comm., Mar. 2005). Randall (1995b) considered *Fusigobius* to be a junior synonym of *Coryphopterus* but a phylogenetic analysis supported the recognition of the two genera as distinct, although *Fusigobius* was also found to be polyphyletic (Thacker & Cole, 2002). The status of the two genera remains controversial as this is written.

COMMON NAMES: Hawaiian sand goby (Randall, 1996a), Twospot goby (Myers, 1999; Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Hawai'i Island to Midway at 1–46 m (Gosline & Brock, 1960; Randall *et al.*, 1993b; Greenfield & Randall, 2004).

GENERAL RANGE: Indo-Pacific from East Africa to the Great Barrier Reef, southern Japan, the Ogasawara Islands, Palau, the Marianas Islands, the Hawaiian Islands, the Society Islands, and the Marquesas. Benthic on sand of shallow coral reefs, rubble, or lagoons at 0–46 m (Myers, 1989, 1999; Randall *et al.*, 1990a, b; Greenfield & Randall, 2004).

***Gnatholepis anjerensis* (Bleeker)**

*Gobius anjerensis* Bleeker, 1851a, p. 251, pl. 1 (fig. 11), Anjer, Java, Indonesia.

*Acentrogobius ophthalmotaenia* (Bleeker, 1854): Streets (1877)?

*Gnatholepis knighti* Jordan & Evermann, 1903: Jordan & Evermann (1903a, 1905), Thacker (2004).

*Acentrogobius cauerensis* non (Bleeker, 1853) [a valid species of *Gnatholepis* also found in the Hawaiian Islands]: Fowler (1949) in part?

*Gnatholepis anjerensis* (Bleeker, 1851): Fowler (1928), Gosline & Brock (1960), Tinker (1982), Akihito *in Masuda et al.* (1984), Randall *et al.* (1985a), Winterbottom & Emery (1986), Myers (1989), Hoover (2003), Randall *et al.* (1993b), Randall & Goren (1993), Randall (1996a, text), Randall & Greenfield (2001), Greenfield & Randall (2004).

TAXONOMY: Randall & Greenfield (2001), Greenfield & Randall, (2004), Thacker (2004). There are differing and potentially confusing conclusions about the nomenclature and identification of *Gnatholepis* species in the Hawaiian Islands. The names used here, those of Randall & Greenfield (2001), follow usage in the California Academy of Sciences Catalog of Fishes website (<http://www.calacademy.org/research/ichthyology/catalog/fishcatmain.asp> 11 Jan. 2005 version, viewed 15 March 2005). Based on morphological characters, Randall & Greenfield (2001) identified one of the two *Gnatholepis* species found in the Hawaiian Islands as conspecific with an Indo-Pacific species *C. anjerensis* (Bleeker, 1851). They designated a neotype for that species and included *G. knighti* Jordan & Evermann, 1903, as a junior synonym. From a genetic analysis in conjunction with morphological characters, Thacker (2004) concluded that the Hawaiian population considered to be *G. anjerensis* by Randall & Greenfield (2001) should be recognized as a separate species for which

*G. knighti* Jordan & Evermann, 1903, is the earliest available name. Specimens from the Society and Cook Islands were included in *G. knighti* as recognized by Thacker (2004) because they were not distinguishable by morphological characters, even though the Hawaiian and South Pacific specimens fell into two genetic clades. Additional potential confusion about the status of *G. anjerensis*, *sensu* Thacker (2004), in the Hawaiian Islands might arise from an apparent mistake in her table 2, where the Hawaiian Islands are mentioned in the range of *G. anjerensis* as recognized by her, instead of in the range of *G. scapulostigma* as in her results, discussion, and list of material examined.

COMMON NAMES: Eye-bar goby (Hoover, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at 1–26 m but records are conflated with those of *G. cauerensis* (Streets, 1877a; Jordan & Evermann, 1905; Gosline & Brock, 1960; Randall *et al.*, 1985b, 1993b; Hoover, 1993; Randall & Greenfield, 2001; Greenfield & Randall, 2004).

GENERAL RANGE: Indo-Pacific from South Africa, the Red Sea, and Maldives to the Ryukyu Islands, the Ogasawara Islands, New Caledonia, Micronesia, Johnston Atoll, the Hawaiian Islands, the Tuamotu Archipelago, and Rapa. Benthic in tidepools, mangroves, and typically on sand next to reefs at 1–25 m, with one record from 46 m (Gosline & Brock, 1960; Akihito *in* Masuda *et al.*, 1984; Myers, 1989; Randall *et al.*, 1993b; Randall & Goren, 1993; Randall & Greenfield, 2001; Greenfield & Randall, 2004). If the species is considered *G. knighti*, it is a central Pacific endemic known from the Hawaiian, Cook, and Society Islands (Thacker, 2004).

### ***Gnatholepis cauerensis hawaiiensis* Randall & Greenfield**

*Gnatholepis cauerensis hawaiiensis* Randall & Greenfield, 2001, p. 10, Pl. IIC, D, Pupukeya, O'ahu, Hawaiian Islands.

*Acentrogobius cauerensis* (Bleeker, 1853): Fowler (1949, in part).

*Gnatholepis anjerensis* non (Bleeker, 1851) [a valid species also found in the Hawaiian Islands]: Hoover (1993), Randall (1996a, photograph only).

*Gnatholepis cauerensis* (Bleeker, 1853): Myers (1999), Hoover (2003).

*Gnatholepis cauerensis hawaiiensis* Randall & Greenfield, 2001: Randall & Greenfield (2001), Greenfield & Randall (2004).

*Gnatholepis scapulostigma* Herre, 1953: Thacker (2004).

TAXONOMY: Randall & Greenfield (2001), Greenfield & Randall (2004), Thacker (2004). As discussed for the previous species, there are differing and potentially confusing conclusions about the nomenclature of the two species of *Gnatholepis* in the Hawaiian Islands. From morphological characters, Randall & Greenfield (2001) described an endemic Hawaiian subspecies, *G. cauerensis hawaiiensis*, as one of four subspecies within an Indo-Pacific species *G. cauerensis*. In a combined genetic and morphological analysis, Thacker (2004) concluded that Randall & Greenfield's (2001) *G. cauerensis hawaiiensis* is conspecific with *G. scapulostigma* Herre, 1953, instead of *G. cauerensis*. She did not recognize subspecies within *G. scapulostigma*. Thacker (2004) also concluded that *G. cauerensis cauerensis* is a junior synonym of *G. anjerensis* (Bleeker, 1851), but that *G. anjerensis* (*sensu* Thacker, 2004) is replaced in the Hawaiian Islands by a sister species, *G. knighti* (see previous species).

COMMON NAMES: Shoulderspot goby (Myers, 1999; Hoover, 2003).

HAWAIIAN RECORDS: Hawai'i Island to Midway at 2–29 m (Streets, 1877a; Jordan & Evermann, 1905; Gosline & Brock, 1960; Randall *et al.*, 1985b, 1993b; Hoover, 1993; Randall & Greenfield, 2001; Greenfield & Randall, 2004). *Gnatholepis cauerensis* occurs at Johnston Atoll but the subspecies there has not been identified (Randall & Greenfield, 2001).

GENERAL RANGE: The subspecies is a Hawaiian endemic found at 2–29 m. *Gnatholepis cauerensis* is an Indo-Pacific species with the distributions of the subspecies as: *G. cauerensis cauerensis* (Bleeker, 1853) from South Africa, southern Oman and the Maldives to Indonesia, New Guinea, the Ryukyu Islands, the Ogasawara Islands, Micronesia, American Samoa, and the Society Islands; *G. cauerensis australis* Randall & Greenfield, 2001, from the Cook Islands, the Austral Islands, and the Pitcairn Group; *G. cauerensis hawaiiensis* Randall & Greenfield, 2001, from the Hawaiian Islands; and *G. cauerensis pascuensis* Randall & Greenfield, 2001, from Easter Island. Benthic on sand near reefs at 1–58 m (Myers, 1999; Randall & Greenfield, 2001; Greenfield & Randall, 2004). If the species is

considered to be *G. scapulostigma*, its range is also Indo-Pacific from South Africa to the Hawaiian Islands and Easter Island (Thacker, 2004).

***Kelloggella oligolepis* (Jenkins)**

*Enypnias oligolepis* Jenkins, 1903, p. 504, Fig. 45, Honolulu, O'ahu, Hawaiian Islands.

*Enypnias oligolepis* Jenkins, 1903: Jenkins (1903), Snyder (1904).

*Kelloggella oligolepis* (Jenkins, 1903): Jordan & Evermann (1905), Fowler (1928, 1949), Gosline & Brock (1960), Hoese (1975), Tinker (1982), Randall (1981a, 1996a), Greenfield & Randall (2004).

TAXONOMY: Greenfield & Randall (2004).

HAWAIIAN RECORDS: Moloka'i to O'ahu in tide pools (Jenkins, 1903; Jordan & Evermann, 1905; Fowler, 1949; Gosline & Brock, 1960; Greenfield & Randall, 2004).

GENERAL RANGE: Central Pacific endemic known from the Hawaiian Islands and Easter Island (Hoese, 1975; Randall, 1982; Greenfield & Randall, 2004). Records of *K. oligolepis* from the Ryukyus by Hoese (1975) are based on his new species therein, *K. centralis* (Hoese, 1975), according to Randall (1982), which in turn was identified as a junior synonym of *K. quindecimfasciata* (Fowler, 1946) by Winterbottom & Emery (1986). Benthic in tide pools (Gosline & Brock, 1960, Greenfield & Randall, 2004).

***Lentipes concolor* (Gill)**

*Sicyogaster concolor* Gill, 1860, p. 102, freshwater streams of Hilo, Hawai'i Island.

*Sicyogaster concolor* Gill, 1860 [originally proposed for males]: Gill (1860).

*Lentipes seminudus* Günther, 1880 [proposed for females]: Günther (1880), Jordan & Evermann (1905), Fowler (1928, 1949), Gosline & Brock (1960), Tinker (1982).

*Lentipes concolor* (Gill, 1860): Günther (1877, 1880), Jordan & Evermann (1905), Fowler (1928), Gosline & Brock (1960), Maciolek (1977), Tinker (1982), Nishimoto & Fitzsimons (1986), Fitzsimons & Nishimoto (1990), Maugé *et al.* (1992), Hoover (1993, 2003), Higashi & Yamamoto (1993), Englund & Filbert (1997), Allen (1997), Yamamoto & Tagawa (2000), Greenfield & Randall (2004).

TAXONOMY: Maciolek (1977), Maugé *et al.* (1992), Allen (1997).

COMMON NAMES: 'O'opu alamo'o (Hoover, 1993, 2003), 'O'opu hi'u kole, 'O'opu hi'u 'ula, 'O'opu nu'ukole (all from Yamamoto & Tagawa, 2000).

HAWAIIAN RECORDS: Hawai'i Island to Kaua'i, but rare on O'ahu, at 1 m to 914 m above sea level (usually at >50 m above sea level) in streams (Gill, 1860; Jordan & Evermann, 1905; Maciolek, 1977; Fitzsimons & Nishimoto, 1990; Hoover, 1993; Higashi & Yamamoto, 1993; Englund & Filbert, 1997; Yamamoto & Tagawa, 2000).

GENERAL RANGE: Main Hawaiian Islands freshwater endemic. Benthic in the middle and upper reaches of streams, often above waterfalls at 1 m to 914 m above sea level (Maciolek, 1977; Hoover, 1993; Englund & Filbert, 1997; Yamamoto & Tagawa, 2000).

***Mugilogobius cavifrons* (Weber)**

*Gobius cavifrons* Weber, 1909, p. 152, Sula Takomi, Ternate, Moluccas, Indonesia.

*Mugilogobius parvus* (Oshima, 1919): Randall *et al.* (1993a).

*Mugilogobius cavifrons* (Weber, 1909): Randall (1996a), Yamamoto & Tagawa (2000), Englund & Eldredge (2001), Larson (2001), Greenfield & Randall (2004).

TAXONOMY: Larson (2001).

COMMON NAMES: Mangrove goby (Yamamoto & Tagawa, 2000).

HAWAIIAN RECORDS: Introduced to O'ahu in 1988–89 by ballast water or ship hull transport and now widespread on O'ahu at <1 m. It has also since been found in estuaries of Kaua'i and thus seems to be dispersing in the islands (Randall *et al.*, 1993a; Yamamoto & Tagawa, 2000; Englund & Eldredge, 2001; Greenfield & Randall, 2004).

GENERAL RANGE: Western Pacific endemic from southern Japan and Taiwan to Indonesia, the Philippines, Papua New Guinea, the Solomon Islands, Guam, and Kosrae; introduced in the Hawaiian Islands. Benthic on mud and sand in brackish to freshwaters, often in mangroves, at <1 m (Masuda *et al.*, 1984; Randall *et al.*, 1993a; Larson, 2001).

***Opua nephodes* Jordan**

*Opua nephodes* E.K. Jordan, 1925, p. 36, pl. 2 (fig. 2), Honolulu market, O'ahu, Hawaiian Islands.

*Acentrogobius nephodes* (Jordan, 1925): Fowler (1949).

*Hazeus nephodes* (Jordan, 1925): Randall (1996a), Anderson *et al.* (1998), Myers (1999).

*Opua nephodes* Jordan, 1925: E.K. Jordan (1925), Fowler (1934), Gosline & Brock (1960), Tinker (1982), Birdsong *et al.* (1988), Myers (1989), Randall & Goren (1993), Larson & Murdy (2001), Greenfield & Randall (2004).

TAXONOMY: Greenfield & Randall (2004). Randall (1996a) placed this species in *Hazeus* without explanation but Anderson *et al.* (1998) provided brief justification for this decision. Larson & Murdy (2001) and Greenfield & Randall (2004) renewed the use of *Opua nephodes*.

COMMON NAMES: Cloudy goby (Randall, 1996a; Myers, 1999).

HAWAIIAN RECORDS: O'ahu at 1–12 m, and Moloka'i at 138–169 m. The deep-water specimens have larger eyes than the shallow-water specimens, but genetic and other morphological characters do not show a species level difference between these remarkably depth separated populations (Jordan, 1925; Fowler, 1934a; Gosline & Brock, 1960; Greenfield & Randall, 2004).

GENERAL RANGE: Central Pacific endemic recorded from Palau, the Marshall Islands, and the Hawaiian Islands. Benthic on silty sand or mud at 1–169 m; shallow water populations found in bays with freshwater input (Tinker, 1982; Myers, 1989; Greenfield & Myers, 2004). J.E. Randall (pers. comm., Mar. 2003) suggested that the specimens from Palau and the Marshall Islands are not this species, based on fin ray counts. Greenfield & Randall (2004) considered *O. nephodes* to be a Hawaiian Islands endemic.

***Oxyurichthys heisei* Pezold**

*Oxyurichthys heisei* Pezold, 1998, p. 687, Figs. 1 & 2a, northwest of Moloka'i, Hawaiian Islands, at 21°14'N, 157°08'W.

Undescribed *Oxyurichthys* species: Struhsaker (1973a), Randall (1985a, 1996a).

*Oxyurichthys heisei* Pezold, 1998: Pezold (1998), Greenfield & Randall (2004).

TAXONOMY: Pezold (1998), Greenfield & Randall (2004).

COMMON NAMES: Ribbon goby (Pezold, 1998).

HAWAIIAN RECORDS: Lāna'i to Moloka'i at 108–143 m (Struhsaker, 1973a; Pezold, 1998; Greenfield & Randall, 2004).

GENERAL RANGE: Hawaiian Islands endemic. Benthic at 108–143 m (Struhsaker, 1973a; Pezold, 1998; Greenfield & Randall, 2004).

***Oxyurichthys lonchotus* (Jenkins)**

*Gobionellus lonchotus* Jenkins, 1903, p. 503, Fig. 44, Honolulu, O'ahu, Hawaiian Islands.

*Gobius papuensis* non Valenciennes in Cuvier & Valenciennes, 1837 [a valid *Oxyurichthys* species not found in the Hawaiian Islands]: Fowler (1900, in part).

*Gobionellus lonchotus* Jenkins, 1903; Jenkins (1903), Fowler (1928, 1949).

*Gobiichthys lonchotus* (Jenkins, 1903): Jordan & Evermann (1905).

*Gobiichthys papuensis* non (Valenciennes in Cuvier & Valenciennes, 1837): Fowler (1928, 1931, 1934, in part). *Oxyurichthys lonchotus* (Jenkins, 1903): Gosline & Brock (1960), Tinker (1982), Randall (1996a), Greenfield & Randall (2004).

TAXONOMY: Pezold (1998), Greenfield & Randall (2004).

HAWAIIAN RECORDS: Hawai'i Island to O'ahu at <1 m, maximum depth unknown (Fowler, 1900; Jordan & Evermann, 1905, Greenfield & Randall, 2004).

GENERAL RANGE: Hawaiian Islands endemic. Benthic on mud in shallow brackish waters, where it may live in burrows of the snapping shrimp *Alpheus malabaricus* (Gosline & Brock, 1960; Greenfield & Randall, 2004).

***Pleurosicya larsonae* Greenfield & Randall**

*Pleurosicya larsonae* Greenfield & Randall, 2004, p. 534, Figs. 32, 71, 72, Kane'ohe Bay, O'ahu, Hawaiian Islands.

*Pleurosicya* sp.: Greenfield (2003).



*Pleurosicya larsonae* Greenfield & Randall, 2004: Greenfield & Randall (2004).

TAXONOMY: Greenfield & Randall (2004).

HAWAIIAN RECORDS: O'ahu at 1–6 m (Greenfield, 2003; Greenfield & Randall, 2004).

GENERAL RANGE: Hawaiian Islands endemic. Benthic in shallow patch reefs at 1–6 m (Greenfield & Randall, 2004).

***Pleurosicya micheli*** Fourmanoir

*Pleurosicya micheli* Fourmanoir, 1971, p. 499, Fig. 8, type locality for neotype is Caban Island, Philippines [original type locality was Lifou, Loyalty Islands, western tropical Pacific].

*Pleurosicya micheli* Larson, 1990: Larson (1990), Randall & Goren (1993), Randall (1996a), Greenfield & Randall (2004).

TAXONOMY: Larson (1990); Greenfield & Randall (2004).

COMMON NAMES: Michel's goby (Randall, 1996a), Michel's ghost goby (Myers, 1999), Coral goby (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Hawai'i Island at 15–38 m (Larson, 1990; Greenfield & Randall, 2004).

GENERAL RANGE: Indo-Pacific from the Seychelles and Maldives to the Ryukyus, Taiwan, the Loyalty Islands, Fiji, Tonga, Micronesia, and the Hawaiian Islands. Benthic on live scleractinian corals at 1–53 m (Larson, 1990; Randall & Goren, 1993; Greenfield & Randall, 2004).

***Priolepis aureoviridis*** (Gosline)

*Quisquilius aureoviridis* Gosline, 1959, p. 68, Fig. 1, Pupukea, O'ahu, Hawaiian Islands.

*Quisquilius aureoviridis* Gosline, 1959: Gosline (1959), Gosline & Brock (1960), Tinker (1982).

*Priolepis aureoviridis* (Gosline, 1959): Randall *et al.* (1985a), Hoover (1993, 2003), Winterbottom & BurrIDGE (1993b), Randall (1996a), Greenfield & Randall (2004).

TAXONOMY: Winterbottom & BurrIDGE (1993b), Greenfield & Randall (2004). Lobel (1979) mentioned an undescribed *Priolepis* species (as *Quisquilius* sp.) from the Hawaiian Islands but Winterbottom & BurrIDGE (1989, 1993a, b) did not refer to it in their comprehensive review of the genus. This undescribed species was not mentioned in Greenfield & Randall's (2004) review of Hawaiian gobiids, and it is not known to which species Lobel's (1979) comment referred.

COMMON NAMES: Golden green goby (Hoover, 1993, 2003), Golden goby (Randall, 1996a), Yellow-green goby (Myers, 1999).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to French Frigate at 6–20 m (Gosline, 1959; Randall *et al.*, 1985b; Hoover, 1993; Winterbottom & BurrIDGE, 1993b; Greenfield & Randall, 2004).

GENERAL RANGE: Central Pacific endemic from the Caroline Islands, Johnston Atoll, and the Hawaiian Islands. Benthic in reefs at 6–20 m (Hoover, 1993; Winterbottom & BurrIDGE, 1993b; Greenfield & Randall, 2004).

***Priolepis eugenius*** (Jordan & Evermann)

*Quisquilius eugenius* Jordan & Evermann, 1903a, p. 203, Waikiki, O'ahu, Hawaiian Islands.

*Quisquilius eugenius* Jordan & Evermann, 1903a: Jordan & Evermann (1903a), Snyder (1904), Fowler (1949), Gosline & Brock (1960), Tinker (1982).

*Gobiomorphus eugenius* (Jordan & Evermann, 1903a): Jordan & Evermann (1905), Fowler (1928).

*Priolepis eugenius* (Jordan & Evermann, 1903a): Randall (1985a, 1996a), Randall *et al.* (1985a, 1993b), Winterbottom & BurrIDGE (1989, 1993b), Hoover (1993, 2003), Randall & Goren (1993), Greenfield & Randall (2004).

TAXONOMY: Winterbottom & BurrIDGE (1989, 1993b), Greenfield & Randall (2004).

COMMON NAMES: Noble goby (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at 1–26 m (Jordan & Evermann, 1903a, 1905; Randall *et al.*, 1985b, 1993b; Winterbottom & BurrIDGE, 1993b; Greenfield & Randall, 2004).

GENERAL RANGE: Johnston Atoll and Hawaiian Islands endemic. Benthic in reefs and coral rubble at 1–26 m (Randall *et al.*, 1993b; Randall & Goren, 1993; Hoover, 1993; Winterbottom & BurrIDGE, 1993b; Greenfield & Randall, 2004).

***Priolepis farcimen*** (Jordan & Evermann)

*Gobiopterus farcimen* Jordan & Evermann, 1903a, p. 205, Hilo, Hawai'i Island.

*Gobiopterus farcimen* Jordan & Evermann, 1903a: Jordan & Evermann (1903a, 1905), Fowler (1928, 1949).

*Zonogobius farcimen* (Jordan & Evermann, 1903a): Gosline & Brock (1960), Tinker (1982).

*Priolepis farcimen* (Jordan & Evermann, 1903a): Randall *et al.* (1985a, 1993b), Winterbottom & Burrige (1993b), Randall (1996a), Greenfield & Randall (2004).

TAXONOMY: Greenfield & Randall (2004). Although Myers (1989) suggested that there are no differences between *P. farcimen* (Jordan & Evermann, 1903) and *P. inhaca* (Smith, 1949), the species are distinct and unrelated. The distinction between *P. farcimen* and *P. semidoliatus* (Valenciennes) is less clear, however, although both are recognized as valid species (Winterbottom & Burrige, 1993b).

COMMON NAMES: Farcimen goby.

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at <1–>25 m (Jordan & Evermann, 1903a; Randall *et al.*, 1985b, 1993b; Winterbottom & Burrige, 1993b; Greenfield & Randall, 2004).

GENERAL RANGE: Johnston Atoll and Hawaiian Islands endemic. Benthic at <1–>25 m. Records of *P. farcimen* from Marcus, the Marshalls, Tonga, the Australs, and the Pitcairn Group (Randall *et al.*, 1984a; Myers, 1989) are probably based on *P. semidoliatus* (see ranges in Winterbottom & Burrige, 1993a; Greenfield & Randall, 2004).

***Priolepis limbatosquamis*** (Gosline)

*Quisquilius limbatosquamis* Gosline, 1959, p. 69, Fig. 2, about 2 mi. west of Hale'iwa, O'ahu, Hawaiian Islands.

*Quisquilius limbatosquamis* Gosline, 1959: Gosline (1959), Gosline & Brock (1960).

*Priolepis limbatosquamis* (Gosline, 1959): Tinker (1982), Randall *et al.* (1993b), Winterbottom & Burrige (1993b), Randall (1996a), Greenfield & Randall (2004).

TAXONOMY: Winterbottom & Burrige (1993b).

COMMON NAMES: Rimmed-scaled goby (Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and O'ahu to Midway at 3–26 m (Gosline, 1959; Randall *et al.*, 1993b; Greenfield & Randall, 2004).

GENERAL RANGE: Johnston Atoll and Hawaiian Islands endemic. Benthic in reefs at 3–26 m (Randall *et al.*, 1993b; Winterbottom & Burrige, 1993b; Greenfield & Randall, 2004).

***Priolepis semidoliatus*** (Valenciennes)

*Gobius semidoliatus* Valenciennes in Cuvier & Valenciennes, 1837, p. 67, Vanikoro Island, Santa Cruz Islands, western South Pacific.

*Priolepis semidoliatus* (Valenciennes, 1837): Akihito in Masuda *et al.* (1984), Myers (1989), Kuitert (1993), Winterbottom & Burrige (1993a), Randall & Goren (1993), Randall *et al.* (1997a, 1997b), Greenfield & Randall (2004).

TAXONOMY: Winterbottom & Burrige (1993a).

COMMON NAMES: Half-banded reef-goby, Half-barred goby (Myers, 1999), Barrel goby (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Johnston Atoll but not the Hawaiian Islands (Winterbottom & Burrige, 1993a).

GENERAL RANGE: Indo-Pacific from East Africa, the Red Sea and the Comoro Islands to Indonesia, southern Japan, the Ogasawara Islands, Australia, Micronesia, Johnston Atoll, the Society Islands, Pitcairn Group, and Ducie Islands. Benthic in caves and crevices of seaward reefs at 1.5–30 m (Akihito in Masuda *et al.*, 1984; Myers, 1989; Kuitert, 1993; Winterbottom & Burrige, 1993a; Randall & Goren, 1993; Randall *et al.*, 1997a, 1997b).

***Psilogobius mainlandi*** Baldwin

*Psilogobius mainlandi* Baldwin, 1972, p. 126, Fig. 4, Coconut Island, Kāne'ohe Bay, O'ahu, Hawaiian Islands.

*Psilogobius mainlandi* Baldwin, 1972: Baldwin (1972), Randall (1976a, 1981a, 1985a, 1996a), Tinker (1982), Watson & Lachner (1985), Hoover (1993, 2003), Greenfield & Randall (2004).

TAXONOMY: Watson & Lachner (1985), Greenfield & Randall (2004).

COMMON NAMES: Mainland's goby (Hoover, 1993, 2003), Hawaiian shrimp goby (Randall, 1996a).

HAWAIIAN RECORDS: Maui to O'ahu at 1–15 m (Baldwin, 1972; Watson & Lachner, 1985; Greenfield & Randall, 2004).

GENERAL RANGE: Hawaiian Islands endemic. Reports of *P. mainlandi* from Australia (Randall, 1982, 1992b) were based on *P. prolatus* Watson & Lachner, 1985. Benthic, living commensally in burrows of alpheid shrimp, including *Alpheus rapax*, at 1–15 m (Baldwin, 1972; Randall, 1982; Watson & Lachner, 1985; Greenfield & Randall, 2004).

***Sicyopterus stimpsoni* (Gill)**

*Sicydium stimpsoni* Gill, 1860, p. 101, freshwater streams of Hilo, Hawai‘i Island.

*Sicydium stimpsoni* Gill, 1860: Gill (1860), Günther (1877), Jordan & Evermann (1905), Fowler (1928, in part), Gosline & Brock (1960), Tinker (1982).

*Sicydium albotaeiatum* Günther, 1877: Günther (1877), Jordan & Evermann (1905).

*Sicydium nigrescens* Günther, 1880: Günther (1880).

*Vitraria clarescens* Jordan & Evermann, 1903: Jordan & Evermann (1903a, 1905), Fowler (1928, 1949), Gosline & Brock (1960), Tinker (1982), Springer (1982), Birdsong *et al.* (1988).

*Sicydium albotaeiatum* Günther, 1877: Fowler (1928, in part).

*Sicyopterus stimpsoni* (Gill, 1860): Streets (1877), Jenkins (1903), Snyder (1904), Fowler (1934, 1949, in part), Akihito & Meguro (1979), Fitzsimons & Nishimoto (1990), Greenfield *et al.* (1998), Yamamoto & Tagawa (2000), Greenfield & Randall (2004).

TAXONOMY: Akihito & Meguro (1979). *Vitraria clarescens* was until recently considered to be a valid genus and species but Greenfield *et al.* (1998) demonstrated that the type specimens from Hilo Bay are juvenile *Sicyopterus stimpsoni* (Gill, 1860). Greenfield *et al.* (1998) also noted that records of *V. clarescens* from localities other than the Hawaiian Islands are based on juvenile synodontids (i.e., records of Fowler & Ball, 1925; Fowler, 1928, 1941, 1949; and others cited by Tinker, 1982; Springer, 1982).

COMMON NAMES: ‘O‘opu nōpili (Yamamoto & Tagawa, 2000).

HAWAIIAN RECORDS: Hawai‘i Island to Kaua‘i at 1 m to 300 m (usually <150 m) above sea level but now rare on O‘ahu (Gill, 1860; Jordan & Evermann, 1905; Fitzsimons & Nishimoto, 1990; Yamamoto & Tagawa, 2000).

GENERAL RANGE: Main Hawaiian Islands freshwater endemic. Benthic in lower and middle reaches of streams at 1 m to 300 m (usually in middle reaches but at <150 m) above sea level (Gosline & Brock, 1960; Fitzsimons & Nishimoto, 1990).

***Stenogobius hawaiiensis* Watson**

*Stenogobius (Insularigobius) hawaiiensis* Watson, 1991, p. 615, Figs. 19a-b, Honolulu, O‘ahu, Hawaiian Islands. *Gobius genivittatus* non Valenciennes in Cuvier & Valenciennes, 1837 [a valid *Stenogobius* species not found in the Hawaiian Islands]: Günther (1877, in part).

*Awaous genivittatus* non (Valenciennes, 1837): Fowler (1900), Jenkins (1903), Snyder (1904), Jordan & Evermann (1905).

*Chonophorus genivittatus* non (Valenciennes, 1837): Fowler (1928, 1931, 1934), Gosline & Brock (1960), Tinker (1982).

*Stenogobius genivittatus* non (Valenciennes, 1837): Fowler (1949, in part), Fitzsimons & Nishimoto (1990), Pezold (1991, in part).

*Stenogobius hawaiiensis* Watson, 1991: Watson (1991), Yamamoto & Tagawa (2000), Greenfield & Randall (2004).

TAXONOMY: Watson (1991).

COMMON NAMES: ‘O‘opu naniha (Yamamoto & Tagawa, 2000).

HAWAIIAN RECORDS: Hawai‘i Island to Kaua‘i in the lower reaches of streams and occasionally in estuaries. Especially abundant on O‘ahu (Günther, 1877; Jordan & Evermann, 1905; Fitzsimons & Nishimoto, 1990; Watson, 1991; Yamamoto & Tagawa, 2000).

GENERAL RANGE: Main Hawaiian Islands freshwater endemic. Benthic in the lower reaches of streams and occasionally estuaries (Fitzsimons & Nishimoto, 1990; Watson, 1991).

***Trimma milta* Winterbottom**

*Trimma milta* Winterbottom, 2002, p. 46, Figs. 1–4, Moorea, Society Islands.

*Trimma milta* Winterbottom, 2002: Winterbottom (2002), Greenfield & Randall (2004).

TAXONOMY: Winterbottom (2002).

HAWAIIAN RECORDS: O‘ahu at 23 m (Winterbottom, 2002; Greenfield & Randall, 2004).

GENERAL RANGE: Eastern Indian and western/central Pacific oceans from Western Australia, the Great Barrier Reef, Timor Sea, Indonesia, the Philippines, and Taiwan to Papua New Guinea, Fiji, the Caroline Islands, the Marshall Islands, the Hawaiian Islands, and the Society Islands. Benthic in crevices of coral rock walls, reefs, and on sand/rubble bottoms at 9–29 m (Winterbottom, 2002; Greenfield & Randall, 2004).

***Trimma taylori*** Lobel

*Trimma taylori* Lobel, 1979, p. 3, Fig. 1, Makaha, O'ahu, Hawaiian Islands.

*Trimma taylori* Lobel, 1979: Lobel (1979), Randall (1980a, 1994, 1996a), Winterbottom (1984), Winterbottom & Emery (1986), Myers (1989), Randall & Goren (1993), Hoover (1993, 2003), Allen & Smith-Vaniz (1994), Greenfield & Randall (2004).

TAXONOMY: Winterbottom (1984), Greenfield & Randall (2004).

COMMON NAMES: Yellow cave goby, Taylor's goby (Hoover, 1993; Randall, 1996a), Cave dwarfgoby (Myers, 1999).

HAWAIIAN RECORDS: Hawai'i Island to Kaua'i at 9–44 m (Lobel, 1979; Hoover, 1993; Greenfield & Randall, 2004; B. Mundy, pers. observ.).

GENERAL RANGE: Indo-Pacific from the Red Sea, the Maldives, and Chagos Archipelago to Indonesia, Micronesia, the Hawaiian Islands, and the Society Islands. Engybenthic, schooling in caves and under ledges on reef drop-offs at 9–>50 m (Winterbottom, 1984; Winterbottom & Emery, 1986; Myers, 1989; Randall & Goren, 1993; Hoover, 1993; Allen & Smith-Vaniz, 1994; Randall, 1994; Greenfield & Randall, 2004).

***Trimma unisquamis*** (Gosline)

*Hazeus unisquamis* Gosline, 1959, p. 70, Fig. 3, Diamond Head, O'ahu, Hawaiian Islands.

*Hazeus unisquamis* Gosline, 1959: Gosline (1959), Gosline & Brock (1960), Tinker (1982).

*Trimma undisquamis* (Gosline, 1959) [a misspelling of *unisquamis*]: Allen & Smith-Vaniz (1994).

*Trimma unisquamis* (Gosline, 1959): Randall *et al.* (1985a, 1993b), Randall (1992b, 1996a), Winterbottom (2002), Greenfield & Randall (2004).

TAXONOMY: Randall *et al.* (1985b), Greenfield & Randall (2004).

COMMON NAMES: Cheekscale dwarfgoby (Myers, 1999).

HAWAIIAN RECORDS: O'ahu to Midway and Johnston at 6–12 m (Gosline, 1959; Randall *et al.*, 1985b, 1993b; Greenfield & Randall, 2004).

GENERAL RANGE: Eastern Indian Ocean and central Pacific endemic from the Cocos-Keeling Islands, Guam, Johnston Atoll, the Hawaiian Islands, the Society Islands, and Easter Island. Benthic in reefs at 6–12 m (Gosline & Brock, 1960; Randall, 1992b; Randall *et al.*, 1993b; Allen & Smith-Vaniz, 1994; Winterbottom, 2002; Greenfield & Randall, 2004).

### Kraemeriidae — Sandfishes, Sand gobies

***Kraemeria bryani*** Schultz

*Kraemeria bryani* Schultz, 1941, p. 271, Fig. 1, Malaekahana, O'ahu, Hawaiian Islands.

*Kraemeria samoensis* non Steindachner, 1906 [a valid species not found in the Hawaiian Islands]: Fowler (1928, in part), Eschmeyer (1998) [noted that another name, *Kraemeria sandvicensis* Steindachner, 1906, was used in the abstract but not the text of Steindachner's paper, and thought that *K. samoensis* and *K. sandvicensis* referred to the same specimens, although Steindachner's use of specific names referring to different localities suggests otherwise].

*Kraemeria bryani* Schultz, 1941: Fowler (1949), Rofen (1958), Gosline & Brock (1960), Tinker (1982), Myers (1989).

TAXONOMY: Rofen (1958).

COMMON NAMES: Bryan's sand dart (Myers, 1999).

HAWAIIAN RECORDS: O'ahu to French Frigate (Fowler, 1928; Rofen, 1958).

GENERAL RANGE: Central Pacific endemic known from the Marshalls, the Hawaiian Islands, and the Society Islands. Burrowing in sand of shallow coral reefs and along the shoreline, particularly near river mouths (Rofen, 1958; Gosline & Brock, 1960; Myers, 1989).

**Microdesmidae — Wormfishes, Dartfishes<sup>63</sup>*****Gunnellichthys curiosus* Dawson**

*Gunnellichthys curiosus* Dawson, 1968, p. 54, Figs. 1–4, Laraie Bay, Curieuse Island, Seychelles, western Indian Ocean.

*Gunnellichthys curiosus* Dawson, 1968: Dawson (1973), Randall *et al.* (1990a), Clarke (1991), Hoover (1993, 2003), Randall & Goren (1993), Chen *et al.* (1994), Randall (1996a).

TAXONOMY: Dawson (1973).

COMMON NAMES: Curious wormfish (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: O‘ahu at 15 m (Dawson, 1973; Clarke, 1991; Hoover, 1993).

GENERAL RANGE: Indo-Pacific from the Seychelles and Maldives to Indonesia, Taiwan, the Great Barrier Reef, the Hawaiian Islands, and the Society Islands. Engyebenthic or burrowing in sand near coral at 9–38 m (Dawson, 1973; Randall *et al.*, 1990a; Hoover, 1993; Randall & Goren, 1993; Chen *et al.*, 1994).

***Nemateleotris magnifica* Fowler**

*Nemateleotris magnificus* Fowler, 1938b, p. 132, Buka Buka Island, Gulf of Tomini, Sulawesi, Indonesia.

*Nemateleotris magnifica* Fowler, 1938b: Randall & Allen (1973), Randall (1980a, 1996a), Masuda *et al.* (1984), Randall *et al.* (1985a, 1990a, 1997a), Winterbottom & Emery (1986), Myers (1989), Hoover (1993, 2003), Randall & Goren (1993).

TAXONOMY: Randall & Allen (1973).

COMMON NAMES: Firefish, Fire dartfish (Hoover, 1993, 2003; Randall, 1996a; Myers, 1999), Fire goby.

HAWAIIAN RECORDS: Johnston Atoll and Maui to O‘ahu at 18–24 m (Randall, 1981a; Randall *et al.*, 1985b; Hoover, 1993).

GENERAL RANGE: Indo-Pacific from East Africa and the Maldives to Indonesia, the Ryukyu and Ogasawara Islands, Australia, New Caledonia, Micronesia, the Hawaiian Islands, French Polynesia, and the Pitcairn Group. Engyebenthic or burrowing in sand near coral or rubble at 5–61 m, but usually <28 m (Randall & Allen, 1973; Randall, 1981a; Masuda *et al.*, 1984; Winterbottom & Emery, 1986; Myers, 1989; Randall *et al.*, 1990a, 1997b; Randall & Goren, 1993).

***Ptereleotris heteroptera* (Bleeker)**

*Eleotris heteropterus* Bleeker, 1855c, p. 422, Rivers, Bandjarmasin, Borneo.

*Ptereleotris heteroptera* (Bleeker, 1855c): Davis *et al.* (1977), Randall (1980a, 1985a, 1996a), Masuda *et al.* (1984), Randall *et al.* (1985a, 1990a, 1997a), Randall & Hoese (1985), Hoese *in* Smith & Heemstra (1986), Myers (1989), Hoover (1993, 2003), Randall & Goren (1993).

TAXONOMY: Randall & Hoese (1985).

COMMON NAMES: Indigo dartfish (Hoover, 1993, 2003), Spot-tail dartfish (Randall, 1996a; Myers, 1999), Indigo hover goby (Randall, 1985).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to French Frigate at 6–37 m, usually >18 m (Davis *et al.*, 1977; Randall, 1985a; Randall *et al.*, 1985b; Randall & Hoese, 1985; Hoover, 1993).

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to Indonesia, the Ryukyu and Ogasawara Islands, Australia, Lord Howe Island, Micronesia, the Hawaiian Islands, the Society Islands, and the Marquesas. Engyebenthic or burrowing in sand near coral at 6–46 m, usually at 15–35 m (Masuda *et al.*, 1984; Randall & Hoese, 1985; Hoese *in* Smith & Heemstra, 1986; Myers, 1989; Randall *et al.*, 1990a, 1997b; Hoover, 1993; Randall & Goren, 1993).

**Schindleriidae*****Schindleria pietschmanni* (Schindler)**

*Hemiramphus pietschmanni* Schindler, 1931, p. 79, “Leeward” [Northwestern] Hawaiian Islands.

*Hemiramphus pietschmanni* Schindler, 1931: Schindler (1931), Fowler (1934).

*Schindleria pietschmanni* (Schindler, 1931): Bruun (1940), Gosline & Brock (1960), Tinker (1982), Watson *et al.* (1984), Clarke (1991), Boehlert *et al.* (1992), Johnson & Brothers (1993), Thacker (1993).

TAXONOMY: Watson *et al.* (1984), Johnson & Brothers (1993).

HAWAIIAN RECORDS: Johnston Atoll and O'ahu to Pearl and Hermes Reef (Schindler, 1932; Bruun, 1940; Gosline & Brock, 1960; Clarke, 1991; Boehlert *et al.*, 1992).

GENERAL RANGE: Indo-Pacific from South Africa, Madagascar and India to the Hawaiian Islands. Planktonic, benthopelagic at 1–60 m (Watson *et al.*, 1984; Thacker, 1993; Harris & Cyrus, 1996).

***Schindleria praematura*** (Schindler)

*Hemiramphus praematurus* Schindler, 1930, p. 79, Pearl and Hermes Reef, Hawaiian Islands.

*Hemiramphus praematurus* Schindler, 1930: Schindler (1930), Fowler (1934).

*Schindleria praematura* (Schindler, 1930): Bruun (1940), Gosline & Brock (1960), Tinker (1982), Springer (1982), Watson *et al.* (1984), Masuda *et al.* (1984), Myers (1989), Parin (1990), Clarke (1991), Boehlert *et al.* (1992), Thacker (1993), Johnson & Brothers (1993).

TAXONOMY: Watson *et al.* (1984), Johnson & Brothers (1993).

COMMON NAMES: Premature floater (Myers, 1999).

HAWAIIAN RECORDS: Johnston Atoll and O'ahu to Pearl and Hermes Reef (Schindler, 1932; Gosline & Brock, 1960; Clarke, 1991; Boehlert *et al.*, 1992).

GENERAL RANGE: Indo-Pacific from South Africa, Madagascar and India to Southern Japan, the South China Sea, Australia, Fiji, the Marshall Islands, the Line Islands, the Hawaiian Islands, and seamounts of the eastern South Pacific. Planktonic, benthopelagic in lagoons and nearshore waters at 1–200 m (Bruun, 1940; Springer, 1982; Watson *et al.*, 1984; Masuda *et al.*, 1984; Myers, 1989; Parin, 1990; Thacker, 1993; Harris & Cyrus, 1996).

## Acanthuroidei

### Ephippidae — Spadefishes

***Platax boersii*** Bleeker

*Platax boersii* Bleeker, 1852c, p. 758, Makassar [= Ujung Pandang], Sulawesi, Indonesia.

*Platax boersii* Bleeker, 1852: Kishimoto *et al.* (1988), Randall *et al.* (1993a), Myers (1999).

TAXONOMY: Kishimoto *et al.* (1988), Randall *et al.* (1993b).

COMMON NAMES: Golden spadefish (Myers, 1999).

HAWAIIAN RECORDS: Known only from two records at Midway in 1980. These were probably waifs (Randall *et al.*, 1993b).

GENERAL RANGE: Indo-Pacific from east Africa to Indonesia, southern Japan, New Guinea, and Palau; also from the Hawaiian Islands as a waif. Benthopelagic at unspecified depths (Kishimoto *et al.*, 1988; Myers, 1999).

[*Platax tiera* (Forsskål)]

*Chaetodon teira* Forsskål, 1775, p. 60, xii, Luhaiya, Yemen, Red Sea.

"... a species of *Platax* ...": Randall *et al.* (1993a)?

*Platax tiera* (Forsskål, 1775): Kishimoto *et al.* (1998), Myers (1999), Heemstra in Carpenter & Neim (2001).

TAXONOMY: Kishimoto *et al.* (1998), Heemstra in Carpenter & Neim (2001b).

COMMON NAMES: Longfin spadefish (AFS, Myers, 1999), Spotbelly batfish (FAO), Teira batfish (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: A single specimen of *Platax tiera* was photographed off Kihei, Maui, in December 2003 at ca. 23 m. It is thought that this was a fish released from an aquarium (J. Hoover, 9 Jan. 2004, [http://www.hawaiiifishes.com/fishes/neatfish/platax\\_tiera.htm](http://www.hawaiiifishes.com/fishes/neatfish/platax_tiera.htm)). A fish tentatively identified as a *Platax* species had been previously recorded from west Maui in 1987, but no photographs or specimens were taken at that time to verify the identity of that fish, which was also thought to have been an aquarium release (Randall *et al.* 1993a). There is no evidence that the species is established in Hawaiian waters.

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to Indonesia, Japan, the Great Barrier Reef, Palau, the Marshall Islands, and Fiji. Eurybenthic in lagoons, mangrove areas, and over inshore and offshore reefs from shallow water to 70 m (Myers, 1999; Heemstra in Carpenter & Neim, 2001b).

**Luvaridae — Louvars*****Luvarus imperialis*** Rafinesque

*Luvarus imperialis* Rafinesque, 1810, p. 22, Sicily, Mediterranean Sea.

*Luvarus imperialis* Rafinesque, 1810: Tyler *et al.* (1989), Décamps *in* Quéro *et al.* (1990).

TAXONOMY: Tyler *et al.* (1989).

COMMON NAMES: Louvar (AFS).

HAWAIIAN RECORDS: Laysan, where a ca. 19 mm SL juvenile was collected by midwater trawl in 1979. This specimen is in the LACM collection (R. Lavenberg, pers. comm., July 1990). Louvar are abundant in transition zone waters just north of the Hawaiian Archipelago (M. Seki, pers. comm., May 1994).

GENERAL RANGE: Circumglobal but antitropical in the subtropical and temperate Mediterranean Sea, Atlantic, Indian, and Pacific oceans. Epipelagic at 0–200 m (Décamps *in* Quéro *et al.*, 1990).

**Zanclidae — Moorish idols*****Zanclus cornutus*** (Linnaeus)

*Chaetodon cornutus* Linnaeus, 1758, p. 273, “Habitat in Indiis”.

*Zanclus canescens* (Linnaeus, 1758): Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Hobson (1974).

*Zanclus ruthiae* Bryan, 1906: Bryan (1906).

*Zanclus cornutus* (Linnaeus, 1758): Cuvier & Valenciennes (1831), Wetmore (1890), Steindachner (1900), Fowler (1900, 1949), Tinker (1982), Okamoto & Kanenaka (1984), Randall (1985a, 1996a), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Uchida & Uchiyama (1986), Randall *in* Smith & Heemstra (1986), Johnson & Washington (1987), Myers (1989), Hoover (1993, 2003), Chave & Mundy (1994), Allen & Robertson (1994), Robertson & Allen (2002).

TAXONOMY: Johnson & Washington (1987). Eschmeyer (1998) noted that *Chaetodon cornutus* Linnaeus, 1758, and *Chaetodon canescens* Linnaeus, 1758, were described in the same publication, that both have been used as the senior synonym for this species (although *Z. cornutus* has been used in recent literature), and that the identification of the first reviser’s decision that determined which name is valid needs research. In the updated website for Eschmeyer’s (1998) catalog, a personal communication from Randall stated that Cuvier (1831) was first reviser of the genus, selecting *Z. cornutus* as the name to be used for this species.

COMMON NAMES: Kihikihi (Hoover, 1993, 2003; Randall, 1996a), Moorish idol (AFS; Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to Kure Atoll at 2–183 m (Cuvier & Valenciennes, 1831; Jordan & Evermann, 1905; Gosline & Brock, 1960; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b; Uchida & Uchiyama, 1986; Randall *et al.*, 1993b; Chave & Mundy, 1994).

GENERAL RANGE: Indo-transPacific from South Africa and the Chagos Archipelago to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, Rapa, Ducie, the offshore eastern tropical Pacific islands, and the southernmost Gulf of California to northern Peru. Engyebenthic over coral and rocky reefs at 1–183 m (Randall *et al.*, 1985b, 1990a, 1997b; Randall *in* Smith & Heemstra, 1986; Myers, 1989; Chave & Mundy, 1994; Allen & Robertson, 1994; Robertson & Allen, 2002).

**Acanthuridae — Surgeonfishes*****Acanthurus achilles*** Shaw

*Acanthurus achilles* Shaw, 1803, p. 383, no type locality given.

*Hepatus achilles* (Shaw, 1803): Jordan & Evermann (1905), Fowler (1928, 1931, 1934).

*Teuthis achilles* (Shaw, 1803): Fowler (1900, 1949), Jenkins (1903), Snyder (1904).

*Acanthurus achilles* Shaw, 1803: Steindachner (1900), Randall (1956a, 1985a, 1996a, 2001b), Gosline & Brock (1960), Hobson (1974), Tinker (1982), Randall *et al.* (1985a, 1993b), Myers (1989), Schroeder (1989), Godwin & Kosaki (1989), Hoover (1993, 2003), Allen & Robertson (1994), Robertson & Allen (2002).

TAXONOMY: Randall (1956a, 2002b).

COMMON NAMES: Pāku'iku'i (Hoover, 1993, 2003; Randall, 1996a), Redtail surgeonfish (AFS), Achilles tang (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at 1–18 m (Steindachner, 1900; Jordan & Evermann, 1905; Hobson, 1974; Randall, 1985a; Randall *et al.*, 1985b; Schroeder, 1989; Godwin & Kosaki, 1989).

GENERAL RANGE: Central and eastern Pacific endemic from the Caroline Islands (but rare in Micronesia) and Torres Strait to the Hawaiian Islands, the Marquesas, and Ducie. Waifs have been recorded in the eastern Pacific at Clipperton Island, the tip of Baja California, and the southwestern Gulf of California. Engybenthic near rock and coral of the surge zone at 1–18 m (Randall, 1985a, 2002b; Myers, 1989; Godwin & Kosaki, 1989; Hoover, 1993; Allen & Robertson, 1994; Robertson & Allen, 2002).

### *Acanthurus blochii* Valenciennes

*Acanthurus blochii* Valenciennes in Cuvier & Valenciennes, 1835, p. 209, Mauritius, western Indian Ocean.

*Acanthurus umbra* non (Jenkins, 1903) [a junior synonym of *A. leucopareius* (Jenkins, 1903), a species also found in the Hawaiian Islands]: Jordan & Jordan (1922, in part).

*Hepatus fuliginosus* (Lesson, 1831): Fowler (1928, 1931, in part).

*Hepatus mata* non (Cuvier, 1829) [a valid *Acanthurus* species not found in the Hawaiian Islands]: Fowler (1928).

*Teuthis fuliginosus* (Lesson, 1831): Fowler (1949, in part).

*Teuthis mata* non (Cuvier, 1829): Fowler (1949).

*Acanthurus mata* non Cuvier, 1829; Gosline & Brock (1960), Tinker (1982).

*Acanthurus blochii* Valenciennes, 1835: Streets (1877) in part?, Randall (1985a, 1987b, 1996a, 2002b), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Randall in Smith & Heemstra (1986), Myers (1989), Hoover (1993, 2003).

TAXONOMY: Randall (1988, 2002b).

COMMON NAMES: Pualu (Hoover, 1993, 2003; Randall, 1996a), Ringtail surgeonfish (AFS; Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at 2–3 m (Streets, 1877a; Jordan & Evermann, 1905; Randall *et al.*, 1985b, 1993b; Hoover, 1993).

GENERAL RANGE: Indo-Pacific from South Africa to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, and the Society Islands. Engybenthic over sand near coral at 2–12 m (Randall *et al.*, 1985b, 1990a, 1997b; Randall in Smith & Heemstra, 1986; Myers, 1989; Randall, 2002b).

### *Acanthurus dussumieri* Valenciennes

*Acanthurus dussumieri* Valenciennes in Cuvier & Valenciennes, 1835, p. 201, Mauritius, western Indian Ocean.

*Teuthis dussumieri* (Valenciennes, 1835): Jenkins (1903).

*Teuthis argenteus* non (Quoy & Gaimard, 1825) [a junior synonym of *Ctenochaetus striatus* (Quoy & Gaimard, 1825), a species not found in the Hawaiian Islands, based on a pelagic juvenile]: Snyder (1904)? [*vide* Jordan & Evermann (1905)].

*Hepatus dussumieri* (Valenciennes, 1835): Jordan & Evermann (1905).

*Hepatus bariene* non (Lesson, 1831) [a valid *Acanthurus* species not found in the Hawaiian Islands]: Fowler (1928, 1931, in part).

*Teuthis bariene* non (Lesson, 1831): Fowler (1949, in part).

*Acanthurus dussumieri* Valenciennes, 1835: Günther (1875), Steindachner (1900), Randall (1956a, 1985a, 1996a, 2002b), Gosline & Brock (1960), Struhsaker (1973a), Hobson (1974), Tinker (1982), Okamoto & Kanenaka (1984), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Myers (1989), Hoover (1993, 2003), Chave & Mundy (1994).

TAXONOMY: Randall (1956a, 2002b).

COMMON NAMES: Palani (AFS; Hoover, 1993, 2003; Randall, 1996a), Eyestripe surgeonfish (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at 6–131 m (Günther, 1875; Jordan & Evermann, 1905; Hobson, 1974; Okamoto & Kanemoto, 1984; Randall *et al.*, 1985b; Hoover, 1993; Chave & Mundy, 1994).

GENERAL RANGE: Indo-Pacific from South Africa to southern Japan, the Ogasawara Islands, New Cale-



donia, Australia, New Zealand, Guam, and the central Pacific, but only from the Hawaiian and Line Islands on the Pacific Plate. Engybenthic over coral and sand at 6–131 m (Randall, 1985a, 2002b; Randall *et al.*, 1985b, 1990a, 1993b, 1997b; Randall *in* Smith & Heemstra, 1986; Myers, 1989; Hoover, 1993; Chave & Mundy, 1994).

#### *Acanthurus guttatus* Forster

*Acanthurus guttatus* Forster *in* Bloch & Schneider, 1801, p. 215, Tahiti, Society Islands.

*Teuthis guttatus* (Forster, 1801): Fowler (1900, 1949), Jenkins (1903), Jordan & Snyder (1904a), Snyder (1904).

*Hepatus guttatus* (Forster, 1801): Jordan & Evermann (1905), Fowler (1928, 1931, 1934).

*Acanthurus guttatus* (Forster, 1801): Günther (1875), Randall (1956a, 1985a, 1996a, 2002b), Gosline & Brock (1960), Hobson (1974), Tinker (1982), Okamoto & Kanenaka (1984), Randall *et al.* (1985a, 1990a), Myers (1989), Winterbottom *et al.* (1989), Hoover (1993, 2003).

TAXONOMY: Randall (1956a, 2002b).

COMMON NAMES: ʻApi (Hoover, 1993, 2003; Randall, 1996a), Whitespotted surgeonfish (AFS; Hoover, 1993, 2003; Randall, 1996a), Mustard tang (Hoover, 1993, 2003).

HAWAIIAN RECORDS: Johnston Atoll and Hawaiʻi Island to Pearl and Hermes Reef at 1–3 m (Günther, 1875; Jordan & Evermann, 1905; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall, 1985a; Randall *et al.*, 1985b; Hoover, 1993).

GENERAL RANGE: Indo-Pacific from Mauritius and the Chagos Archipelago to Australia, the Ryukyus, Micronesia, the Hawaiian Islands, the Tuamotu Archipelago, the Marquesas, and Rapa. Engybenthic over rock and coral of the surge zone at 1–3 m (Randall 1956a, 1985a, 2002b; Myers, 1989; Winterbottom *et al.*, 1989; Randall *et al.*, 1990a).

#### *Acanthurus leucopareius* (Jenkins)

*Teuthis leucopareius* Jenkins, 1903, p. 476, Fig. 28, Honolulu, Oʻahu, Hawaiian Islands.

*Teuthis leucopareius* Jenkins, 1903: Jenkins (1903), Fowler (1949).

*Teuthis umbra* Jenkins, 1903: Jenkins (1903), Snyder (1904).

*Hepatus umbra* (Jenkins, 1903): Jordan & Evermann (1905).

*Hepatus leucopareius* (Jenkins, 1903): Jordan & Evermann (1905), Fowler (1928, 1931).

*Acanthurus leucopareius* (Jenkins, 1903): Randall (1956a, 1985a, 1996a, 2002b), Gosline & Brock (1960), Hobson (1974), Tinker (1982), Okamoto & Kanenaka (1984), Myers (1989), Hoover (1993, 2003), Randall *et al.* (1993b, 1997b).

TAXONOMY: Randall (1956a, 2002b).

COMMON NAMES: Māikoiko (Hoover, 1993, 2003; Randall, 1996a), Whitebar surgeonfish (AFS; Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Hawaiʻi Island to Kure Atoll at 1–85 m (Jenkins, 1903; Jordan & Evermann, 1905; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall, 1985a; Randall *et al.*, 1993b).

GENERAL RANGE: Pacific endemic, primarily antiequatorial. In the north from southern Japan, the Ogasawara Islands, and the Marianas to the Hawaiian Islands. In the south from New Caledonia to French Polynesia, the Pitcairn Islands, and Easter Island. Engybenthic over rock and coral, usually in the surge zone at 1–85 m (Randall, 1985a, 2002b; Myers, 1989; Randall *et al.*, 1997b).

#### *Acanthurus lineatus* (Linnaeus)

*Chaetodon lineatus* Linnaeus, 1758, p. 274, “Habitat in Indiis”.

*Acanthurus lineatus* (Linnaeus, 1758): Randall (1956a, 1980a, 1996a, 2002b), Tinker (1982), Randall *in* Smith & Heemstra (1986), Myers (1989), Winterbottom *et al.* (1989), Randall *et al.* (1990a, 1997a).

TAXONOMY: Randall (1956a, 2002b).

COMMON NAMES: Clown surgeonfish (AFS), Striped surgeonfish (Randall *et al.*, 1997a), Blue-banded surgeonfish (Myers, 1999).

HAWAIIAN RECORDS: Hawaiʻi Island to Oʻahu, but only known from two specimens that were probably waifs (Randall, 1981a, 1996a).

GENERAL RANGE: Indo-Pacific from South Africa and the Chagos Archipelago to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands as waifs, the Tuamotu Archipelago, and the Marquesas Islands. Engybenthic over rock and coral on edges of reefs exposed to surge at

0–10 m, usually <3 m (Randall *in* Smith & Heemstra, 1986; Myers, 1989; Winterbottom, *et al.* 1989; Randall *et al.*, 1990a, 1997b; Randall, 2002b).

***Acanthurus maculiceps* (Ahl)**

*Hepatus maculiceps* Ahl, 1923, p. 36, fig. 4, Talassia (perhaps Bismarck Sea?), Neu-Pommern (Bismarck Archipelago).

*Acanthurus maculiceps* (Ahl, 1923): Randall *et al.* (1997a), Myers (1999), Randall (2002b), Ballauer & Settlemer (2004).

TAXONOMY: Randall (2002b).

COMMON NAMES: White-freckled surgeonfish (Myers, 1999), Spotted-face surgeonfish (Randall *et al.*, 1996a; Randall, 2001).

HAWAIIAN RECORDS: An *Acanthurus maculiceps* was first seen by State of Hawai‘i Division of Aquatic Resources biologists at ca. 5 m in Kealakekua Bay, Kona Coast of Hawai‘i Island, on 19 November 2001 (W. Walsh, pers. comm., Aug. 2002). Ballauer & Settlemer (2004) documented this record, recorded three juveniles from 1.5 m in the Wai ‘Opae fishponds on the Kona Coast in October 2003, and mentioned seeing “several more *A. maculiceps* that vary size in different areas of the tide pools.” The localities and number of sightings make it probable that these were waifs rather than an aquarium releases.

GENERAL RANGE: Central Indian to central Pacific oceans, from the Maldives to the Ryukyu Islands, Great Barrier Reef, Solomon Islands, Samoa, Micronesia, and the Line Islands. Engybenitic at coral reefs from 1–30 m (Myers, 1999; Randall, 2002b).

***Acanthurus nigricans* (Linnaeus)**

*Chaetodon nigricans* Linnaeus, 1758, p. 274, “Habitat in Mari Rubro”.

*Acanthurus blochii* non Valenciennes, 1835 [a valid species also found in the Hawaiian Islands]: Streets (1877), Günther (1880)?

*Hepatus glaucopareius* (Cuvier, 1829): Fowler (1928, 1931).

*Hepatus leucosternon* non (Bennett, 1833) [a valid *Acanthurus* species not indigenous to the Hawaiian Islands]: Fowler (1931).

*Teuthis glauco-pareius* (Cuvier, 1829): Fowler (1949).

*Acanthurus glaucopareius* Cuvier, 1829: Gosline & Brock (1960), Hobson (1974), Tinker (1982), Randall *et al.* (1985a).

*Acanthurus nigricans* (Linnaeus, 1758): Randall (1981a, 1985a, 1987b, 1996a, 2002b), Myers (1989), Randall *et al.* (1990a, 1997a), Hoover (1993, 2003), Chave & Mundy (1994), Allen & Robertson (1994), Robertson & Allen (2002).

TAXONOMY: Randall (1988, 2002b).

COMMON NAMES: Whitecheek surgeonfish (AFS; Hoover, 1993, 2003; Randall *et al.*, 1997a), Goldrim surgeonfish (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to French Frigate at 2–101 m (Streets, 1877; Hobson, 1974; Randall *et al.*, 1985b; Hoover, 1993; Chave & Mundy, 1994).

GENERAL RANGE: Eastern Indian Ocean and transPacific from Cocos-Keeling and Christmas Islands, Indonesia, southern Japan and the Ogasawara Islands to Australia, Micronesia, the Hawaiian Islands, the Tuamotu Archipelago, Easter Island, the offshore tropical eastern Pacific islands, and the tip of Baja California to Ecuador. Engybenitic over coral and rocky reefs at 2–101 m (Randall, 1982, 1985a, 2002b; Myers, 1989; Randall *et al.*, 1990a, 1997b; Hoover, 1993; Chave & Mundy, 1994; Allen & Robertson, 1994; Robertson & Allen, 2002).

**[*Acanthurus nigricauda* Duncker & Mohr]**

*Acanthurus gahm* var. *nigricauda* Duncker & Mohr, 1929, p. 75, Massau Island, St. Matthias Island, northeast of New Ireland Island, Bismarck Archipelago.

*Hepatus nigricans* non (Linnaeus, 1758) [a valid *Acanthurus* species found in the Hawaiian Islands]: Fowler & Ball (1925), Fowler (1928).

*Teuthis nigricans* non (Linnaeus, 1758): Fowler (1949).

*Acanthurus nigricauda* Duncker & Mohr, 1929: Randall *et al.* (1985a), Randall *in* Smith & Heemstra (1986), Randall (1987b, 2002b), Myers (1989), Winterbottom *et al.* (1989).

TAXONOMY: Randall (1988, 2002b).

COMMON NAMES: Epulette surgeonfish (AFS), Blackstreak surgeonfish (Randall *et al.*, 1997a; Myers, 1999).

HAWAIIAN RECORDS: A record of *A. nigricauda* from Johnston (Fowler & Ball, 1925) is probably in error (Randall *et al.*, 1985b). Because of taxonomic confusion prior to 1956, other early records of this species from Hawaiian waters are doubtful.

GENERAL RANGE: Indo-Pacific from South Africa and the Chagos Archipelago to the Ryukyus, Australia, Micronesia, and the Tuamotu Archipelago. Eurybenthic over sand, rock, or coral at 1–30 m (Randall *in Smith & Heemstra*, 1986; Myers, 1989; Winterbottom *et al.*, 1989; Randall, 2002b).

### *Acanthurus nigrofuscus* (Forsskål)

*Chaetodon nigrofuscus* Forsskål, 1775, p. 64, xiii, Jidda, Saudi Arabia, Red Sea.

*Acanthurus bipunctatus* non Günther, 1861 [a junior synonym of *A. nigroris* Valenciennes, 1835, a species that also occurs in the Hawaiian Islands]; Steindachner (1900).

*Teuthis bipunctatus* non (Günther, 1861): Jenkins (1903)?

*Hepatus elongatus* (Lacépède, 1802) [a taxon of uncertain status, according to Eschmeyer (1998)]: Jordan & Evermann (1905, in part), Fowler (1928, 1931).

*Hepatus nigrofuscus* (Forsskål, 1775): Fowler (1928).

*Hepatus lineolatus* (Valenciennes *in Cuvier & Valenciennes*, 1835) [questionably a junior synonym of *Acanthurus nigrofuscus*]: Fowler (1928, in part, 1931).

*Teuthis lucillae* (Fowler, 1938): Fowler (1938, 1949).

*Teuthis elongatus* (Lacépède, 1802): Fowler (1949, in part).

*Teuthis lineolatus* (Valenciennes *in Cuvier & Valenciennes*, 1835): Fowler (1949, in part).

*Acanthurus nigrofuscus* (Forsskål, 1775): Randall (1956a, 1985a, 1996a, 2002b), Gosline & Brock (1960), Hobson (1974), Tinker (1982), Randall *in Smith & Heemstra* (1986), Myers (1989), Godwin & Kosaki (1989), Winterbottom *et al.* (1989), Randall *et al.* (1990a, 1993b, 1997a), Hoover (1993, 2003).

TAXONOMY: Randall (1956a, 2002b).

COMMON NAMES: Mā'i'i'i (Hoover, 1993, 2003; Randall, 1996a), Brown surgeonfish (Hoover, 1993, 2003; Randall, 1996a), Lavender tang (Hoover, 1993, 2003).

HAWAIIAN RECORDS: Hawai'i Island to Midway at 2–18 m (Steindachner, 1900; Jordan & Evermann, 1905; Hobson, 1974; Godwin & Kosaki, 1989; Hoover, 1993; Randall *et al.*, 1993b).

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to southern Japan, the Ogasawara Islands, Australia, the Hawaiian Islands, and French Polynesia. Eurybenthic over rock and coral at 1–18 m (Randall, 1985a, 2002b; Randall *in Smith & Heemstra*, 1986; Myers, 1989; Winterbottom *et al.*, 1989; Godwin & Kosaki, 1989; Randall *et al.*, 1990a, 1997b).

### *Acanthurus nigroris* Valenciennes

*Acanthurus nigroris* Valenciennes *in Cuvier & Valenciennes*, 1835, p. 208, “îles Sandwich”.

*Acanthurus nigros* Günther, 1861: Günther (1875), Snyder (1904).

*Acanthurus lineolatus* non (Valenciennes *in Cuvier & Valenciennes*, 1835) [questionably a junior synonym of *Acanthurus nigrofuscus*]: Steindachner (1900).

*Hepatus elongatus* (Lacépède, 1802) [a taxon of uncertain status, according to Eschmeyer (1998)]: Jordan & Evermann (1905, in part).

*Teuthis atrimentatus* Jordan & Evermann, 1903: Jordan & Evermann (1903a), Jenkins (1903).

*Teuthis atramentatus* Jordan & Evermann, 1903 [an unjustified emendation of the species name]: Snyder (1904).

*Hepatus atramentatus* (Jordan & Evermann, 1903) [see above]: Jordan & Evermann (1905).

*Hepatus lineolatus* non (Valenciennes, 1835): Fowler (1928, in part).

*Teuthis elongatus* (Lacépède, 1802): Fowler (1949, in part).

*Teuthis lineolatus* non (Valenciennes, 1835): Fowler (1949, in part).

*Acanthurus nigroris* Valenciennes, 1835: Cuvier & Valenciennes (1835), Randall (1956a, 1985a, 1996a, 2002b), Gosline & Brock (1960), Hobson (1974), Tinker (1982), Okamoto & Kanenaka (1984), Randall *et al.* (1985a, 1990a, 1993b), Uchida & Uchiyama (1986), Myers (1989), Hoover (1993, 2003).

TAXONOMY: Randall (1956a, 2002b). The Hawaiian Islands and Johnston Atoll population shows subtle but overlapping morphological differences from other populations (Randall, 2002b).

COMMON NAMES: Maiko (Hoover, 1993, 2003; Randall, 1996a), Bluelined surgeonfish (AFS; Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 1–48 m (Cuvier & Valenciennes,

1835; Jordan & Evermann, 1905; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986).

GENERAL RANGE: Pacific endemic from Australia (Great Barrier Reef), Micronesia, the Hawaiian Islands, the Tuamotu Archipelago, and the Marquesas. Reports of *A. nigroris* from the Indian Ocean are mis-identifications. Engybenitic over rock and coral at 1–48 m (Randall, 1985a, 2002b; Myers, 1989; Randall *et al.*, 1990a).

#### *Acanthurus olivaceus* Bloch & Schneider

*Acanthurus olivaceus* Bloch & Schneider, 1801, p. 214, Tahiti, Society Islands.

*Acanthurus nigricans* non (Linnaeus, 1758) [a valid species that also occurs in the Hawaiian Islands]: Lay & Bennett (1839).

*Acanthurus humeralis* Valenciennes in Cuvier & Valenciennes, 1835: Eydoux & Souleyet (1850).

*Hepatus olivaceus* (Bloch & Schneider, 1801): Jordan & Evermann (1905), Fowler (1928, 1931).

*Teuthis olivaceus* (Bloch & Schneider, 1801): Jenkins (1903), Snyder (1904), Fowler (1949).

*Acanthurus olivaceus* (Bloch & Schneider, 1801): Günther (1875), Steindachner (1900), Randall (1956a, 1985a, 1996a, 2002b), Gosline & Brock (1960), Struhsaker (1973a), Hobson (1974), Tinker (1982), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Uchida & Uchiyama (1986), Myers (1989), Hoover (1993, 2003), Chave & Mundy (1994).

TAXONOMY: Randall (1956a, 2002b).

COMMON NAMES: Na'ena'e (Hoover, 1993, 2003; Randall, 1996a), Orangespot surgeonfish (AFS), Orange-band surgeonfish (Hoover 1993, 2003; Randall, 1996a), Orange spot tang (DLNR).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at 3–83 m (Lay & Bennett, 1839; Eydoux & Souleyet, 1850; Jordan & Evermann, 1905; Hobson, 1974; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Hoover, 1993; Chave & Mundy, 1994).

GENERAL RANGE: Eastern Indian and western-central Pacific oceans from Cocos-Keeling and Christmas Islands, and Indonesia to Australia, Micronesia, the Hawaiian Islands, and the Tuamotu Archipelago. Replaced by *A. reversus* Randall & Earle, 1999 in the Marquesas. Engybenitic over sand, coral, rock, and rubble at 3–83 m (Randall 1956a, 1985a, 2002b; Myers, 1989; Randall *et al.*, 1990a, 1997a; Chave & Mundy, 1994).

#### [*Acanthurus rackliffei* Schultz]

*Acanthurus rackliffei* Schultz, 1943, p. 163, Fig. 13, Hull Island, Phoenix Islands.

*Teuthis rackliffei* (Schultz, 1943): Fowler (1949).

*Acanthurus rackliffei* Schultz, 1943: Randall (1956a).

*Acanthurus achilles* Shaw, 1803, x *Acanthurus glaucopareius* Cuvier, 1829 [hybrid]: Randall (1956b).

*Acanthurus achilles* Shaw, 1803, x *Acanthurus nigricans* Linnaeus, 1758 [hybrid]: Myers (1989).

TAXONOMY: Randall (1956b) demonstrated that this nominal species is a hybrid between *A. achilles* and *A. nigricans*.

COMMON NAMES: Hybrid surgeonfish.

HAWAIIAN RECORDS: O'ahu (Fowler, 1949; Randall, 1956b).

GENERAL RANGE: Micronesia and the Hawaiian Islands (Randall, 1956b; Myers, 1989).

#### *Acanthurus thompsoni* (Fowler)

*Hepatus thompsoni* Fowler, 1923, p. 386, Honolulu, O'ahu, Hawaiian Islands.

*Hepatus thompsoni* Fowler, 1923: Fowler (1923, 1928).

*Teuthis thompsoni* (Fowler, 1923): Fowler (1949).

*Acanthurus thompsoni* (Fowler, 1923): Randall (1956a, 1996a, 2002b), Gosline & Brock (1960), Hobson (1974), Tinker (1982), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Randall *in* Smith & Heemstra (1986), Myers (1989), Hoover (1993, 2003), Chave & Mundy (1994).

TAXONOMY: Randall (1956a, 2002b).

COMMON NAMES: Thompson's surgeonfish (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at 6–119 m (Fowler, 1923; Hobson, 1974; Randall *et al.*, 1985b, 1993b).

GENERAL RANGE: Indo-Pacific from South Africa to southern Japan, the Ogasawara Islands, Australia,

Micronesia, the Hawaiian Islands, the Marquesas, Rapa, and Ducie. Engybenthic and benthopelagic over coral and sand at 4–119 m (Randall *et al.*, 1985b, 1990a, 1997b; Randall *in* Smith & Heemstra, 1986; Myers, 1989; Chave & Mundy, 1994; Randall, 2002b).

***Acanthurus triostegus sandvicensis* Streets**

*Acanthurus triostegus* var. *sandvicensis* Streets, 1877, p. 67, Honolulu, O'ahu, Hawaiian Islands.  
*Chaetodon triostegus* Linnaeus, 1758: Broussonet (1782).  
*Acanthurus triostegus* var. *sandvicensis* Streets, 1877: Streets (1877).  
*Teuthis triostegus* (Linnaeus, 1758): Fowler (1900, 1949).  
*Hepatus triostegus* (Linnaeus, 1758): Jordan & Evermann (1905), Fowler (1928, 1931, 1934).  
*Teuthis sandvicensis* (Streets, 1877): Jenkins (1903), Snyder (1904), Fowler (1949).  
*Acanthurus sandvicensis* Streets, 1877: Gosline & Brock (1960), Hobson (1974), Tinker (1982).  
*Acanthurus triostegus* (Linnaeus, 1758): Lay & Bennett (1839), Günther (1861), Smith & Swain (1882), Steindachner (1900), Randall (1956a, 1976a, 1985a, 1996a, 2002b), Okamoto & Kanenaka (1984), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Uchida & Uchiyama (1986), Randall *in* Smith & Heemstra (1986), Myers (1989), Hoover (1993, 2003), Allen & Robertson (1994), Robertson & Allen (2002), Planes & Fauvelot (2002).

TAXONOMY: Randall (1956a, 2002b).

COMMON NAMES: Manini (Hoover, 1993, 2003; Randall, 1996a), Convict tang (AFS; Hoover, 1993, 2003), Convict surgeonfish (Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 1–46 m (Broussonet, 1782; Smith & Swain, 1882; Jordan & Evermann, 1905; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall, 1985a; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986).

GENERAL RANGE: The subspecies is a Hawaiian Islands and Johnston Atoll endemic. The species is Indo-transPacific from South Africa to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, Rapa, Ducie, Easter Island, the Galapagos, the offshore eastern tropical Pacific islands, and the southernmost Gulf of California to Colombia. Engybenthic over rock, coral, rubble, or sand at 1–90 m (Gosline & Brock, 1960; Randall, 1985a, 2002b; Randall *in* Smith & Heemstra, 1986; Myers, 1989; Randall *et al.*, 1990a, 1997b; Allen & Robertson, 1994; Robertson & Allen, 2002; Planes & Fauvelot, 2002).

***Acanthurus xanthopterus* Valenciennes**

*Acanthurus xanthopterus* Valenciennes *in* Cuvier & Valenciennes, 1835, p. 215, Seychelles Islands, western Indian Ocean.  
*Teuthis annularis* (Valenciennes *in* Cuvier & Valenciennes, 1835): Fowler (1900).  
*Teuthis guentheri* Jenkins, 1903: Jenkins (1903).  
*Teuthis xanthopterus* (Valenciennes, 1835): Jenkins (1903).  
*Teuthis matooides* non (Valenciennes *in* Cuvier & Valenciennes, 1835) [a junior synonym of *Acanthurus nigrofuscus* (Forsskål, 1775), a species that is also found in the Hawaiian Islands]: Jenkins (1903).  
*Hepatus matooides* non (Valenciennes, 1835): Jordan & Evermann (1905).  
*Hepatus xanthopterus* (Valenciennes, 1835): Jordan & Evermann (1905).  
*Hepatus guentheri* (Jenkins, 1903) [*lapsus* for *guentheri*]: Jordan & Evermann (1905).  
*Hepatus fuliginosus* (Lesson, 1831) [a taxon of unknown status]: Fowler (1928, 1931, in part).  
*Teuthis fuliginosus* (Lesson, 1831): Fowler (1949, in part).  
*Acanthurus xanthopterus* Valenciennes, 1835: Randall (1956a, 1985a, 1996a, 2002b), Gosline & Brock (1960), Hobson (1974), Tinker (1982), Okamoto & Kanenaka (1984), Uchida & Uchiyama (1986), Randall *in* Smith & Heemstra (1986), Myers (1989), Randall *et al.* (1990a, 1997a), Hoover (1993, 2003), Chave & Mundy (1994), Allen & Robertson (1994), Robertson & Allen (2002).

TAXONOMY: Randall (1956a, 2002b).

COMMON NAMES: Pualu (Hoover, 1993, 2003; Randall, 1996a), Yellowfin surgeonfish (AFS; Hoover, 1993, 2003; Randall 1996a).

HAWAIIAN RECORDS: Hawai'i Island to French Frigate at 1–120 m (Fowler, 1900; Jordan & Evermann, 1905; Hobson, 1974; Okamoto & Kanenaka, 1984; Uchida & Uchiyama, 1986; Hoover, 1993; Chave & Mundy, 1994).

GENERAL RANGE: Indo-transPacific from South Africa to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, Rapa, Ducie, the offshore eastern tropical Pacific islands,

and the southernmost Gulf of California to Ecuador. Engybenitic over coral, rock, rubble, and sand at 1–120 m (Randall, 1985a, 2002b; Randall *in* Smith & Heemstra, 1986; Myers, 1989; Randall *et al.*, 1990a, 1997b; Hoover, 1993; Chave & Mundy, 1994; Allen & Robertson, 1994; Robertson & Allen, 2002).

### *Ctenochaetus hawaiiensis* Randall

*Ctenochaetus hawaiiensis* Randall, 1955c, p. 161, pl. 2 (fig. 2), Keauhou Bay, Kona Coast, Hawai'i Island.

*Ctenochaetus hawaiiensis* Randall, 1955c: Brock (1954), Randall (1955c, 1985a, 1996a, 2002b), Gosline & Brock (1960), Hobson (1974), Tinker (1982), Randall *et al.* (1985a), Godwin & Kosaki (1989), Myers (1989), Hoover (1993, 2003), Randall & Clements (2001).

TAXONOMY: Randall (1955c), Randall & Clements (2001). Brock (1954) used Randall's manuscript name prior to its publication but Brock did not provide information diagnostic for identifying the species, thereby avoiding preemption of authorship of the name. *Ctenochaetus hawaiiensis* Brock, 1954 is therefore a *nomen nudum* (see Randall, 1955).

COMMON NAMES: Black surgeonfish (AFS; Hoover, 1993, 2003; Randall, 1996a), Hawaiian surgeonfish (Myers, 1999), Chevron tang (juveniles) (Hoover, 1993, 2003).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to O'ahu, but rare except at Hawai'i Island, at 4–31 m (Brock, 1954; Randall, 1955c; Hobson, 1974; Randall *et al.*, 1985b; Godwin & Kosaki, 1989; Hoover, 1993).

GENERAL RANGE: Pacific endemic from Guam, Micronesia and Samoa to the Hawaiian Islands, the Tuamotu Archipelago, the Marquesas, and the Pitcairn Group. Engybenitic over rock and coral at 1–61 m (Randall, 1955c, 1985a, 2002b; Godwin & Kosaki, 1989; Myers, 1989; Hoover, 1993; Randall & Clements, 2001).

### *Ctenochaetus marginatus* (Valenciennes)

*Acanthurus marginatus* Valenciennes *in* Cuvier & Valenciennes, 1835, p. 221, Caroline Islands, central Pacific.

*Ctenochaetus cyanoguttatus* Randall, 1955: Randall (1955c).

*Ctenochaetus marginatus* (Valenciennes, 1835): Randall *et al.* (1985a), Randall (1987b, 2002b), Myers (1989), Allen & Robertson (1994), Randall & Clements (2001), Robertson & Allen (2002).

TAXONOMY: Randall (1988), Randall & Clements (2001).

COMMON NAMES: Blue-spotted bristletooth (Myers, 1999), Bluespotted surgeonfish.

HAWAIIAN RECORDS: Johnston Atoll but not the Hawaiian Islands (Randall *et al.*, 1985b; Randall & Clements, 2001).

GENERAL RANGE: Central and eastern tropical Pacific endemic from the Caroline, Marshall, Gilbert, Phoenix, and Line Islands to Johnston Atoll, the Tuamotu Archipelago, the Marquesas, Rapa, the off-shore eastern tropical Pacific islands, and Costa Rica to Colombia. Engybenitic over coral, rock, and rubble at 1–30 m (Randall, 1955c, 2002b; Myers, 1989; Allen & Robertson, 1994; Randall & Clements, 2001; Robertson & Allen, 2002).

### *Ctenochaetus strigosus* (Bennett)

*Acanthurus strigosus* Bennett, 1828, p. 41, "Hawaiian Islands".

*Acanthurus strigosus* Bennett, 1828: Bennett (1828), Steindachner (1900).

*Ctenochaetus striatus* non (Quoy & Gaimard, 1825) [a valid species not found in the Hawaiian Islands]: Jordan & Evermann (1905) [text but not illustration?].

*Ctenochaetus strigosus* (Bennett, 1828): Jenkins (1903), Snyder (1904), Fowler (1928, 1934, 1949 — all in part), Randall (1955c, in part, 1985a, 1996a, 2002b), Gosline & Brock (1960), Hobson (1974), Tinker (1982), Okamoto & Kanenaka (1984), Randall *et al.* (1985a, 1993b), Uchida & Uchiyama (1986), Hoover (1993, 2003), Chave & Mundy (1994), Randall & Clements (2001).

TAXONOMY: Randall & Clements (2001) concluded that various populations previously included in *Ctenochaetus strigosus* (Bennett, 1828) comprise four species. *Ctenochaetus strigosus* (Bennett) *sensu stricto* is an endemic Hawaiian Islands species (Randall & Clements, 2001).

COMMON NAMES: Kole (Hoover, 1993, 2003; Randall, 1996a), Goldring surgeonfish (AFS; Hoover, 1993, 2003; Randall, 1996a), Goldring bristletooth (Randall *et al.*, 1997a; Myers, 1999; Hoover, 2003).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 6–113 m (Bennett, 1828; Jordan

& Evermann, 1905; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Chave & Mundy, 1994).

GENERAL RANGE: Johnston Atoll and Hawaiian Islands endemic. Engybenitic over coral, rock, and rubble at 6–113 m (Randall, 1985a, 2002b; Chave & Mundy, 1994; Randall & Clements, 2001).

***Naso annulatus*** (Quoy & Gaimard)

*Priodon annulatus* Quoy & Gaimard, 1825, p. 377, Timor Island, southern Malay Archipelago, Indonesia.

*Acanthurus incipiens* Jenkins, 1903: Jenkins (1903), Jordan & Evermann (1905).

*Naso annulatus* (Quoy & Gaimard, 1825): Smith (1966), Fowler (1928, 1931, 1949), Gosline & Brock (1960), Randall & Struhsaker (1971), Tinker (1982), Randall (1985a, 1996a, 2002b), Randall *in* Smith & Heemstra (1986), Myers (1989), Randall *et al.* (1990a, 1993b, 1997a), Robertson & Allen (2002).

TAXONOMY: Randall (2002b).

COMMON NAMES: Whitemargin unicornfish (Randall *et al.*, 1997a; Randall, 1996a; Myers, 1999).

HAWAIIAN RECORDS: O'ahu to Midway at 26 m (Jenkins, 1903; Jordan & Evermann, 1905; Randall *et al.*, 1993b). This species was long known from the Hawaiian Islands only by a single specimen, the type of *Acanthurus incipiens* Jenkins, 1903 (Randall & Struhsaker, 1971). Others have recently been collected in the islands; three are in the Bishop Museum collection (J.E. Randall, pers. comm.).

GENERAL RANGE: Indo-Pacific from South Africa to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, the Tuamotu Archipelago, and the Marquesas. Waifs have been recorded from Cocos and Clipperton Islands in the eastern Pacific. Benthopelagic near coral or rock drop-offs at 1–>25 m (Randall *in* Smith & Heemstra, 1986; Myers, 1989; Randall *et al.*, 1990a, 1997b; Robertson & Allen, 2002; Randall, 2002b).

***Naso brevirostris*** (Valenciennes)

*Naseus brevirostris* Cuvier, 1829, p. 225, no type locality given; no types known.

*Acanthurus brevirostris* (Cuvier, 1829): Jenkins (1903), Snyder (1904), Jordan & Evermann (1905).

*Naso brevirostris* (Cuvier, 1829): Fowler (1928, 1931, 1949), Gosline & Brock (1960), Hobson (1974), Tinker (1982), Randall (1985a, 1996a, 2002b), Uchida & Uchiyama (1986), Randall *in* Smith & Heemstra (1986), Myers (1989), Randall *et al.* (1990a, 1993b, 1997a), Kosaki *et al.* (1991), Hoover (1993, 2003), Chave & Mundy (1994), Robertson & Allen (2002).

TAXONOMY: Randall (2002b).

COMMON NAMES: Kala lōlō (Hoover, 1993, 2003; Randall, 1996a), Spotted unicornfish (AFS; Randall *et al.*, 1997a; Hoover, 1993, 2003), Paletail unicornfish (Randall, 1996a; Hoover, 2003).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at 2–122 m (Jenkins, 1903; Jordan & Evermann, 1905; Hobson, 1974; Uchida & Uchiyama, 1986; Kosaki *et al.*, 1991; Hoover, 1993; Randall *et al.*, 1993b; Chave & Mundy, 1994).

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, French Polynesia, and the Pitcairn Group. A waif has been recorded from the Galapagos Islands. Benthopelagic over rock or coral at 2–122 m (Randall, 1985a, 2002b; Randall *in* Smith & Heemstra, 1986; Myers, 1989; Randall *et al.*, 1990a, 1997b; Hoover, 1993; Chave & Mundy, 1994; Robertson & Allen, 2002).

***Naso caesioides*** Randall & Bell

*Naso caesioides* Randall & Bell, 1992, p. 347, pl. 1 A–B, Figs. 1–2, East Channel, Enewetok Atoll, Marshall Islands.

*Naso thorpei* non Smith, 1966 [probably a junior synonym of *N. hexacanthus* (Bleeker, 1855), a valid species that also occurs in the Hawaiian Islands]: Randall *et al.* (1990a).

*Naso* sp.: Kosaki *et al.* (1991)?

*Naso caesioides* Randall & Bell, 1992: Randall & Bell (1992), Randall (1996a, 2002b).

TAXONOMY: Randall & Bell (1992).

COMMON NAMES: Gray unicornfish (Randall *et al.*, 1997a; Randall, 1996a).

HAWAIIAN RECORDS: O'ahu (Randall *et al.*, 1990a; Randall & Bell, 1992). This may also be the unidentified species recorded from Johnston Atoll by Kosaki *et al.* (1991).

GENERAL RANGE: Pacific endemic from Australia, New Caledonia, Micronesia, the Hawaiian Islands, the Society Islands, and the Pitcairn group. Engybenitic and benthopelagic over coral and rock at 3–36 m (Randall *et al.*, 1990a; Randall & Bell, 1992; Randall, 2002b).

*Naso hexacanthus* (Bleeker)

*Priodon hexacanthus* Bleeker, 1855a, p. 421, Ambon Island, Moluccas Islands, Indonesia.

*Callicanthus metoposphron* Jenkins, 1903: Jenkins (1903), Jordan & Snyder (1904b), Jordan & Evermann (1905).

*Naso hexacanthus* (Bleeker, 1855): Fowler (1928, in part, 1931, 1949), Gosline & Brock (1960), Hobson (1974), Tinker (1982), Randall (1985a, 1996a, 2002b), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Uchida & Uchiyama (1986), Randall *in* Smith & Heemstra (1986), Myers (1989), Randall & Bell (1992), Hoover (1993, 2003), Chave & Mundy (1994), Robertson & Allen (2002).

TAXONOMY: Randall & Bell (1992), Randall (2002b).

COMMON NAMES: Kala lōlō (Hoover, 1993; Randall, 1996a), Kala holo (Hoover, 2003), 'Opelu kala (Hoover, 1993, 2003; Randall, 1996a), Sleek unicornfish (Hoover, 1993, 2003; Randall, 1996a), Black-tongue unicornfish (Myers, 1999).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at 9–229 m (Jenkins, 1903; Jordan & Evermann, 1905; Hobson, 1974; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Chave & Mundy, 1994).

GENERAL RANGE: Indo-Pacific from east Africa and the Red Sea to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, the Marquesas, and Ducie. Waifs have been recorded from Clipperton and Cocos Islands in the eastern Pacific. Engybenthic and benthopelagic over coral and rock at 6–229 m, usually >15 m (Randall, 1985a, 2002b; Randall *et al.*, 1985b, 1990a, 1997b; Randall *in* Smith & Heemstra, 1986; Myers, 1989; Chave & Mundy, 1994; Robertson & Allen, 2002).

*Naso lituratus* (Forster)

*Acanthurus lituratus* Forster *in* Bloch & Schneider, 1801, p. 216, Eschmeyer (1998) gave the type locality information as "No locality [Tahiti]".

*Naseus lituratus* (Forster, 1801): Günther (1875), Smith & Swain (1882).

*Naseus litturatus* (Forster, 1801) [a *lapsus* in spelling of the species name]: Steindachner (1900).

*Callicanthus lituratus* (Forster, 1801): Jenkins (1903), Snyder (1904), Jordan & Evermann (1905).

*Naso lituratus* (Forster, 1801): Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Hobson (1974), Tinker (1982), Randall & Struhsaker (1981), Randall (1985a, 1996a, 2002b), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Myers (1989), Hoover (1993, 2003), Chave & Mundy (1994), Robertson & Allen (2002).

TAXONOMY: Randall (2002b).

COMMON NAMES: 'Umauma-lei (Hoover, 1993), Umaumalei (Randall, 1996a), Umauma-lei (Hoover, 2003), Masked unicornfish (AFS), Orangespine unicornfish (Hoover, 1993, 2003; Randall, 1996a), Naso tang (Hoover, 1993, 2003), Clown tang (DLNR).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway 2–76 m (Günther, 1875; Smith & Swain, 1882; Jordan & Evermann, 1905; Hobson, 1974; Randall *et al.*, 1985b, 1993b; Hoover, 1993; Chave & Mundy, 1994).

GENERAL RANGE: Trans-Pacific endemic from southern Japan, the Ogasawara Islands, northeastern Australia, Micronesia, the Hawaiian Islands, the Tuamotu Archipelago, the Marquesas, Rapa, and Clipperton Island. Replaced in the Indian Ocean by *N. elegans* (Rüppell, 1829). Engybenthic over coral, rubble, and sand at 1–90 m (Randall *et al.*, 1990a, 1997b; Chave & Mundy, 1994; Randall, 2002b; Robertson & Allen, 2002).

*Naso maculatus* Randall & Struhsaker

*Naso maculatus* Randall & Struhsaker, 1981, p. 554, Fig. 1, Haleiwa, O'ahu, Hawaiian Islands.

*Naso hexacanthus* non (Bleeker, 1855) [a valid species that also occurs in the Hawaiian Islands]: Fowler (1928, in part).

*Naso lopezi* non (Herre, 1927) [a valid species not found in the Hawaiian Islands]: Randall & Struhsaker (1971), Struhsaker (1973a), Randall (1976a).

*Naso maculatus* Randall & Struhsaker, 1981: Randall & Struhsaker (1981), Tinker (1982), Yamakawa *in* Okamura (1985), Uchida & Uchiyama (1986), Randall *et al.* (1993b, 1997b), Chave & Mundy (1994), Randall (1996a, 2002b).

TAXONOMY: Randall & Struhsaker (1981), Randall (2002b).

COMMON NAMES: Spotted unicornfish (Randall, 1996a).



HAWAIIAN RECORDS: Moloka'i to Midway at 20–120 m (Randall & Struhsaker, 1971; Struhsaker, 1973a; Uchida & Uchiyama, 1986; Randall *et al.*, 1993b; Chave & Mundy, 1994).

GENERAL RANGE: Antitropical Pacific endemic known in the north from the east China Sea, Japan, the Okinawa Trough, the Ogasawara Islands, and the Hawaiian Islands, and in the south from Lord Howe Island, the Chesterfield Islands, and New Caledonia. Engybenthic and benthopelagic at 20–220 m (Yamakawa *in* Okamura *et al.*, 1985; Randall *et al.*, 1993b, 1997b; Chave & Mundy, 1994; Randall, 2002b).

*Naso unicornis* (Forsskål)

*Chaetodon unicornis* Forsskål, 1775, p. 63, xiii, Jidda, Saudi Arabia, Red Sea.

*Naseus fronticornis* Lacépède, 1801: Cuvier & Valenciennes (1835).

*Naseus unicornis* (Forsskål, 1775): Streets (1877), Steindachner (1900).

*Monoceros unicornis* (Forsskål, 1775): Fowler (1900).

*Acanthurus unicornis* (Forsskål, 1775): Jenkins (1903), Snyder (1904), Jordan & Evermann (1905).

*Naso unicornis* (Forsskål, 1775): Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Smith (1966), Hobson (1974), Tinker (1982), Okamoto & Kanenaka (1984), Humphreys *et al.* (1984), Randall (1985a, 1996a, 2002b), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Uchida & Uchiyama (1986), Randall *in* Smith & Heemstra (1986), Myers (1989), Hoover (1993, 2003).

TAXONOMY: Myers (1989), Randall *et al.* (1990a), Randall (2002b).

COMMON NAMES: Kala (Hoover, 1993, 2003; Randall, 1996a), Bluespine unicornfish (AFS; Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 1–33 m (Commerson *in* Cuvier & Valenciennes, 1835; Jordan & Evermann, 1905; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Hoover, 1993).

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, the Tuamotu Archipelago, and the Marquesas. Engybenthic over coral and rock at 1–80 m (Randall *in* Smith & Heemstra, 1986; Randall *et al.*, 1990a, 1997b; Randall, 2002b).

[*Naso vlamingii* (Valenciennes)]

*Naseus vlamingii* Valenciennes *in* Cuvier & Valenciennes, 1835, p. 293, Moluccas Islands, Indonesia.

*Naso vlamingii* (Valenciennes, 1835): Kishimoto *in* Masuda *et al.* (1984), Randall *in* Smith & Heemstra (1986), Myers (1989), Randall *et al.* (1990a, 1997a), Randall (2002b), Robertson & Allen (2002).

TAXONOMY: Myers (1989), Randall (2002b).

COMMON NAMES: Vlaming's unicornfish (Randall *et al.*, 1997a), Bignose unicornfish (Myers, 1999).

HAWAIIAN RECORDS: Although Smith (1966) and Kishimoto *in* Masuda *et al.* (1984) listed Hawai'i as within the range of this species, no other references to its occurrence in the region have been found. These records are considered false (Randall, 2002b).

GENERAL RANGE: Indo-Pacific from South Africa to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Line Islands, the Tuamotu Archipelago, and the Marquesas. A waif has been recorded from the Galapagos Islands. Engybenthic and benthopelagic near coral and rock drop-offs at 4–>50 m (Randall *in* Smith & Heemstra, 1986; Myers, 1989; Randall *et al.*, 1990a, 1997b; Randall, 2002b; Robertson & Allen, 2002).

[*Naso* sp.]

*Naso* species: Randall *et al.* (1985a).

TAXONOMY: Unresolved.

HAWAIIAN RECORDS: Randall *et al.* (1985b) reported an unidentified species of *Naso* from Johnston Atoll at 122 m. The species has a black spot on the caudal peduncle (E. Chave, pers. comm., Nov. 2000), as does *Naso minor* (Smith, 1966), a species not recorded from the central Pacific Ocean (Winterbottom, 1992). *Naso brevirostris* rarely has a black spot on the caudal peduncle and it is possible that the unidentified *Naso* recorded at Johnston Atoll was that species (J.E. Randall, pers. comm., March 2003).

GENERAL RANGE: Unknown. Benthopelagic at 122 m (Randall *et al.*, 1985b).

***Paracanthurus hepatus*** (Linnaeus)

*Teuthis hepatus* Linnaeus, 1766, p. 507, Ambon Island, Indonesia; Moluccas, Indonesia; Jamaica, Carolina, U.S.A [see Randall (1955b) for a comment on the species and type localities involved in Linnaeus' description of this species].

*Paracanthurus hepatus* (Linnaeus, 1766): Randall *et al.* (1997a), Myers (1999).

TAXONOMY: Randall (1955b, 2002b).

COMMON NAMES: Palette surgeonfish (Randall *et al.*, 1997a; Myers, 1999).

HAWAIIAN RECORDS: Records of isolated individuals from Honolulu, O'ahu in 1995 (C. Yoshinaga, pers. comm., 1995), and Olowalu to Ka'anapali, Maui in 1994–1996 (S. Hau, pers. comm., Oct. 1995; A. Fielding, pers. comm., June 1996; both communicated by A. Suzumoto, June 2001) may have been of aquarium specimens that were released near these populous areas of the main islands (Randall, 2002b). However, the number of sightings at two islands during 1994–1996 and not thereafter may also indicate a natural recruitment of waifs to the Hawaiian Islands that may have failed because of the absence of appropriate coral habitat for this species in the Hawaiian Islands.

GENERAL RANGE: Indo-Pacific from East Africa to southern Japan, northeastern Australia, New Caledonia, Samoa, Micronesia, and the Line Islands. Engybenitic at coral reefs at 2–40 m (Randall *et al.*, 1997a; Myers, 1999; Randall, 2002b).

***Zebrasoma flavescens*** (Bennett)

*Acanthurus flavescens* Bennett, 1828, p. 40, "Hawaiian Islands".

*Acanthurus flavescens* Bennett, 1828: Bennett (1828), Günther (1875), Steindachner (1900).

*Acanthurus rhombeus* Kittlitz, 1834 [a species of undetermined identity at present]; Günther (1861).

*Scopas flavescens* (Bennett, 1828): Jenkins (1903), Snyder (1904).

*Zebrasoma flavescens* (Bennett, 1828): Jordan & Snyder (1904a), Jordan & Evermann (1905), Fowler (1928, 1931, 1941), Randall (1955b, 1985a, 1996a, 2002b), Gosline & Brock (1960), Hobson (1974), Tinker (1982), Okamoto & Kanenaka (1984), Randall *et al.* (1985a, 1993b, 1997b), Myers (1989), Hoover (1993, 2003), Chave & Mundy (1994).

TAXONOMY: Randall (1955b, 2002b).

COMMON NAMES: Lau-i-pala (Hoover, 1993, 2003), Lau'ipala (Randall, 1996a), Pala (DLNR), Yellow tang (AFS; Hoover, 1993, 2003; Randall, 1996a; DLNR).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 1–81 m (Bennett, 1828; Jordan & Evermann, 1905; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Hoover, 1993; Chave & Mundy, 1994).

GENERAL RANGE: Pacific endemic from southern Japan, the Ogasawara Islands, Micronesia, and the Hawaiian Islands. Abundant only in the Hawaiian Islands but also common in the Ogasawara Islands. Xanthic individuals of *Z. scopas* (Cuvier, 1829) have been reported from other areas as *Z. flavescens*. Engybenitic over rock and coral at 1–81 m (Randall 2002b; Randall *et al.*, 1985b, 1997b; Myers, 1989; Hoover, 1993; Chave & Mundy, 1994).

***Zebrasoma rostratum*** (Günther)

*Acanthurus rostratus* Günther, 1875, p. 117, pl. 66 (fig. B), Society Islands.

*Zebrasoma rostratum* (Günther, 1875): Randall (1955b), Springer (1982), Randall (2002b).

TAXONOMY: Randall (1955b, 2002b), Randall *et al.* (1990b).

COMMON NAMES: Longnose tang (Randall, 2002b).

HAWAIIAN RECORDS: A single black *Zebrasoma* was seen at ca. 3 m in Hanauma Bay, O'ahu during 1997 (J. Kuwabara, J. Hoover, pers. comm., Nov. 1997). The identification of this fish as *Z. rostratum* was confirmed from a photograph taken by J. Hoover (J.E. Randall, pers. comm., Feb. 2003). It is not known if this individual was a waif or an aquarium release, although the location (a marine reserve with closely observed access) makes the possibility that it was an aquarium release unlikely.

GENERAL RANGE: A central Pacific endemic, known only from Rapa, the Society Islands, the Tuamotu Archipelago, the Marquesas, and the Line Islands. Engybenitic over coral reefs in shallow water ca. 2–4 m deep (Randall, 1955b, 2002b; Springer, 1982; Randall *et al.*, 1990b).

***Zebrasoma veliferum*** (Bloch)

*Acanthurus velifer* Bloch, 1795, p. 106, pl. 427 (fig. 1), Eschmeyer (1998) gave the type locality as “No locality [East Indies]”.

*Acanthurus virgatus* Vaillant & Sauvage, 1875: Vaillant & Sauvage (1875) [mistakenly attributed to *Z. flavescens* by Jordan & Snyder (1904a) and Jordan & Evermann (1905)].

*Acanthurus hypselopterus* Bleeker, 1854: Steindachner (1900).

*Zebrasoma hypselopterus* (Bleeker, 1854): Jenkins (1903), Snyder (1904).

*Zebrasoma veliferum* (Bloch, 1795): Jordan & Snyder (1904a), Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949), Randall (1955b, 1985a, 1996a, 2002b), Gosline & Brock (1960), Hobson (1974), Tinker (1982), Okamoto & Kanenaka (1984), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Myers (1989), Hoover (1993, 2003).

TAXONOMY: Randall (1955b, 2002b), Randall *et al.* (1997a).

COMMON NAMES: Māneʻoneʻo (Hoover, 1993, 2003), Māneoneo (Randall, 1996a), Sailfin tang (AFS; Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawaiʻi Island to Kure Atoll at 1–20 m (Steindachner, 1900; Jordan & Evermann, 1905; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Hoover, 1993).

GENERAL RANGE: Pacific endemic from Indonesia, southern Japan, the Ogasawara Islands, and Australia to Micronesia, the Hawaiian Islands, the Tuamotu Archipelago, and Rapa. Usually described as Indo-Pacific in range prior to ca. 1997, but the Indian Ocean populations are now considered to be a sister species, *Z. desjardini* (Bennett, 1836). Engyobenthic at 1–30 m (Randall, 1985a, 2002b; Myers, 1989; Randall *et al.*, 1990a, 1997b).

**Scombrolabraoidei****Scombrolabracidae — Black mackerels*****Scombrolabrax heterolepis*** Roule

*Scombrolabrax heterolepis* Roule, 1921, p. 1534, south of Madeira, eastern North Atlantic.

*Scombrolabrax heterolepis* Roule, 1921: Higgins *et al.* (1970), Clarke & Wagner (1976), Potthoff *et al.* (1980), Fujii *in* Uyeno *et al.* (1983), Nakamura *in* Smith & Heemstra (1986), Parin (1991), Boehlert *et al.* (1992).

TAXONOMY: Potthoff *et al.* (1980).

COMMON NAMES: Black mackerel.

HAWAIIAN RECORDS: Johnston Atoll and Maui to Oʻahu at 25–250 m at night and 750–1000 m during day (Higgins *et al.*, 1970; Clarke & Wagner, 1976; Boehlert *et al.*, 1992).

GENERAL RANGE: Circumglobal in the tropical and subtropical Gulf of Mexico, Atlantic, Indian, and Pacific oceans between 29°N–22°S. Mesopelagic at 25–350 m at night and 560–1000 m during day (Clarke & Wagner, 1976; Potthoff *et al.*, 1980; Fujii *in* Uyeno *et al.*, 1983; Nakamura *in* Smith & Heemstra, 1986; Parin, 1991).

**Scombroidei****Sphyraenidae — Barracudas*****Sphyraena barracuda*** (Walbaum)

*Esox barracuda* Walbaum, 1792, p. 94, “West Indies”.

*Sphyraena commersonii* Cuvier *in* Cuvier & Valenciennes, 1829: Fowler (1900), Jenkins (1903), Snyder (1904).

*Sphyraena agam* Rüppell, 1838: Steindachner (1900).

*Sphyraena snodgrassi* Jenkins, 1901: Jenkins (1901b), Jordan & Evermann (1905).

*Sphyraena barracuda* (Walbaum, 1792): Fowler (1928, 1931, 1949), Gosline & Brock (1960), Tinker (1982), de Sylva (1984), Randall *et al.* (1985a, 1990a), Uchida & Uchiyama (1986), de Sylva & Williams *in* Smith & Heemstra (1986), Myers (1989), Winterbottom *et al.* (1989), Hoover (1993, 2003), Randall (1996a), Senou (2001), Robertson & Allen (2002).

TAXONOMY: de Sylva (1984), de Sylva & Williams *in* Smith & Heemstra (1986), Senou (2001).

COMMON NAMES: Kākū (Randall, 1996a; Hoover, 2003), Kāku (Hoover, 1993), 'Ōpelu mama (for large individuals trained by fishermen to help catch *Decapterus* species; Hoover, 2003), Great barracuda (AFS; FAO; Hoover, 1993; Randall, 1996a), Barracuda (DLNR).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to French Frigate at 1–198 m (Fowler, 1900; Jenkins, 1901b; Jordan & Evermann, 1905; Randall *et al.*, 1985b; Uchida & Uchiyama, 1986; Hoover, 1993).

GENERAL RANGE: Circumtropical and subtropical in the Red Sea, Gulf of Mexico, Atlantic, Indian, and Pacific oceans except the eastern Pacific. A waif has been recorded from the Galapagos Islands. Epipelagic over all nearshore habitats at 1–198 m, juveniles frequently in estuaries (Uchida & Uchiyama, 1986; de Sylva & Williams *in* Smith & Heemstra, 1986; Myers, 1989; Winterbottom *et al.*, 1989; Randall *et al.*, 1990a; Senou, 2001; Robertson & Allen, 2002).

[*Sphyraena forsteri* Cuvier]

*Sphyraena forsteri* Cuvier *in* Cuvier & Valenciennes, 1829a, p. 353, neotype from New Guinea, originally based on a drawing of a fish from Tahiti, Society Islands.

*Sphyraena forsteri* Cuvier, 1829: Tinker (1982), de Sylva (1984), de Sylva & Williams *in* Smith & Heemstra (1986), Myers (1989), Winterbottom *et al.* (1989), Randall *et al.* (1990a, 1997a), Senou (2001).

TAXONOMY: de Sylva (1984), de Sylva & Williams *in* Smith & Heemstra (1986), Senou (2001).

COMMON NAMES: Blackspot barracuda (AFS), Bigeye barracuda (FAO; Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Tinker (1982) and Winterbottom *et al.* (1989) listed this species as occurring in Hawai'i. There are no other records of its presence in the region, so these listings are questionable.

GENERAL RANGE: Indo-Pacific from east Africa and the Chagos Archipelago to the Ryukyu and Ogasawara Islands, Australia, Micronesia, the Society Islands, and the Marquesas. Epipelagic over reefs and drop-offs at 1–300 m (de Sylva & Williams *in* Smith & Heemstra, 1986; Myers, 1989; Winterbottom *et al.*, 1989; Randall *et al.*, 1990a, 1997b; Senou, 2001).

*Sphyraena helleri* Jenkins

*Sphyraena helleri* Jenkins, 1901b, p. 387, Fig. 1, Honolulu, O'ahu, Hawaiian Islands.

*Sphyraena japonica* non Bloch & Schneider, 1801 [apparently a valid species that is not found in the Hawaiian Islands]: Fowler (1928), Yoshino *in* Masuda *et al.* (1984).

*Sphyraena acutipinnis* non Day, 1876 [a valid species that does not occur in the Hawaiian Islands]: de Sylva (1984 fig. 283), de Sylva & Williams *in* Smith & Heemstra (1986 synonymy).

*Sphyraena helleri* Jenkins, 1901b: Jenkins (1901b, 1903), Jordan & Evermann (1905), Fowler (1949), Gosline & Brock (1960), Struhsaker (1973a), Tinker (1982), de Sylva (1984 table 128), Randall *et al.* (1985a, 1990a, 1997a), Uchida & Uchiyama (1986), de Sylva & Williams *in* Smith & Heemstra (1986 text), Hoover (1993, 2003), Randall (1995c, 1996a), Senou (2001).

TAXONOMY: Senou (2001). de Sylva & Williams *in* Smith & Heemstra (1986) included *S. helleri* Jenkins, 1901, in synonymy with *S. acutipinnis* Day, 1876, although they referred to *S. helleri* in their text as if they considered it a valid species. de Sylva (1984) listed both as valid species in his table 128, but included *S. helleri* as a synonym of *S. acutipinnis* in his fig. 283. Randall (1995c, 1996a), Randall *et al.* (1997b), and Senou (2001) considered *S. helleri* to be a valid species distinct from *S. acutipinnis*. Senou (2001) is the most recent reliable revision of Pacific *Sphyraena* species.

COMMON NAMES: Kawele'ā (Hoover, 1993; Randall, 1996a), Heller's barracuda (FAO; Hoover, 1993; Randall *et al.*, 1997a; Randall, 1996a), Japanese barracuda (DLNR).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 1–104 m (Jenkins, 1901b; Jordan & Evermann, 1905; Struhsaker, 1973a; Randall *et al.*, 1985b; Uchida & Uchiyama, 1986; Hoover, 1993).

GENERAL RANGE: At least throughout the Pacific Ocean from northern Australia and southern Japan through Micronesia to the Hawaiian Islands and French Polynesia. Together, *S. helleri* and *S. acutipinnis* have an Indo-Pacific distribution from South Africa to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, the Tuamotu Archipelago, and the Marquesas. It is not possible at present to determine what the exact distributions of these two species are because of confusion in identifications in the literature to date. Epipelagic over reefs at 1–42 m (Yoshino *in* Masuda *et al.*, 1984; Uchida & Uchiyama, 1986; de Sylva & Williams *in* Smith & Heemstra, 1986; Myers, 1989; Randall *et al.*, 1990a, 1997b; Senou, 2001).

*[Sphyraena novaehollandiae* Günther]

*Sphyraena novae Hollandiae* Günther, 1860, p. 335, Hobson's Bay, Port Phillip, Victoria, Australia.

*Sphyraena novaehollandiae* Günther, 1860: de Sylva (1984), Yoshino *in* Masuda *et al.* (1984), de Sylva & Williams *in* Smith & Heemstra (1986), Myers (1989), Kuitert (1993).

TAXONOMY: de Sylva (1984), de Sylva & Williams *in* Smith & Heemstra (1986).

COMMON NAMES: Australian barracuda (AFS), Snook, Short-finned sea pike, Arrow barracuda.

HAWAIIAN RECORDS: Yoshino *in* Masuda *et al.* (1984) included Hawai'i in the range of this species. There are no other records of its capture in Hawai'i; the listing of the Hawaiian Islands as within the range of this species is probably an error. Senou (2001) noted that *S. helleri* has been misidentified as *S. novaehollandiae* but did not cite specific examples.

GENERAL RANGE: Perhaps a Pacific endemic from southern Japan, Australia, New Guinea, and Micronesia, although Kuitert (1993) stated that *S. novaehollandiae* is a southern Australia endemic from Victoria and Tasmania to southwestern Australia. Reports from elsewhere (east Africa, the Ryukyus, the Hawaiian Islands) are likely misidentifications. Epipelagic near reefs or in estuaries (Yoshino *in* Masuda *et al.*, 1984; de Sylva & Williams *in* Smith & Heemstra, 1986; Myers, 1989; Kuitert, 1993).

*Sphyraena genie* Klunzinger

*Sphyraena genie* Klunzinger, 1870, p. 823, Al-Quseir [Kosseir], Egypt, Red Sea.

*Sphyraena genie* Klunzinger, 1870: de Sylva (1984), de Sylva & Williams *in* Smith & Heemstra (1986), Myers (1989), Randall (1996a), Randall *et al.* (1997a, 1997a), Senou (2001), Robertson & Allen (2002).

TAXONOMY: Senou (2001).

COMMON NAMES: Blackfin barracuda (AFS; FAO), Chevron barracuda (Randall *et al.*, 1997a), Blacktail barracuda (Myers, 1999).

HAWAIIAN RECORDS: Hawai'i Island at unspecified depths; recorded from two sightings of four individuals, probably waifs (Randall, 1996a, J.E. Randall, pers. comm., May, 2002).

GENERAL RANGE: Indo-transPacific from South Africa and the Red Sea to the Ogasawara Islands, the Great Barrier Reef, New Caledonia, Micronesia, the Hawaiian Islands, French Polynesia, Clipperton Island, and Mexico to Colombia. Epipelagic (de Sylva & Williams *in* Smith & Heemstra, 1986; Myers, 1989; Randall *et al.*, 1997a, 1997; Senou, 2001; Robertson & Allen, 2002).

**Gempylidae — Snake mackerels***Diplospinus multistriatus* Maul

*Diplospinus multistriatus* Maul, 1948b, p. 42, Fig. 17, Madeira, eastern North Atlantic.

*Diplospinus multistriatus* Maul, 1948b [a misspelling of *multistriatus*]; Borets & Sokolovsky (1978).

*Diplospinus multistriatus* Maul, 1948b: Strasburg (1964b), Clarke & Wagner (1976), Loeb (1979), Novikov *et al.* (1981), Mikhaylin (1982), Boehlert & Mundy (1992), Nakamura & Parin (1993).

TAXONOMY: Mikhaylin (1982), Nakamura & Parin (1993).

COMMON NAMES: Lined cutlassfish (AFS), Striped escolar (FAO).

HAWAIIAN RECORDS: O'ahu to the Hancock and Koko seamounts at 100–500 m at night, 500–1000 m during day (Clarke & Wagner, 1976; Novikov *et al.*, 1981; Boehlert & Mundy, 1992).

GENERAL RANGE: Almost circumglobal between 40°N–40°S in the tropical through warm-temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans except the western Indian Ocean and eastern and western tropical Pacific Ocean. Primarily confined to central gyre water masses. Mesopelagic at 100–500 m at night, 500–1000 m during day (Clarke & Wagner, 1976; Nakamura & Parin, 1993).

*Epinnula magistralis* Poey

*Epinnula magistralis* Poey, 1854, p. 369, pl. 32 (figs. 3–4), Havana, Cuba.

*Epinnula magistralis* Poey, 1854: Clarke (1972), Randall (1976a), Tinker (1982), Parin & Kotlyar (1991), Nakamura & Parin (1993).

TAXONOMY: Nakamura & Parin (1993).

COMMON NAMES: Domine (AFS; FAO).

HAWAIIAN RECORDS: O'ahu at 185 m (Clarke, 1972).

GENERAL RANGE: Probably circumtropical and subtropical except in the eastern Pacific, but known only from the Caribbean Sea, Indonesia, southern Japan, and the Hawaiian Islands. Benthopelagic at 100–185 m (Clarke, 1972; Parin & Kotlyar, 1991; Nakamura & Parin, 1993).

***Gempylus serpens* Cuvier**

*Gempylus serpens* Cuvier, 1829, p. 200, Jamaica.

*Lemnisoma thyrsitoides* Lesson, 1831: Jordan & Evermann (1905).

*Gempylus serpens* Cuvier, 1829: Günther (1875), Fowler (1928), Gosline & Brock (1960), Clarke & Wagner (1976), Borets & Sokolovsky (1978), Loeb (1979), Novikov *et al.* (1981), Tinker (1982), Boehlert *et al.* (1992), Boehlert & Mundy (1992), Nakamura & Parin (1993).

TAXONOMY: Nakamura & Parin (1993).

COMMON NAMES: Haūliuli puhī (Gosline & Brock, 1960), Hauliuli (DLNR), Snake mackerel (AFS; FAO).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to the Hancock and Koko seamounts at 1–250 m at night, 450–800 m during day (Günther, 1875; Jordan & Evermann, 1905; Clarke & Wagner, 1976; Novikov *et al.*, 1981; Boehlert *et al.*, 1992; Boehlert & Mundy, 1992).

GENERAL RANGE: Circumglobal between 40°N–40°S in the tropical through warm-temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans. Epi- and mesopelagic at 1–250 m at night, 450–800 m during day (Clarke & Wagner, 1976; Nakamura & Parin, 1993).

***Lepidocybium flavobrunneum* (Smith)**

*Cybium flavo-brunneum* Smith, 1843, no pagination, pl. 20, Cape of Good Hope, South Africa.

*Nesogrammus thompsoni* Fowler, 1923: Fowler (1923).

*Grammatorcynus thompsoni* (Fowler, 1923): Fowler (1928).

*Lepidocybium flavobrunneum* (Smith, 1843): Gosline & Brock (1960), Clarke & Wagner (1976), Tinker (1982), Fujii *in* Uyeno *et al.* (1983), Boehlert *et al.* (1992), Nakamura & Parin (1993).

TAXONOMY: Nakamura & Parin (1993).

COMMON NAMES: Escolar (AFS; FAO).

HAWAIIAN RECORDS: Johnston Atoll and O'ahu at 1–350 m (Fowler, 1923; Clarke & Wagner, 1976; Boehlert *et al.*, 1992).

GENERAL RANGE: Circumglobal between 50°N–45°S in the tropical through temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans. Epi- and meso-pelagic, perhaps also benthopelagic, at 1–885 m, adults below 100 m (Fujii *in* Uyeno *et al.*, 1983; Parin, 1991; Nakamura & Parin, 1993).

***Nealotus tripes* Johnson**

*Nealotus tripes* Johnson, 1865, p. 434, Madeira, eastern North Atlantic.

*Nealotus tripes* Johnson, 1865: Strasburg (1964b), Struhsaker (1973a), Clarke & Wagner (1976), Borets & Sokolovsky (1978), Tinker (1982), Fujii *in* Uyeno *et al.* (1983), Kido *in* Amaoka *et al.* (1983), Boehlert *et al.* (1992), Nakamura & Parin (1993).

TAXONOMY: Nakamura & Parin (1993).

COMMON NAMES: Black snake mackerel (AFS; FAO).

HAWAIIAN RECORDS: Johnston Atoll and O'ahu at 1–250 m at night, 350–750 m during day (Strasburg, 1964b; Struhsaker, 1973a; Clarke & Wagner, 1976; Boehlert *et al.*, 1992).

GENERAL RANGE: Circumglobal between 40°N–38°S in the tropical through temperate Atlantic, Indian, and Pacific oceans. Epi- and mesopelagic at 1–250 m at night, 350–950 m during day (Clarke & Wagner, 1976; Fujii *in* Uyeno *et al.*, 1983; Kido *in* Amaoka *et al.*, 1983; Nakamura & Parin, 1993).

***Nesiarchus nasutus* Johnson**

*Nesiarchus nasutus* Johnson, 1862, p. 173, pl. 22, Madeira, eastern North Pacific.

*Nesiarchus nasutus* Johnson, 1862: Clarke & Wagner (1976), Kido *in* Amaoka *et al.* (1983), Parin (1991), Boehlert *et al.* (1992), Nakamura & Parin (1993).

TAXONOMY: Nakamura & Parin (1993).

COMMON NAMES: Black gemfish (AFS; FAO).

HAWAIIAN RECORDS: Johnston Atoll and O'ahu at 170–370 m, larvae at 1–100 m (Clarke & Wagner, 1976; Boehlert *et al.*, 1992).

GENERAL RANGE: Almost circumglobal between 65°N–50°S in the tropical through cold-temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans except the eastern north and tropical Pacific. Epi-, meso- and bathybenthopelagic at 90–1200 m, migrating upward at night (Clarke & Wagner, 1976; Kido *in Amaoka et al.*, 1983; Parin, 1991; Nakamura & Parin, 1993).

***Promethichthys prometheus* (Cuvier)**

*Gempylus prometheus* Cuvier *in* Cuvier & Valenciennes, 1832, p. 213, pl. 222, St. Helena Island, central South Atlantic.

*Thyrsites ballieui* Sauvage, 1882: Sauvage (1882).

*Thyrsites prometheus* (Cuvier, 1832): Günther (1889).

*Promethichthys solandri* non (Cuvier *in* Cuvier & Valenciennes, 1832) [a valid *Rexea* species not found in the Hawaiian Islands]: Jordan *et al.* (1927) [the possibility that this record is of *Rexea nakamurai* Parin, 1989 cannot be completely discounted, but Eschmeyer (1998, and the updated website of that catalog) gave this as a synonym of *P. prometheus* and the text of Jordan *et al.* (1927) most closely matches that species among Hawaiian gempylids].

*Promethichthys prometheus* (Cuvier, 1832): Jordan & Evermann (1905), Fowler (1928, 1949), Gosline & Brock (1960), Clarke (1972), Struhsaker (1973a), Borets & Sokolovsky (1978), Novikov *et al.* (1981), Tinker (1982), Fujii *in* Uyeno *et al.* (1983), Humphreys *et al.* (1984), Machida *in* Okamura (1985), Uchida & Uchiyama (1986), Borets (1986), Parin (1991), Nakamura & Parin (1993).

TAXONOMY: Nakamura & Parin (1993).

COMMON NAMES: Roudi (AFS), Roudi escolar (FAO), Bermuda catfish.

HAWAIIAN RECORDS: Moloka'i to the Hancock and Koko seamounts at 60–400 m (Sauvage, 1882; Jordan & Evermann, 1905; Clarke, 1972; Struhsaker, 1973a; Humphreys *et al.*, 1984; Uchida & Uchiyama, 1986; Borets, 1986).

GENERAL RANGE: Almost circumglobal between 45°N–38°S in the tropical through temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans except the eastern Pacific. Epi- and meso-benthopelagic at 60–1050 m (Clarke, 1972; Fujii *in* Uyeno *et al.*, 1983; Machida *in* Okamura *et al.*, 1985; Borets, 1986; Parin, 1991; Nakamura & Parin, 1993).

***Rexea nakamurai* Parin**

*Rexea nakamurai* Parin, 1989, p. 14 [100], Fig. 1(3), 4, Kyushu-Palau Ridge, western North Pacific, at 26°11'N, 135°48'E.

*Rexea solandri* non (Cuvier *in* Cuvier & Valenciennes, 1832) [a valid species not found in the Hawaiian Islands]: Struhsaker (1973a).

*Rexea nakamurai* Parin, 1989: Parin (1989), Nakamura & Parin (1993), Chave & Mundy (1994).

TAXONOMY: Parin (1989).

COMMON NAMES: Nakamura's escolar (FAO), Half-scaled *Rexea*, Hawaiian gemfish.

HAWAIIAN RECORDS: Lāna'i to O'ahu at 110–420 m (Struhsaker, 1973a; Chave & Mundy, 1994).

GENERAL RANGE: Indo-Pacific from the western Indian Ocean near the Seychelles to Indonesia, the Kyushu-Palau Ridge, and the Hawaiian Islands. Epi- and mesobenthopelagic over rock and sand at 90–420 m (Struhsaker, 1973a; Parin, 1989; Nakamura & Parin, 1993; Chave & Mundy, 1994).

***Ruvettus pretiosus* Cocco**

*Ruvettus pretiosus* Cocco, 1833, p. 18, Messina, Italy, Mediterranean Sea [see note in Eschmeyer (1998) about the uncertainty for the date of publication for this name].

*Ruvettus pretiosus* Cocco, 1833: Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1949), Gosline & Brock (1960), Tinker (1982), Kido *in* Amaoka *et al.* (1983), Humphreys *et al.* (1984), Uchida & Uchiyama (1986), Borets (1986), Parin (1991), Nakamura & Parin (1993).

TAXONOMY: Nakamura & Parin (1993).

COMMON NAMES: Walu (Gosline & Brock, 1960), Oilfish (AFS; FAO).

HAWAIIAN RECORDS: O'ahu to the Hancock and Colahan Seamounts at 160–390 m (Snyder, 1904; Jordan & Evermann, 1905; Humphreys *et al.*, 1984; Uchida & Uchiyama, 1986; Borets, 1986).

GENERAL RANGE: Circumglobal between 50°N–42°S in the tropical through temperate Caribbean Sea, Mediterranean Sea, Atlantic, Indian, and Pacific oceans. Epi-, meso-, and benthopelagic at 32–880 m (Kido *in* Amaoka *et al.*, 1983; Parin, 1991; Nakamura & Parin, 1993).

***Thyrstitoides marleyi* Fowler**

*Thyrstitoides marleyi* Fowler, 1929, p. 256, Fig. 2, Natal, South Africa.

*Thyrstitoides marleyi* Fowler, 1929: Nakamura *in* Okamura *et al.* (1982), Machida *in* Okamura (1985), Gon (1987), Nakamura & Parin (1993).

TAXONOMY: Nakamura & Parin (1993).

COMMON NAMES: Black snoek (AFS; FAO).

HAWAIIAN RECORDS: Ni'ihau at unrecorded depths (Gon, 1987).

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to Indonesia, southern Japan, Australia, Vanuatu, and the Hawaiian Islands. Benthopelagic at 1–620 m, migrating to the surface at night (Nakamura *in* Okamura *et al.*, 1982; Machida *in* Okamura *et al.*, 1985; Nakamura & Parin, 1993).

**Trichiuridae — Cutlassfishes*****Aphanopus arigato* Parin**

*Aphanopus arigato* Parin, 1994, p. 741, off Hokkaido, western North Pacific Ocean at 39°24'N, 14°27'E [the longitude is a typographic error for a locality likely between 140–146°E].

*Aphanopus carbo* non Lowe, 1839 [a valid species not found in the Hawaiian Islands]: Clarke & Wagner (1976), Novikov *et al.* (1981), Kido *in* Amaoka *et al.* (1983), Borets (1986).

Trichiuridae Type A (poss. *Aphanopus carbo*): Loeb (1979)?

*Aphanopus intermedius* non Parin, 1983 [a valid species not found in the Hawaiian Islands]: Parin (1983), Nakamura & Parin (1993) — North Pacific records only, Evseyenko *et al.* (1994).

*Aphanopus arigato* Parin, 1994: Parin (1994).

TAXONOMY: Parin (1994).

COMMON NAMES: Pacific Black scabbardfish.

HAWAIIAN RECORDS: O'ahu to the Hancock and Koko seamounts at 150–190 m at night, 660–1100 m during day (Clarke & Wagner, 1976; Novikov *et al.*, 1981; Borets, 1986; Parin, 1994).

GENERAL RANGE: North Pacific endemic between 21°–55°N from Japan to North America. Adults benthopelagic at 400–1100 m; juveniles mesopelagic at 146–190 m at night, 300–1100 m during day (Clarke & Wagner, 1976; Kido *in* Amaoka *et al.*, 1983; Nakamura & Parin, 1993, in part; Evseyenko *et al.*, 1994; Parin, 1994).

***Assurger anzac* (Alexander)**

*Evoxymetopon anzac* Alexander, 1917, p. 104, pl. 7, North Fremantle, Western Australia.

*Assurger anzac* (Alexander, 1917): Randall (1980a), Tinker (1982 appendix), Parin (1991), Nakamura & Parin (1993).

TAXONOMY: Nakamura & Parin (1993).

COMMON NAMES: Razorback scabbardfish (AFS; FAO).

HAWAIIAN RECORDS: Hawai'i Island to Midway at 125–200 m (Randall, 1981a; Nakamura & Parin, 1993).

GENERAL RANGE: Probably circumglobal between 40°N–37°S in the tropical through warm-temperate Atlantic, Indian, and Pacific oceans, but recorded only from Puerto Rico, Uruguay, the Walvis Ridge, western Australia, Japan, New Guinea, Australia, the Hawaiian Islands, California, and the southeastern Pacific. Epi- and meso-benthopelagic at 125–400 m (Randall, 1981a; Parin, 1991; Nakamura & Parin, 1993).

**[*Benthodesmus pacificus* Parin & Becker]**

*Benthodesmus elongatus pacificus* Parin & Becker, 1970, p. 362, off Honshu, Japan, at 38°35'N, 142°53'E.

*Benthodesmus* sp.?: Borets & Sokolovsky (1978)?

*Benthodesmus elongatus pacificus* Parin & Becker, 1970: Parin & Becker (1970), Anderson & Cailliet (1975), Novikov *et al.* (1981).

*Benthodesmus pacificus* Parin & Becker, 1970: Nakamura & Parin (1993).

TAXONOMY: Parin & Becker (1970), Anderson & Cailliet (1975), Nakamura & Parin (1993).

COMMON NAMES: North-Pacific frostfish (FAO).

HAWAIIAN RECORDS: Novikov *et al.* (1981) reported this species from the Milwaukee Seamount. It can be expected to occur at the Hancock Seamount. *Benthodesmus* species collected in Hawaiian waters



should be carefully examined to determine if they are this species or the next.

GENERAL RANGE: North Pacific endemic between 25°–50°N, from the Ryukyus to the Emperor Seamounts, British Columbia, and southern California. Benthopelagic at >305 m, juveniles meso- and bathypelagic at 100–1000 m (Nakamura & Parin, 1993).

***Benthodesmus tenuis*** (Günther)

*Lepidopus tenuis* Günther, 1877b, p. 437, off Inoshima, Japan.

*Benthodesmus* sp. (poss. *tenuis*): Loeb (1979)?

*Benthodesmus tenuis* (Günther, 1877b): Parin & Becker (1970), Struhsaker (1973a), Tinker (1982), Humphreys *et al.* (1984), Machida *in* Okamura (1985), Nakamura & Parin (1993).

TAXONOMY: Parin & Becker (1970), Nakamura & Parin (1993).

COMMON NAMES: Slender frostfish (AFS; FAO).

HAWAIIAN RECORDS: Maui to O‘ahu and perhaps the Hancock Seamounts at 335–686 m (Struhsaker, 1973a; Humphreys *et al.*, 1984).

GENERAL RANGE: Perhaps circumglobal between 45°N–30°S in the Gulf of Mexico, Atlantic, Indian, and Pacific oceans, although known only from isolated populations that may represent different species. Benthopelagic at 200–850 m, juveniles mesopelagic (Machida *in* Okamura *et al.*, 1985; Nakamura & Parin, 1993).

[*Lepidopus calcar* Parin & Mikhailin]

*Lepidopus calcar* Parin & Mikhailin, 1982, p. 27, Figs. 1–2, Colahan Seamount, Hawaiian Ridge, central North Pacific at 31°01'N, 175°53'E.

*Lepidophus* [sic] *caudatus* non (Euphrasen, 1788) [*Lepidopus caudatus* is a valid species not found in the Hawaiian Islands]: Borets & Sokolovsky (1978).

*Lepidopus* sp. (prob. *caudatus*): Loeb (1979).

*Lepidopus* sp.: Novikov *et al.* (1981), Boehlert *et al.* (1992)?

*Lepturacanthus* sp. [a valid genus not found in the central North Pacific — see *Trichiurus lepturus* Linnaeus, 1758]: Novikov *et al.* (1981).

*Lepidopus lex* non Phillipps, 1932 [a junior synonym of *L. caudatus* (Euphrasen, 1788), a valid species not found in the Hawaiian Islands]: Humphreys *et al.* (1984).

*Lepidopus calcar* Parin & Mikhailin, 1982: Parin & Mikhailin (1982), Humphreys *et al.* (1984), Borets (1986), Rosenblatt & Wilson (1987), Nakamura & Parin (1993).

TAXONOMY: Rosenblatt & Wilson (1987), Nakamura & Parin (1993).

COMMON NAMES: Hawaiian Ridge scabbardfish (FAO).

HAWAIIAN RECORDS: The occurrence of *L. calcar* from the Colahan Koko seamounts at 100–600 m (Parin & Mikhailin, 1982; Borets, 1986) indicates that it can be expected at the Hancock Seamounts. This may also be the *Lepidopus* sp. recorded as larvae from Johnston Atoll at 100–200 m (Boehlert *et al.*, 1992).

GENERAL RANGE: Central North Pacific endemic known from the Emperor Seamounts and perhaps Johnston Atoll. Benthopelagic at 270–350 m (Boehlert *et al.*, 1992; Nakamura & Parin, 1993).

[*Trichiurus lepturus* Linnaeus]

*Trichiurus lepturus* Linnaeus, 1758, p. 246, “Habitat in America, China”.

*Trichiurus lepturus* Linnaeus, 1758: Tinker (1982), Springer (1982), Machida *in* Okamura (1985), Nakamura & Parin (1993), Allen & Robertson (1994).

TAXONOMY: Nakamura & Parin (1993).

COMMON NAMES: Atlantic cutlassfish (AFS), Largehead hairtail (FAO).

HAWAIIAN RECORDS: Tinker (1982) included an illustration of this species and mentioned it in his discussion of *Benthodesmus tenuis* (Günther, 1877). There is no evidence that *T. lepturus* or either *Lepturacanthus* species occur non-marginally on the central Pacific Plate (Springer, 1982; Nakamura & Parin, 1993).

GENERAL RANGE: Circumglobal on continental shelves between 60°N–45°S in the tropical to boreal Gulf of Mexico, Mediterranean Sea, Red Sea, Atlantic, Indian, and Pacific oceans. Absent from the islands of the Pacific Plate. Benthopelagic at 1–385 m (Machida *in* Okamura *et al.*, 1985; Nakamura & Parin, 1993; Allen & Robertson, 1994).

## Scombridae — Mackerels

*Acanthocybium solandri* (Cuvier)

*Cybium solandri* Cuvier in Cuvier & Valenciennes, 1832, p. 192, no type locality given.

*Acanthocybium solanderi* (Cuvier, 1832) [a misspelling of *solandri*]: Randall *et al.* (1985a).

*Acanthocybium* sp.: Loeb (1979).

*Acanthocybium solandri* (Cuvier, 1832): Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Tinker (1982), Collette & Nauen (1983), Uchida & Uchiyama (1986), Boehlert & Mundy (1992), Randall *et al.* (1993b), Allen & Robertson (1994).

TAXONOMY: Collette & Nauen (1983).

COMMON NAMES: Ono (Gosline & Brock, 1960), Wahoo (AFS; FAO; Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to the Hancock Seamounts at 1 m (Jenkins, 1903; Jordan & Evermann, 1905; Randall *et al.*, 1985b; Uchida & Uchiyama, 1986; Boehlert & Mundy, 1992).

GENERAL RANGE: Almost circumglobal between 40°N–40°S, although usually near topography, in the tropical through warm-temperate Gulf of Mexico, Mediterranean Sea, Atlantic, Indian, and Pacific oceans. Epipelagic near the surface (Collette & Nauen, 1983).

*Auxis rochei rochei* (Risso)

*Scomber rochei* Risso, 1810, p. 165, Nice, France.

*Auxis thynnoides* Bleeker, 1855: Matsumoto (1960), Gosline & Brock (1960), Tinker (1982).

*Auxis rochei* (Risso, 1810): Yoshida & Nakamura (1965), Collette & Nauen (1983), Allen & Robertson (1994).

*Auxis rochei rochei* (Risso, 1810): Collette & Aadland (1996).

TAXONOMY: Collette & Aadland (1996).

COMMON NAMES: Bullet mackerel (AFS), Bullet tuna (FAO), Corseletted frigate mackerel (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Lāna'i to O'ahu at 1 m (Matsumoto, 1960; Gosline & Brock, 1960; Yoshida & Nakamura, 1965). The *Auxis* sp. reported by Loeb (1979) is not identifiable to species.

GENERAL RANGE: Almost circumglobal, usually near topography, between 60°N–48°S in the tropical to temperate Gulf of Mexico, Mediterranean Sea, Atlantic, Indian, and Pacific oceans. This subspecies is replaced by *A. rochei eudorax* Collette & Aadland, 1996, in the eastern Pacific. Epipelagic near the surface (Collette & Nauen, 1983; Collette & Aadland, 1996).

*Auxis thazard thazard* (Lacépède)

*Scomber thazard* Lacépède, 1800, p. 599, coast of New Guinea between 6° and 7°S.

*Auxis tapeinosoma* Bleeker, 1854: Tinker (1982).

*Auxis thazard* (Lacépède, 1800): Jenkins (1903), Jordan & Evermann (1905), Fowler (1928, 1949), Matsumoto (1960), Gosline & Brock (1960), Yoshida & Nakamura (1965), Tinker (1982), Fujii in Uyeno *et al.* (1983), Collette & Nauen (1983), Allen & Robertson (1994), Collette & Aadland (1996).

TAXONOMY: Collette & Aadland (1996).

COMMON NAMES: Keokeo (Gosline & Brock, 1960), Frigate mackerel (AFS; Randall *et al.*, 1997a), Frigate tuna (FAO).

HAWAIIAN RECORDS: Hawai'i Island to O'ahu at 1 m (Jenkins, 1903; Jordan & Evermann, 1905; Matsumoto, 1960; Yoshida & Nakamura, 1965).

GENERAL RANGE: Almost circumglobal, usually near topography between 60°N–48°S in the tropical to temperate Gulf of Mexico, Mediterranean Sea, Red Sea, Atlantic, Indian, and Pacific oceans. This subspecies is replaced by *A. thazard brachydorax* Collette & Aadland, 1996, in the eastern Pacific. Epipelagic at 1–45 m (Fujii in Uyeno *et al.*, 1983; Collette & Nauen, 1983; Collette & Aadland, 1996).

*Euthynnus affinis* (Cantor)

*Thynnus affinis* Cantor, 1849, p. 1088, Sea of Penang, Malaysia.

*Gymnosarda alleterata* non (Rafinesque, 1810) [a valid Atlantic Ocean *Euthynnus* species, but with the species name misspelled]: Jenkins (1903).

*Gymnosarda alleterata* non (Rafinesque, 1810): Jordan & Evermann (1905).

*Euthynnus alletteratus* non (Rafinesque, 1810): Fowler (1928, 1931, 1934).

*Euthynnus wallisi* (Whitley, 1937) [Whitley's original binomial, *Wanderer wallisi*, is too amusing to leave unmentioned here]: Fowler (1949).

*Euthynnus yaito* Kishinouye, 1915: Gosline & Brock (1960).

*Euthynnus affinis* (Cantor, 1849): Tinker (1982), Collette & Nauen (1983), Randall *et al.* (1985a, 1993b, 1997a), Uchida & Uchiyama (1986).

TAXONOMY: Collette & Nauen (1983).

COMMON NAMES: Kāwakāwa (AFS; FAO), Mackerel tuna (Randall *et al.*, 1997a), Little tuna (DLNR).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 1 m (Jenkins, 1903; Jordan & Evermann, 1905; Randall *et al.*, 1985b; Uchida & Uchiyama, 1986).

GENERAL RANGE: Indo-Pacific, usually near topography, from South Africa and the Red Sea to Indonesia, southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, and French Polynesia. Epipelagic near the surface (Collette & Nauen, 1983; Randall *et al.*, 1997b).

### ***Euthynnus lineatus*** Kishinouye

*Euthynnus lineatus* Kishinouye, 1920, p. 113, Manzanillo, Pacific coast of Mexico.

*Euthynnus lineatus* Kishinouye, 1920: Matsumoto & Kang (1967), Matsumoto (1976), Tinker (1982), Collette & Nauen (1983), Allen & Robertson (1994).

TAXONOMY: Collette & Nauen (1983).

COMMON NAMES: Black skipjack (AFS; FAO).

HAWAIIAN RECORDS: Known from Hawai'i Island and Moloka'i at 1 m as waifs. Only two specimens have been captured in the region (Matsumoto & Kang, 1967; Matsumoto, 1976).

GENERAL RANGE: Eastern tropical Pacific endemic from southern California to the Galapagos Islands and Peru; two stray specimens recorded from the Hawaiian Islands. Epipelagic near the surface (Collette & Nauen, 1983; Allen & Robertson, 1994).

### [*Gasterochisma melampus* Richardson]

*Gasterochisma melampus* Richardson, 1845d, p. 346, Port Nicholson, New Zealand.

*Gasterochisma melampus* Richardson, 1845d: Collette & Nauen (1983), Ito *et al.* (1994).

TAXONOMY: Collette & Nauen (1983).

COMMON NAMES: Butterfly mackerel (AFS), Butterfly kingfish (FAO).

HAWAIIAN RECORDS: None but a single specimen was collected 670 km north of Kaua'i at ca. 30 m (Ito *et al.*, 1994) and a second was collected at ca. 30°N in Sept. 2003 (D. Hawn, pers. comm., Sept. 2003).

GENERAL RANGE: Circumglobal in the cold temperate South Atlantic, Indian, and Pacific oceans between 20°–50°S (usually between 30°–50°S), with waifs known from Ecuador and north of the Hawaiian Islands. Epipelagic to ca. 30 m (Collette & Nauen, 1983; Ito *et al.*, 1994).

### ***Katsuwonus pelamis*** (Linnaeus)

*Scomber pelamis* Linnaeus, 1758, p. 297, "Habitat in Pelago inter Tropicos".

*Gymnosarda pelamis* (Linnaeus, 1758): Jenkins (1903), Jordan & Evermann (1905).

*Euthynnus pelamis* (Linnaeus, 1758): Fowler (1928, 1931, 1934).

*Katsuwonus vagans* (Lesson, 1829): Fowler (1949).

*Katsuwonus pelamis* (Linnaeus, 1758): Gosline & Brock (1960), Loeb (1979), Tinker (1982), Collette & Nauen (1983), Randall *et al.* (1985a), Uchida & Uchiyama (1986), Boehlert & Mundy (1992), Randall *et al.* (1993b), Allen & Robertson (1994).

TAXONOMY: Collette & Nauen (1983).

COMMON NAMES: Aku (Gosline & Brock, 1960; DLNR), Katsuwo (Gosline & Brock, 1960; DLNR), Skipjack tuna (AFS; FAO; Randall *et al.*, 1997a), Skipjack (Gosline & Brock, 1960).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to the Hancock Seamounts at 1 m (Jenkins, 1903; Jordan & Evermann, 1905; Randall *et al.*, 1985b; Uchida & Uchiyama, 1986; Boehlert & Mundy, 1992).

GENERAL RANGE: Circumglobal between 60°N–50°S in the tropical to boreal Gulf of Mexico, Mediterranean Sea, Atlantic, Indian, and Pacific oceans. Epi- and mesopelagic from 0–260 m (Collette & Nauen, 1983).

***Sarda orientalis*** (Temminck & Schlegel)

*Pelamys orientalis* Temminck & Schlegel, 1844, p. 99, pl. 52, "Japan".

*Sarda chilensis* non (Cuvier in Cuvier & Valenciennes, 1832) [*lapsus* for *chilensis*; a valid species not found in the Hawaiian Islands]: Jordan & Snyder (1904b), Jordan & Evermann (1905), Fowler (1928, 1949, in part), Tinker (1982).

*Sarda orientalis* (Temminck & Schlegel, 1844): Gosline & Brock (1960), Clarke (1972), Collette & Chao (1975), Tinker (1982), Uchida & Uchiyama (1986), Collette & Nauen (1983), Machida in Okamura (1985), Allen & Robertson (1994), Randall *et al.* (1997a).

TAXONOMY: Collette & Chao (1975), Collette & Nauen (1983).

COMMON NAMES: Striped bonito (AFS; FAO), Oriental bonito (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: O'ahu to Pearl and Hermes Reef at 90–110 m (Jordan & Snyder, 1904c; Jordan & Evermann, 1905; Clarke, 1972; Uchida & Uchiyama, 1986).

GENERAL RANGE: Indo-transPacific from South Africa and the Red Sea to Indonesia, Japan, the Ogasawara Islands, western Australia, and Baja California to Peru; known only from the Hawaiian Islands on the central Pacific Plate. Epipelagic, usually near topography, at 1–167 m (Clarke, 1972; Collette & Nauen, 1983; Machida in Okamura *et al.*, 1985; Allen & Robertson, 1994; Randall *et al.*, 1997b).

***Scomber australasicus*** Cuvier

*Scomber australasicus* Cuvier in Cuvier & Valenciennes, 1832, p. 49, King George Sound, western Australia.

*Scomber japonicus* non Houttuyn, 1782 [a valid *Scomber* or *Pneumatophorus* species which also occurs in the Hawaiian Islands]: Iwai (1976).

*Scomber australasicus* Cuvier, 1832: Matsui (1967), Miller *et al.* (1979), Collette & Nauen (1983), Machida in Okamura (1985), Baker & Collette (1998), Randall *et al.* (1997a), Collette (1997).

TAXONOMY: Matsui (1967), Collette & Nauen (1983), Baker & Collette (1998). Collette (1997) suggested that *Scomber australasicus* Cuvier, 1832, and *Scomber japonicus* Houttuyn, 1782, should be placed in the subgenus *Pneumatophorus* distinct from the subgenus *Scomber*.

COMMON NAMES: Spotted mackerel (AFS), Spotted chub mackerel (FAO).

HAWAIIAN RECORDS: Main Hawaiian Islands to the Hancock Seamounts at fishing depths to 265 m (Matsui, 1967; Iwai, 1976; Miller *et al.*, 1979; M. Seki, pers. comm., Aug. 1988).

GENERAL RANGE: Indo-Pacific with disjunct populations in the northwestern Indian Ocean to Red Sea and otherwise from Japan and the Ogasawara Islands southward to Australia and New Zealand, the Hawaiian Islands on the Pacific Plate, and Socorro Island near Mexico. Epipelagic, usually near topography, at 1–160 m and fishing depths to 265 m (Iwai, 1976; Collette & Nauen, 1983; Machida in Okamura *et al.*, 1985; Baker & Collette, 1998; Randall *et al.*, 1997b).

***Scomber japonicus*** Houttuyn

*Scomber japonicus* Houttuyn, 1782, p. 331, "Japan".

*Scomber japonicus* Houttuyn, 1782: Jordan & Evermann (1905), Fowler (1928, 1931), Gosline & Brock (1960), Matsui (1967), Novikov *et al.* (1981), Tinker (1982), Springer (1982), Collette & Nauen (1983), Humphreys *et al.* (1984), Machida in Okamura (1985), Uchida & Uchiyama (1986), Parin (1991), Boehlert *et al.* (1992), Allen & Robertson (1994), Collette (1997), Scoles *et al.* (1998).

TAXONOMY: Matsui (1967), Collette & Nauen (1983). Collette (1997) suggested that *Scomber japonicus* Houttuyn, 1782, and *Scomber australasicus* Cuvier, 1832, should be placed in the subgenus *Pneumatophorus* distinct from the subgenus *Scomber*. Collette (1997) and Scoles *et al.* (1998) also recognized *S. colias* Gmelin, 1789, as an endemic Atlantic species distinct from the Indo-Pacific *S. japonicus*. The two species had previously been considered to be one circumglobal species.

COMMON NAMES: 'Opelu palahu, Saba (Gosline & Brock, 1960; DLNR), Chub mackerel (AFS; FAO), Japanese mackerel (DLNR).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to the Hancock Seamounts at 27–99 m and to 342 m fishing depths (Jordan & Evermann, 1905; Humphreys *et al.*, 1984; Uchida & Uchiyama, 1986; Boehlert *et al.*, 1992). Springer (1982) questioned records of *S. japonicus* from the Hawaiian Islands and suggested that they may have been based upon misidentifications of *S. australasicus*. This question was not addressed by Collette (1997), Baker & Collette (1998), or Scoles *et al.* (1998) in the

most recent review of Indo-Pacific *Scomber* taxonomy. The occurrence of *S. japonicus* in the archipelago thus needs verification.

GENERAL RANGE: A transPacific endemic when considered distinct from *S. colias*, but antitropical and reported only from the Hawaiian Islands on the Pacific Plate. Otherwise known from Japan through the Philippines in the western Pacific and southern Alaska to Chile in the eastern Pacific. Epi- and mesopelagic at 1–300 m (Collette & Nauen, 1983; Machida *in* Okamura *et al.*, 1985; Parin, 1991; Allen & Robertson, 1994; Collette, 1997; Scoles *et al.*, 1998).

### *Thunnus alalunga* (Bonnaterre)

*Scomber alalunga* Bonnaterre, 1788, p. 139, Sardinia, Mediterranean Sea.

*Thunnus alalunga* (Bonnaterre, 1788): Jordan & Jordan (1922), Fowler (1928, 1931), Gosline & Brock (1960), Gibbs & Collette (1967), Tinker (1982), Collette & Nauen (1983).

TAXONOMY: Gibbs & Collette (1967), Collette & Nauen (1983).

COMMON NAMES: Ahipahala (Gosline & Brock, 1960; DLNR), Albacore (AFS; FAO; Randall *et al.*, 1997a), Tonbo (DLNR).

HAWAIIAN RECORDS: O'ahu to the Hancock Seamounts (Jordan & Jordan, 1922; Fowler, 1928; Gosline & Brock, 1960).

GENERAL RANGE: Nearly circumglobal between 50°N–40°S in the tropical through temperate Mediterranean Sea, Atlantic, Indian, and Pacific oceans except the eastern tropical Pacific. Epi- and mesopelagic at 1–600 m, avoiding the surface in the tropics (Collette & Nauen, 1983).

### *Thunnus albacares* (Bonnaterre)

*Scomber albacares* Bonnaterre, 1788, p. 140, Jamaica, Caribbean Sea.

*Germo germo* non (Lacépède, 1801) [a junior synonym of *T. alalunga* (Bonnaterre, 1788), a valid species also found in the Hawaiian Islands]: Jordan & Evermann (1905) in part?

*Germo macropterus* (Temminck & Schlegel, 1844): Fowler (1928, 1931).

*Germo albacores* (Bonnaterre, 1788) [*lapsus* for *albacares*]: Fowler (1928).

*Neothunnus macropterus* (Temminck & Schlegel, 1844): Fowler (1934, 1949).

*Semithunnus guildi* Fowler, 1933: Fowler (1934).

*Semithunnus itosibi* Jordan & Evermann, 1926: Jordan & Evermann (1926), Fowler (1934).

*Kishinoella zacalles* Jordan & Evermann, 1926: Jordan & Evermann (1926), Tinker (1982).

*Thunnus albacares* (Bonnaterre, 1788): Gosline & Brock (1960), Gibbs & Collette (1967), Tinker (1982), Collette & Nauen (1983), Randall *et al.* (1985a, 1993b), Uchida & Uchiyama (1986).

TAXONOMY: Gibbs & Collette (1967), Collette & Nauen (1983).

COMMON NAMES: Ahi (Gosline & Brock, 1960; DLNR), Yellowfin tuna (AFS; FAO; Randall *et al.*, 1997a), Shibi (Gosline & Brock, 1960).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to the Hancock Seamounts at 1 m (Jordan & Evermann, 1905; Randall *et al.*, 1985b; Uchida & Uchiyama, 1986).

GENERAL RANGE: Circumglobal between 40°N–40°S in the Gulf of Mexico, Atlantic, Indian, and Pacific oceans. Epipelagic at 1–200 m (Collette & Nauen, 1983).

### *Thunnus obesus* (Lowe)

*Thynnus obesus* Lowe, 1839, p. 78, off Madeira, eastern North Atlantic.

*Germo sibi* (Temminck & Schlegel, 1844): Snyder (1904), Fowler (1928, 1931, 1934).

*Germo germo* non (Lacépède, 1801) [a junior synonym of *T. alalunga* (Bonnaterre, 1788), a valid species also found in the Hawaiian Islands]: Jordan & Evermann (1905) in part?

*Parathunnus sibi* (Temminck & Schlegel, 1844): Fowler (1949).

*Thunnus obesus* (Lowe, 1839): Gosline & Brock (1960), Gibbs & Collette (1967), Tinker (1982), Collette & Nauen (1983), Uchida & Uchiyama (1986), Randall *et al.* (1993b), Allen & Robertson (1994).

TAXONOMY: Gibbs & Collette (1967), Collette & Nauen (1983).

COMMON NAMES: Po'o-nui (Gosline & Brock, 1960), Bigeye tuna (AFS; FAO; Randall *et al.*, 1997a), Mebachi shibi (Gosline & Brock, 1960; DLNR).

HAWAIIAN RECORDS: Hawai'i Island to Midway and the Hancock Seamounts. Probably at Johnston Atoll but no specific records could be found (Snyder, 1904; Jordan & Evermann, 1905; Uchida & Uchiyama, 1986).

GENERAL RANGE: Nearly circumglobal between 45°N–40°S in the Atlantic, Indian, and Pacific oceans except the extreme eastern equatorial Pacific. Epi- and mesopelagic at 1–250 m (Collette & Nauen, 1983; Allen & Robertson, 1994).

***Thunnus orientalis*** (Temminck & Schlegel)

*Thynnus orientalis* Temminck & Schlegel, 1844, p. 94, “Japan”.

*Thunnus thynnus* non (Linnaeus, 1758) [a valid species found in the Atlantic Ocean]: Fowler (1923, 1928, 1931), Tinker (1982).

*Thunnus thynnus orientalis* (Temminck & Schlegel, 1844): Gosline & Brock (1960), Gibbs & Collette (1967), Collette & Nauen (1983).

*Thunnus orientalis* (Temminck & Schlegel, 1844): Fowler (1934), Collette (1997).

TAXONOMY: Gibbs & Collette (1967), Collette & Nauen (1983). Collette (1997) argued that the North Pacific population previously recognized as a subspecies of *Thunnus thynnus* (Linnaeus, 1758) should be elevated to the status of a separate species, *Thunnus orientalis* (Temminck & Schlegel, 1844).

COMMON NAMES: Ahi (DLNR), Maguro (Gosline & Brock, 1960; DLNR), Pacific bluefin tuna (adapted from AFS and FAO).

HAWAIIAN RECORDS: O‘ahu (Fowler, 1923, 1928).

GENERAL RANGE: North Pacific endemic found between 3–60°N. Populations or stray specimens are recorded from off western Australia, New Guinea, and the eastern South Pacific. Epipelagic at 1–200 m (Collette & Nauen, 1983; Collette, 1997).

**Xiphiidae — Billfishes<sup>64</sup>**  
**Istiophorinae**

***Istiophorus platypterus*** (Shaw)

*Xiphias platypterus* Shaw in Shaw & Nodder, 1791, pl. 88, “Indian Ocean”.

*Istiophorus orientalis* (Temminck & Schlegel, 1844): Fowler (1923, 1928, 1949), Gosline & Brock (1960).

*Istiophorus brookei* Fowler, 1933: Fowler (1934).

*Istiophorus platypterus* (Shaw, 1791): Naughton (1973), Tinker (1982), Nakamura (1985), Allen & Robertson (1994).

TAXONOMY: Graves & McDowell (2003). Genetic evidence suggests that Atlantic and Indo-Pacific sailfish populations are a single, circumglobal species, *I. platypterus* (Shaw, 1792), instead of distinct Atlantic and Indo-Pacific species as proposed by Nakamura (1985) (see Graves & McDowell, 1995, 2003).

COMMON NAMES: A‘u-lepe (Gosline & Brock, 1960; DLNR), Sailfish (AFS), Indo-Pacific sailfish (FAO; Randall *et al.*, 1997a), Pacific sailfish.

HAWAIIAN RECORDS: Hawai‘i Island to O‘ahu at 1 m (Fowler, 1923, 1928; Naughton, 1973).

GENERAL RANGE: Circumsubtropical, with expatriates in warm, poleward extensions of ocean-basin boundary currents, between 50°N–45°S. Epipelagic at 1–200 m (Nakamura, 1985).

***Makaira indica*** (Cuvier)

*Tetrapturus indicus* Cuvier in Cuvier & Valenciennes, 1832, p. 286, Sumatra, Indonesia.

*Istiompax marlina* (Jordan & Hill in Jordan & Evermann, 1926): Gosline & Brock (1960).

*Makaira indica* (Cuvier, 1832): Fowler (1949), Naughton (1973), Tinker (1982), Nakamura (1985), Allen & Robertson (1994).

TAXONOMY: Nakamura (1985).

COMMON NAMES: A‘u (DLNR), Black marlin (AFS; FAO; Randall *et al.*, 1997a), Shirokajiki (Gosline & Brock, 1960).

HAWAIIAN RECORDS: Hawai‘i Island to O‘ahu at 1 m (Fowler, 1949; Naughton, 1973).

GENERAL RANGE: Eastern Atlantic and Indo-transPacific between 40°N–45°S from South Africa and the southern Red Sea to Indonesia, northern Japan, Tasmania, New Zealand, Micronesia, the Hawaiian Islands, French Polynesia, Easter Island, southern California, the Gulf of California, and northern Chile. Epipelagic from 1–200 m (Nakamura, 1985).

***Makaira nigricans* Lacépède**

*Makaira nigricans* Lacépède, 1802, p. 688, Pl. 13 (fig. 3), Île de Ré, Bay of Biscay, France.

*Tetrapturus mitsukurii* non Jordan & Snyder, 1901 [a junior synonym of *Tetrapturus audax* (Philippi, 1887), a species that also occurs in the Hawaiian Islands]: Fowler (1928, 1931, in part).

*Makaira ampla* (Poey, 1860): Gosline & Brock (1960).

*Makaira mazara* (Jordan & Snyder, 1901): Nakamura (1985), Allen & Robertson (1994).

*Makaira nigricans* Lacépède, 1801: Jordan & Evermann (1926), Matsumoto & Kazama (1972), Naughton (1973), Tinker (1982), Randall *et al.* (1985a), Uchida & Uchiyama (1986).

**TAXONOMY:** Graves & McDowell (2003). There has been contention over whether the Atlantic and Indo-Pacific blue marlin populations are separate species as Nakamura (1985) concluded. Genetic evidence now suggests that Atlantic and Indo-Pacific blue marlin populations are a single, circumglobal species for which the oldest available name is *M. nigricans* Lacépède, 1801 (see Graves & McDowell, 1995, 2003).

**COMMON NAMES:** A'u (DLNR), Indo-Pacific blue marlin (FAO; Randall *et al.*, 1997a), Pacific blue marlin (DLNR), Kurokajiki (Gosline & Brock, 1960), Kajiki (DLNR).

**HAWAIIAN RECORDS:** Johnston Atoll and Hawai'i Island to Laysan at 1 m (Jordan & Evermann, 1926; Fowler, 1928; Matsumoto & Kazama, 1972; Naughton, 1973; Randall *et al.*, 1985b; Uchida & Uchiyama, 1986).

**GENERAL RANGE:** Circumsubtropical, with expatriates in warm, poleward extensions of ocean-basin boundary currents, between 45°N–45°S. Epipelagic, usually avoiding coastal waters, from 1–200 m (Nakamura, 1985).

***Tetrapturus angustirostris* Tanaka**

*Tetrapturus angustirostris* Tanaka, 1915, p. 324, pl. 88 (fig. 285), Sagami Sea at Funakata, Boshu Province, Japan.

*Tetrapturus illingworthi* Jordan & Evermann, 1926: Jordan & Evermann (1926), Fowler (1934).

*Tetrapturus brevirostris* non (Playfair in Playfair & Günther, 1867) [a junior synonym of *Makaira indica* (Cuvier, 1832), a species also found in the Hawaiian Islands]: Fowler (1928, in part).

*Tetrapturus angustirostris* Tanaka, 1915: Gosline & Brock (1960), Matsumoto & Kazama (1972), Naughton (1973), Tinker (1982), Nakamura (1985), Allen & Robertson (1994).

**TAXONOMY:** Nakamura (1985).

**COMMON NAMES:** A'u (DLNR), Shortbill spearfish (AFS; FAO; Randall *et al.*, 1997a), Shortnosed spearfish (DLNR), Indian fish (DLNR).

**HAWAIIAN RECORDS:** Hawai'i Island to Gardner at 1 m (Jordan & Evermann, 1926; Fowler, 1928; Matsumoto & Kazama, 1972; Naughton, 1973).

**GENERAL RANGE:** Southeastern Atlantic and Indo-transPacific between 40°N–45°S from South Africa and the Persian Gulf to Indonesia, central Japan, southern Australia, northern New Zealand, Micronesia, the Hawaiian Islands, French Polynesia, Easter Island, northern California, and northern Chile. Epipelagic in oceanic waters at 1–200 m (Nakamura, 1985).

***Tetrapturus audax* (Philippi)**

*Histiophorus audax* Philippi, 1887, p. 567 [35], pl. 8, Iquique, Chile.

*Tetrapturus mitsukurii* Jordan & Snyder, 1901: Jordan & Jordan (1922, in part), Fowler (1928, in part).

*Tetrapturus brevirostris* non (Playfair in Playfair & Günther, 1867) [a junior synonym of *Makaira indica* (Cuvier, 1832), a species also found in the Hawaiian Islands]: Fowler (1928, in part).

*Tetrapturus mazara* Jordan & Snyder, 1901 [here considered a junior synonym of *Makaira nigricans* Lacépède, a species also found in the Hawaiian Islands]: Fowler (1934, in part).

*Tetrapturus ectenes* Jordan & Evermann, 1926: Fowler (1934).

*Makaira audax* (Philippi, 1887): Gosline & Brock (1960).

*Tetrapturus audax* (Philippi, 1887): Naughton (1973), Tinker (1982), Nakamura (1985), Allen & Robertson (1994), Graves & McDowell (2003).

**TAXONOMY:** Nakamura (1985). Genetic evidence suggests that there is great similarity between the Atlantic white marlin, *T. albidus* Poey, 1860, and the Indo-Pacific striped marlin, *T. audax* Philippi, 1887, but that the two are distinct evolutionary lineages that should be recognized as separate species (see Graves & McDowell, 2003).

COMMON NAMES: A'u (DLNR), Striped marlin (AFS; FAO; Randall *et al.*, 1997a), Kajiki (Gosline & Brock, 1960), Naraigi (DLNR).

HAWAIIAN RECORDS: Hawai'i Island to O'ahu at 1 m (Jordan & Jordan, 1922; Fowler, 1928; Naughton, 1973).

GENERAL RANGE: Southeastern Atlantic and Indo-transPacific between 45°N–45°S from South Africa and the southern Red Sea to Indonesia, northern Japan, Tasmania, New Zealand, Micronesia, the Hawaiian Islands, French Polynesia, Easter Island, southern California, and northern Chile. Epipelagic in oceanic waters at 1–200 m (Nakamura, 1985).

### Xiphiinae

#### *Xiphias gladius* Linnaeus

*Xiphias gladius* Linnaeus, 1758, p. 248, "Habitat in Oceano Europae" [Atlantic].

*Xiphias gladius* Linnaeus, 1758: Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1931, 1949), Gosline & Brock (1960), Matsumoto & Kazama (1972), Tinker (1982), Nakamura (1985), Allen & Robertson (1994).

TAXONOMY: Nakamura (1985).

COMMON NAMES: A'u (DLNR), Swordfish (AFS; FAO; Randall *et al.*, 1997a), Broadbill (DLNR).

HAWAIIAN RECORDS: Hawai'i Island to Gardner Pinnacles and northward throughout the archipelago (Snyder, 1904; Jordan & Evermann, 1905; Matsumoto & Kazama, 1972).

GENERAL RANGE: Cosmopolitan between 60°N–50°S in all seas and oceans. Epi- and mesopelagic at 1–650 m (Nakamura, 1985).

### Stromateoidei

#### Amarsipidae

#### *Amarsipus carlsbergi* Haedrich

*Amarsipus carlsbergi* Haedrich, 1969, p. 8, Figs. 2–8, western Indian Ocean at 4°21'S, 42°56'E.

*Amarsipus carlsbergi* Haedrich, 1969: Haedrich (1969), Ahlstrom *et al.* (1976), Haedrich *in* Smith & Heemstra (1986), Konovalenko & Piotrovsky (1988).

TAXONOMY: Konovalenko & Piotrovsky (1988).

COMMON NAMES: Amarsipa.

HAWAIIAN RECORDS: Hawai'i Island to Maui near the surface (Ahlstrom *et al.*, 1976).

GENERAL RANGE: Indo-transPacific from South Africa, the Arabian Sea, and Ceylon to Indonesia, western Australia, the Philippines, New Guinea, Micronesia, the Hawaiian Islands, and central America. Benthopelagic at 12–130 m, juveniles epipelagic (Haedrich, 1969; Ahlstrom *et al.*, 1976; Haedrich *in* Smith & Heemstra, 1986; Konovalenko & Piotrovsky, 1988).

### Centrolophidae — Barrelfishes, Medusafishes

#### *Hyperoglyphe japonica* (Döderlein)

*Centrolophus japonicus* Döderlein *in* Steindachner & Döderlein, 1884, p. 183, Tokyo, Japan.

*Hyperoglyphe japonica* (Döderlein, 1884): Haedrich & Horn (1972), Iwai (1976), Randall (1980a), Novikov *et al.* (1981), Tinker (1982 appendix), Amaoka *in* Okamura *et al.* (1982), Humphreys *et al.* (1984), Masuda *et al.* (1984), Okamura (1985), Uchida & Uchiyama (1986), Borets (1986).

TAXONOMY: Haedrich & Horn (1972).

COMMON NAMES: Pacific barrelfish.

HAWAIIAN RECORDS: Pearl and Hermes Reef to the Hancock and Koko seamounts at 146–500 m (Iwai, 1976; Randall, 1981a; Novikov *et al.*, 1981; Uchida & Uchiyama, 1986; Borets, 1986).

GENERAL RANGE: Western and central North Pacific endemic from southern Japan, the Kyushu-Palau Ridge, the Emperor Seamounts, and the Northwestern Hawaiian Islands. Juveniles epipelagic under floating material at 1 m; adults meso- and benthopelagic at 146–500 m (Iwai, 1976; Amaoka *in* Oka-



mura *et al.*, 1982; Masuda *et al.*, 1984; Okamura *et al.*, 1985; Uchida & Uchiyama, 1986; Borets, 1986).

[*Psenopsis anomala* (Temminck & Schlegel)]

*Trachinotus anomalus* Temminck & Schlegel, 1844, p. 107, pl. 57 (fig. 2), “Seas of Japan”.

*Psenopsis anomala* (Temminck & Schlegel, 1844): Haedrich & Horn (1972), Humphreys *et al.* (1984), Yamada *et al.* (1984), Okamura (1985), Piotrovsky (1987).

TAXONOMY: Haedrich & Horn (1972), Piotrovsky (1987).

HAWAIIAN RECORDS: None but records from Koko Seamount (Humphreys *et al.*, 1984) suggest that it could occur at the Hancock Seamounts.

GENERAL RANGE: Western and central Pacific endemic from the East China Sea and southern Japan to the Emperor Seamounts. Epi- and mesopelagic at 1–370 m (Yamada *et al.*, 1984; Okamura *et al.*, 1985; Piotrovsky, 1987).

### Nomeidae — Driftfishes, Man-of-war fishes

#### *Cubiceps baxteri* McCulloch

*Cubiceps baxteri* McCulloch, 1923, p. 15, pl. 1 (fig. 4), Lord Howe Island, western South Pacific.

*Cubiceps caeruleus* non Regan, 1913 [a valid species not found in the Hawaiian Islands]: Ahlstrom *et al.* (1976), Loeb (1979).

*Cubiceps baxteri* McCulloch, 1923: Butler (1979), Haedrich *in* Quéro *et al.* (1990), Boehlert *et al.* (1992), Boehlert & Mundy (1992), Agafonova (1994).

TAXONOMY: Butler (1979), Agafonova (1994).

COMMON NAMES: Black cubiceps.

HAWAIIAN RECORDS: Johnston Atoll and Hawai‘i Island to the Hancock Seamounts at 1–100 m (Ahlstrom *et al.*, 1976; Butler, 1979; Boehlert *et al.*, 1992; Boehlert & Mundy, 1992; Agafonova, 1994). The *Cubiceps* species of Borets & Sokolovsky (1978) was not identified.

GENERAL RANGE: Antiequatorial transPacific endemic from central Japan and southeastern Australia to the Emperor Seamounts, the Hawaiian Islands, Baja California, and southern Chile. Epi- and mesopelagic at 1 to >100 m (Ahlstrom *et al.*, 1976; Haedrich *in* Quéro *et al.*, 1990; Agafonova, 1994).

#### *Cubiceps capensis* (Smith)

*Atimostoma capensis* Smith, 1845, no pagination, pl. 24, north of Cape Town, South Africa.

*Cubiceps* species A: Ahlstrom *et al.* (1976).

*Cubiceps capensis* (Smith, 1845): Agafonova (1994).

TAXONOMY: Agafonova (1994).

COMMON NAMES: Cape cubiceps.

HAWAIIAN RECORDS: The Hancock Seamounts at unrecorded depths (Agafonova, 1989).

GENERAL RANGE: Circumglobal between 40°N–40°S in the tropical through temperate Atlantic, Indian, and Pacific oceans. Epi- and mesopelagic (Ahlstrom *et al.*, 1976; Agafonova, 1994).

#### *Cubiceps paradoxus* Butler

*Cubiceps paradoxus* Butler, 1979, p. 235, Fig. 9, off Portuguese Bend, Los Angeles Co., California, U.S.A.

*Cubiceps* species B: Ahlstrom *et al.* (1976).

*Cubiceps paradoxus* Butler, 1979: Butler (1979), Agafonova (1994).

TAXONOMY: Butler (1979).

COMMON NAMES: Longfin cigarfish (AFS).

HAWAIIAN RECORDS: Kaua‘i at unrecorded depths (Agafonova, 1994). Records of *C. paradoxus* from 34°N, 155°W (Ahlstrom *et al.*, 1976; Butler, 1979) indicate that it occurs at the Hancock Seamounts.

GENERAL RANGE: Eastern and central North Pacific endemic, known from off central America, the Galapagos, Peru, and the Hawaiian Islands. Epi- and mesopelagic (Ahlstrom *et al.*, 1976; Agafonova, 1994).

***Cubiceps pauciradiatus* Günther**

*Cubiceps pauciradiatus* Günther, 1872b, p. 423, Misool [= Misol] Island, Irian Jaya, Indonesia.

*Cubiceps pauciradiatus* Günther, 1872b: Gosline & Brock (1960), Ahlstrom *et al.* (1976), Loeb (1979), Butler (1979), Tinker (1982), Fujii *in* Uyeno *et al.* (1983), Uchida & Uchiyama (1986), Salekhov (1989), Boehlert *et al.* (1992), Agafonova (1994).

TAXONOMY: Butler (1979).

COMMON NAMES: Bigeye cigarfish (AFS), Smallfin cubiceps, Small cigarfish.

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to the Hancock Seamounts at 1–357 m (Gosline & Brock, 1960; Ahlstrom *et al.*, 1976; Boehlert *et al.*, 1992; Agafonova, 1994).

GENERAL RANGE: Circumglobal between 42°N–36°S in the tropical through warm-temperate Atlantic, Pacific, and Indian oceans. Epi- and mesopelagic at 1–90 m at night, 200–660 m during day (Ahlstrom *et al.*, 1976; Fujii *in* Uyeno *et al.*, 1983; Uchida & Uchiyama, 1986; Salekhov, 1989; Agafonova, 1994).

***Nomeus gronovii* (Gmelin)**

*Gobius gronovii* Gmelin, 1789, p. 1205, "East Atlantic".

*Nomeus gronovii* (Gmelin, 1789): Fowler (1923, 1928), Gosline & Brock (1960), Ahlstrom *et al.* (1976), Tinker (1982), Haedrich *in* Whitehead *et al.* (1984), Suda *et al.* (1986), Kuitert (1993), Allen & Robertson (1994).

TAXONOMY: Suda *et al.* (1986).

COMMON NAMES: Man-of-war fish (AFS), Bluebottle fish.

HAWAIIAN RECORDS: Hawai'i Island to O'ahu at 1 m (Fowler, 1923, 1928; B. Mundy, pers. observ., 1999).

GENERAL RANGE: Circumglobal in the tropical and subtropical Atlantic, Indian, and Pacific oceans. Juveniles epipelagic at the surface under jellyfish, particularly the Portuguese-man-of-war (*Physalia* sp.), adults meso- and benthopelagic at 200–1000 m (Ahlstrom *et al.*, 1976; Haedrich *in* Whitehead *et al.*, 1984; Suda *et al.*, 1986; Kuitert, 1993; Allen & Robertson, 1994).

***Psenes arafurensis* Günther**

*Psenes arafurensis* Günther, 1889, p. 13, pl. 2 (fig. G), Arafura Sea.

*Psenes arafurensis* Günther, 1889: Fowler (1925, 1928), Gosline & Brock (1960), Ahlstrom *et al.* (1976), Loeb (1979), Tinker (1982), Masuda *et al.* (1984), Haedrich *in* Smith & Heemstra (1986), Haedrich *in* Quéro *et al.* (1990), Kuitert (1993).

TAXONOMY: Ahlstrom *et al.* (1976).

COMMON NAMES: Banded driftfish.

HAWAIIAN RECORDS: Maui to Gardner Pinnacles (Fowler, 1925, 1928; Ahlstrom *et al.*, 1976).

GENERAL RANGE: Circumglobal in the tropical and subtropical Atlantic, Indian, and Pacific oceans. Juveniles epi- and mesopelagic, often associated with jellyfish (Ahlstrom *et al.*, 1976; Masuda *et al.*, 1984; Haedrich *in* Smith & Heemstra, 1986; Haedrich *in* Quéro *et al.*, 1990; Kuitert, 1993).

***Psenes cyanophrys* Valenciennes**

*Psenes cyanophrys* Valenciennes *in* Cuvier & Valenciennes, 1833, p. 260, Pl. 265, New Ireland Island, Bismarck Archipelago, western South Pacific.

*Psenes cyanophrys* Valenciennes, 1833: Fowler (1928), Gosline & Brock (1960), Ahlstrom *et al.* (1976), Tinker (1982), Fujii *in* Uyeno *et al.* (1983), Haedrich *in* Smith & Heemstra (1986), Haedrich *in* Quéro *et al.* (1990), Allen & Robertson (1994 text but not photograph).

TAXONOMY: Ahlstrom *et al.* (1976).

COMMON NAMES: Freckled driftfish (AFS).

HAWAIIAN RECORDS: Maui to Kaua'i at 1 m (Gosline & Brock, 1960; Ahlstrom *et al.*, 1976).

GENERAL RANGE: Circumglobal in the tropical through warm temperate Gulf of Mexico, Atlantic, Indian, and Pacific oceans. Epi- and mesopelagic at 1–550 m, juveniles frequently beneath floating objects, especially *Physalia physalis* (Linnaeus, 1758) (see Ahlstrom *et al.*, 1976; Fujii *in* Uyeno *et al.*, 1983; Haedrich *in* Smith & Heemstra, 1986; Haedrich *in* Quéro *et al.*, 1990).

***Psenes maculatus* Lütken**

*Psenes maculatus* Lütken, 1880, p. 518 [110], 601, Pl. 5 (fig. 2), Atlantic Ocean at 39°N, 25°04'W and 34°40'–27°26'W.

*Psenes maculatus* Lütken, 1880: Ahlstrom *et al.* (1976), Haedrich *in* Whitehead *et al.* (1984), Masuda *et al.* (1984), Haedrich *in* Smith & Heemstra (1986), Haedrich *in* Quéro *et al.* (1990), Kuiter (1993).

TAXONOMY: Ahlstrom *et al.* (1976).

COMMON NAMES: Silver driftfish (AFS), Blue driftfish.

HAWAIIAN RECORDS: Larvae tentatively identified as this species have been found at O'ahu and the Hancock Seamounts (B. Mundy, unpubl. data).

GENERAL RANGE: Antitropical in the temperate Atlantic, Indian, and North Pacific oceans. Epi- and mesopelagic, juveniles frequently associated with jellyfish (Ahlstrom *et al.*, 1976; Haedrich *in* Whitehead *et al.*, 1984; Masuda *et al.*, 1984; Haedrich *in* Smith & Heemstra, 1986; Haedrich *in* Quéro *et al.*, 1990; Kuiter, 1993).

### *Psenes pellucidus* Lütken

*Psenes pellucidus* Lütken, 1880, p. 516 [108], 610, Fig. (p. 516), Surabaya Strait, Java, Indonesia.

*Psenes pellucidus* Lütken, 1880: Ahlstrom *et al.* (1976), Borets & Sokolovsky (1978), Haedrich *in* Whitehead *et al.* (1984), Haedrich *in* Smith & Heemstra (1986).

TAXONOMY: Ahlstrom *et al.* (1976).

COMMON NAMES: Bluefin driftfish (AFS).

HAWAIIAN RECORDS: Borets & Sokolovsky (1978) reported this species from the Hawaiian Ridge but did not give a specific locality of capture. Larvae tentatively identified as this species have been found off O'ahu (B. Mundy, unpubl. data).

GENERAL RANGE: Circumtropical and subtropical in the Atlantic, Indian, and Pacific oceans. Epi-, meso- and benthopelagic, juveniles frequently associated with jellyfish (Ahlstrom *et al.*, 1976; Haedrich *in* Whitehead *et al.*, 1984; Haedrich *in* Smith & Heemstra, 1986).

## Ariommatidae — Ariommatids

### *Ariomma brevipanum* (Klunzinger)

*Cubiceps brevipanum* Klunzinger, 1884, p. 116, pl. 12 (fig. 3), Al-Quseir [Kosseir], Egypt, Red Sea.

*Ariomma evermanni* Jordan & Snyder, 1907: Jordan & Snyder (1907), Gosline & Brock (1960), Tinker (1982), Masuda *et al.* (1984), Myers & Donaldson (1996).

*Cubiceps thompsoni* Fowler, 1923: Fowler (1923, 1928), Jordan *et al.* (1927).

*Cubiceps evermanni* (Jordan & Snyder, 1907): Fowler (1934, 1949).

*Ariomma lurida* non Jordan & Snyder, 1904 [a valid species also found in the Hawaiian Islands]: Fowler (1928, in part).

*Ariomma brevipanum* (Klunzinger, 1884): Masuda *et al.* (1984).

*Ariomma brevipanum* (Klunzinger, 1884): Karrer (1984).

TAXONOMY: Karrer (1984).

HAWAIIAN RECORDS: Hawai'i Island to O'ahu (Jordan & Snyder, 1907; Fowler, 1928; Tinker, 1982).

GENERAL RANGE: Indo-Pacific from the Red Sea to Indonesia, Japan, the Mariana Islands, and the Hawaiian Islands. Depths unrecorded (one at 18 m over deeper water), probably epi- and mesobenthopelagic (Masuda *et al.*, 1984; Karrer, 1984; Myers & Donaldson, 1996).

### *Ariomma luridum* Jordan & Snyder

*Ariomma lurida* Jordan & Snyder, 1904b, p. 943, Honolulu, O'ahu, Hawaiian Islands.

*Ariomma lurida* Jordan & Snyder, 1904b: Jordan & Snyder (1904b), Jordan & Evermann (1905, in Apogonidae), Fowler (1928, in part), Gosline & Brock (1960), Struhsaker (1973a), Tinker (1982), Humphreys *et al.* (1984), Okamura (1985), Uchida & Uchiyama (1986), Borets (1986).

*Ariomma luridum* Jordan & Snyder, 1904b: Haedrich (1967, 1968), Karrer (1984), Parin (1991).

TAXONOMY: Haedrich (1967, 1968), Karrer (1984).

HAWAIIAN RECORDS: Maui to the Hancock and Koko seamounts at 37–400 (Jordan & Snyder, 1904b; Jordan & Evermann, 1905; Struhsaker, 1973a; Tinker, 1982; Humphreys *et al.*, 1984; Uchida & Uchiyama, 1986; Borets, 1986).

GENERAL RANGE: Atlantic and Pacific oceans from the Caribbean Sea, tropical eastern Atlantic, Japan, the Kermadec Islands, the Hawaiian Islands, and the southeastern Pacific. Epi- and mesobenthopelagic at 37–400 m (Struhsaker, 1973a; Tinker, 1982; Karrer, 1984; Okamura *et al.*, 1985; Borets, 1986; Parin, 1991).

**Tetragonuridae — Squaretails*****Tetragonurus atlanticus* Lowe**

*Tetragonurus atlanticus* Lowe, 1839, p. 79, off Madeira, eastern North Atlantic.

*Tetragonurus atlanticus* Lowe, 1839: Grey (1955), Ahlstrom *et al.* (1976), Loeb (1979), Haedrich *in* Whitehead *et al.* (1984), Haedrich *in* Smith & Heemstra (1986), Haedrich *in* Quéro *et al.* (1990), Boehlert & Mundy (1992).

TAXONOMY: Ahlstrom *et al.* (1976).

COMMON NAMES: Bigeye squaretail (AFS).

HAWAIIAN RECORDS: Hawai'i Island to the Hancock Seamounts at 1–200 m (Ahlstrom *et al.*, 1976; Boehlert & Mundy, 1992).

GENERAL RANGE: Circumglobal in the tropical through temperate Atlantic, Indian, and Pacific oceans. Juveniles epipelagic, adults mesopelagic at 1–800 m (Grey, 1955; Ahlstrom *et al.*, 1976; Haedrich *in* Whitehead *et al.*, 1984; Haedrich *in* Smith & Heemstra, 1986; Haedrich *in* Quéro *et al.*, 1990).

***Tetragonurus cuvieri* Risso**

*Tetragonurus cuvieri* Risso, 1810, p. 347, pl. 10 (fig. 37), Nice, France.

*Tetragonurus cuvieri* Risso, 1810: Fowler (1928), Grey (1955), Gosline & Brock (1960), Ahlstrom *et al.* (1976), Borets & Sokolovsky (1978), Novikov *et al.* (1981), Tinker (1982), Haedrich *in* Whitehead *et al.* (1984), Haedrich *in* Smith & Heemstra (1986), Haedrich *in* Quéro *et al.* (1990), Boehlert & Mundy (1992).

TAXONOMY: Ahlstrom *et al.* (1976).

COMMON NAMES: Smalleye squaretail (AFS).

HAWAIIAN RECORDS: Hawai'i Island to the Hancock and Milwaukee Seamounts at 1–200 m (Fowler, 1928; Novikov *et al.*, 1981; Boehlert & Mundy, 1992).

GENERAL RANGE: Perhaps antiequatorial in the tropical through warm-temperate Mediterranean Sea, Atlantic, and Pacific oceans. Juveniles epipelagic, adults mesopelagic at 1–800 m (Grey, 1955; Ahlstrom *et al.*, 1976; Haedrich *in* Whitehead *et al.*, 1984; Haedrich *in* Smith & Heemstra, 1986; Haedrich *in* Quéro *et al.*, 1990).

***Tetragonurus pacificus* Abe**

*Tetragonurus pacificus* Abe, 1953, p. 45, Figs. 5–6, west of the Solomon Islands at 6°36.5'S, 152°29'E.

*Tetragonurus pacificus* Abe, 1953: Grey (1955), Ahlstrom *et al.* (1976), Haedrich *in* Smith & Heemstra (1986).

TAXONOMY: Ahlstrom *et al.* (1976).

HAWAIIAN RECORDS: Hawai'i Island to Maui (Ahlstrom *et al.*, 1976).

GENERAL RANGE: Indo-Pacific from the Seychelles and Sri Lanka to Indonesia, the Solomon Islands, the Tokelau Islands, the Hawaiian Islands, and the central equatorial Pacific but not the eastern Pacific. Juveniles epipelagic, adults probably mesopelagic (Grey, 1955; Haedrich *in* Smith & Heemstra, 1986).

**Stromateidae****[*Pampus argenteus* (Euphrasen)]**

*Stromateus argenteus* Euphrasen, 1788, p. 53, pl. 9, “Castellum Chinense Boca Tigris”.

*Pampus*: Springer (1982).

*Pampus argenteus* (Euphrasen, 1788): Fowler (1938), Haedrich (1967), Randall (1995c), Last (2001).

TAXONOMY: Haedrich (1967), Randall (1995c), Last (2001).

COMMON NAMES: Silver pomfret.

HAWAIIAN RECORDS: Fowler (1938b) listed two specimens of *Pampus argenteus* from Honolulu but speculated that these were so far from the known range of the species that they might have been “introduced” (the sense in which Fowler used this term is unclear). Haedrich (1967) and Springer (1982) also questioned the validity of this record, but Last (2001) included the Hawaiian Islands within the range of this species without comment. There are no records of it from the Pacific Plate other than that of Fowler (1938) and it is not here considered to occur in the Hawaiian Islands.

GENERAL RANGE: An Indo-West Pacific continental-shelf species known from the Arabian Gulf to India,

Indonesia, Borneo, the Philippines and southern Japan, but not south to Australia or New Guinea, at 5–80 m. Apparently a Lessepsian migrant to the Adriatic Sea, with an extralimital report from the North Sea (Haedrich, 1967; Randall, 1995c; Last, 2001).

### Anabantoidei

#### Belontiidae — Gouramies<sup>65</sup>

##### [*Trichogaster leerii* (Bleeker)]

*Trichopus leerii* Bleeker, 1852b, p. 577, Palembang, Sumatra, Indonesia.

*Trichogaster leerii* (Bleeker, 1852b): Brock (1960), Maciolek (1984), Roberts (1989), Kottelat (1989), Kottelat *et al.* (1993), Fuller *et al.* (1999).

TAXONOMY: Kottelat *et al.* (1993).

COMMON NAMES: Pearl gourami (AFS).

HAWAIIAN RECORDS: Introduced to O‘ahu in 1940, this species failed to become established (Brock, 1960; Maciolek, 1984; Fuller *et al.*, 1999).

GENERAL RANGE: Indigenous to Sumatra, Borneo, the Malay Peninsula, and perhaps Thailand; widely introduced elsewhere. Benthopelagic in shallow, lentic freshwaters (Roberts, 1989; Kottelat, 1989; Kottelat *et al.*, 1993; Fuller *et al.*, 1999).

#### Osphronemidae — Giant gouramies

##### [*Osphronemus goramy* Lacépède]

*Osphronemus goramy* Lacépède, 1801, p. 116, 117, pl. 8 (fig. 2), Mauritius, western Indian Ocean; China; and Jakarta [Batavia], Java, Indonesia.

*Osphronemus goramy* Lacépède, 1801: Brock (1960), Maciolek (1984), Roberts (1989, 1994), Kottelat *et al.* (1993), Fuller *et al.* (1999).

TAXONOMY: Kottelat *et al.* (1993), Roberts (1994).

COMMON NAMES: Gourami (AFS).

HAWAIIAN RECORDS: Introduced to O‘ahu from the Philippines in 1950, this species failed to become established (Brock, 1960; Maciolek, 1984; Fuller *et al.*, 1999).

GENERAL RANGE: Indigenous to Sumatra, Borneo, and Java; widely introduced elsewhere. Benthopelagic in shallow, lentic freshwaters (Roberts, 1989, 1994; Kottelat *et al.*, 1993; Fuller *et al.*, 1999).

### Channoidei

#### Channidae — Snakeheads

##### *Channa maculata* (Lacépède)

*Bostrychus maculatus* Lacépède, 1801, p. 140, 143, no type locality given; no types known.

*Ophicephalus striatus* non Bloch, 1793 [a valid *Channa* species known in the Hawaiian Islands from captive stocks in aquaculture operations and aquaria]: Jordan & Evermann (1905), Fowler (1928), Maciolek (1984), Devick (1991).

*Ophicephalus striatus* non (Bloch, 1793) [a frequently seen misspelling of *Ophicephalus*]: Brock (1960).

*Channa striata* (Bloch, 1793): Roberts (1989), Kottelat (1989), Kottelat *et al.* (1993), Fuller *et al.* (1999), Yamamoto & Tagawa (2000).

*Channa maculata* (Lacépède, 1801): Masuda *et al.* (1984), Tummons (2003), Courtenay & Williams (2004), Courtenay *et al.* (2004).

TAXONOMY: Masuda *et al.* (1984). This species has been misidentified as *Channa striata* in all of the literature on Hawaii’s fishes and its true identity was only recently determined (J.E. Randall, pers. comm., Oct. 2002; W. Courtenay, pers. comm., Oct. 2002; Courtenay & Williams, 2004; Courtenay *et al.*, 2004).

COMMON NAMES: I‘a Pākē, Pongee (DLNR), Panchon (DLNR), Chevron snakehead (all from Yamamoto & Tagawa, 2000; the AFS name for *C. striata* Bloch), Snake head (DLNR), Blotched snakehead.

HAWAIIAN RECORDS: Introduced prior to 1900. *Channa maculata* is established in reservoirs on the north-

ern part of O'ahu and is abundant in the Wahiawā Reservoir where it is a popular catch among sport-fishermen (Jordan & Evermann, 1905; Devick, 1991; Fuller *et al.*, 1999; Yamamoto & Tagawa, 2000; Tummons, 2003, Courtenay & Williams, 2004; Courtenay *et al.*, 2004). The true *C. striata* is also present in Hawai'i in aquaculture facilities, but as of Feb. 2003 has not been found released into open waters of the state (W. Courtenay, pers. comm., Oct. 2002; Tummons, 2003; Courtenay & Williams, 2004; Courtenay *et al.*, 2004).

GENERAL RANGE: Indigenous to southeastern Asia from southern China and Vietnam to Hainan Island, Taiwan, and the Philippines. Introduced to Japan and the Hawaiian Islands. Engybenthic in shallow, lentic freshwaters (Masuda *et al.*, 1984).

## Pleuronectiformes Pleuronectoidei

### Bothidae — Lefteye flounders<sup>66</sup>

#### *Arnoglossus debilis* (Gilbert)

*Anticitharus debilis* Gilbert, 1905, p. 683, pl. 97, Pailolo Channel between Moloka'i and Maui Islands, Hawaiian Islands.

*Anticitharus debilis* Gilbert, 1905: Gilbert (1905), Fowler (1928).

*Arnoglossus debilis* (Gilbert, 1905): Norman (1934), Fowler (1949), Gosline & Brock (1960), Struhsaker (1973a), Tinker (1982), Humphreys *et al.* (1984), Uchida & Uchiyama (1986), Hensley & Amaoka (2001).

TAXONOMY: Norman (1934).

HAWAIIAN RECORDS: Hawai'i Island to the Hancock Seamounts at 183–402 m (Gilbert, 1905; Norman, 1934; Struhsaker, 1973a; Humphreys *et al.*, 1984; Uchida & Uchiyama, 1986).

GENERAL RANGE: Western and central Pacific Ocean from Indonesia, the Line Islands, and the Hawaiian Islands. Benthic at 150–440 m (Norman, 1934; Struhsaker, 1973a; Uchida & Uchiyama, 1986; Hensley & Amaoka, 2001).

#### *Asterorhombus filifer* Hensley & Randall

*Asterorhombus filifer* Hensley & Randall, 2003, p. 2, Figs. 1–3, Midway Atoll, Hawaiian Islands.

*Asterorhombus* species: Randall *et al.* (1993b), Myers (1999)?

*Asterorhombus filifer* Hensley & Randall, 2003: Hensley & Randall (2003).

TAXONOMY: Randall *et al.* (1993b), Myers (1999), Hensley & Randall (2003).

HAWAIIAN RECORDS: O'ahu to Midway at 13–21 m (Randall *et al.*, 1993b; R. Holcom, pers. comm., 1998, B. Mundy, pers. observ., July 2001; Hensley & Randall, 2003).

GENERAL RANGE: Indo-Pacific from South Africa, Mauritius, the Comoro Islands, and the Seychelles to the Great Barrier Reef, the Coral Sea, New Caledonia, the Philippines, Micronesia, the Hawaiian Islands, and the Society Islands. Benthic on sand or rubble near reefs, often at gullies or cave entrances, at 3–57 m (Myers, 1999; Hensley & Randall, 2003).

#### *Bothus mancus* (Broussonet)

*Pleuronectes mancus* Broussonet, 1782, p. [19], pls. [3–4], Ulitea near Anamoka, Tahiti, Society Islands.

*Platophrys mancus* (Broussonet, 1782): Smith & Swain (1882), Jordan & Snyder (1904a), Gilbert (1905), Jordan & Evermann (1905), Fowler (1928, 1931, 1934).

*Platophrys pavo* (Bleeker, 1855): Steindachner (1900).

*Bothus mancus* (Broussonet, 1782): Norman (1934), Fowler (1949), Gosline & Brock (1960), Amaoka (1969), Hobson (1974), Tinker (1982), Okamoto & Kanenaka (1984), Randall (1985a, 1996a), Randall *et al.* (1985a, 1993b, 1997a), Hensley *in* Smith & Heemstra (1986), Myers (1989), Winterbottom *et al.* (1989), Hensley & Suzumoto (1990), Hoover (1993), Allen & Robertson (1994), Robertson & Allen (2002).

TAXONOMY: Norman (1934), Amaoka (1969), Hensley & Suzumoto (1990).

COMMON NAMES: Pāki'i (Hoover, 1993, 2003; Randall, 1996a), Paku (Gosline & Brock, 1960), 'Ui'ui (Gosline & Brock, 1960), Tropical flounder (AFS), Peacock flounder (Hoover, 1993, 2003), Many-ray flatfish (Hoover, 1993, 2003), Flowery flounder (Randall *et al.*, 1997a; Randall, 1996a; Myers, 1999).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 1–256 m (Smith & Swain, 1882; Gilbert, 1905; Jordan & Evermann, 1905; Tinker, 1982; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b).

GENERAL RANGE: Indo-transPacific from South Africa and the Red Sea to the Ryukyu and Ogasawara Islands, Lord Howe Island, Micronesia, the Hawaiian Islands, Easter Island, the offshore eastern tropical Pacific islands, and the tip of Baja California to Costa Rica. Benthic on sand or rock near sand at 1–256 m (Hobson, 1974; Tinker, 1982; Hensley *in* Smith & Heemstra, 1986; Myers, 1989; Winterbottom *et al.*, 1989; Hensley & Suzumoto, 1990; Randall *et al.*, 1993b, 1997b; Allen & Robertson, 1994; Robertson & Allen, 2002).

COMMENTS: *Achirus pellucidus* Bennett, 1840, was described based on two specimens from 27°N, 170°W, north of Maro Reef, Hawaiian Islands, and “about a day’s sail from the Marquesas Group”. These specimens were larvae, and were almost certainly *Bothus* species, based on the circular body shape, eyes on the left side of the body, size of the specimens, and pinkish lines on the otherwise transparent body (the statement that pectoral fins were absent is probably an error). It is impossible to determine which species they were, based on Bennett’s (1840) description. Fowler (1928) repeated Bennett’s description without further information. Otherwise, no references to *A. pellucidus* have been found, except that the identity of *A. pellucidus* Bennett was not determined for Eschmeyer’s (1998) catalog of fishes and the website updating that catalog (<http://www.calacademy.org/research/ichthyology/catalog/fishcatmain.asp>).

### ***Bothus pantherinus* (Rüppell)**

*Rhombus pantherinus* Rüppell, 1830, p. 121, pl. 31 (fig. 1), Mohila, Red Sea.

*Rhombus pantherinus* Rüppell, 1830: Streets (1877).

*Rhomboidichthys pantherinus* (Rüppell, 1830): Streets (1877), Günther (1880).

*Platophrys pantherinus* (Rüppell, 1830): Steindachner (1900), Jenkins (1903), Jordan & Evermann (1905), Fowler (1928, 1931, 1934).

*Platophrys panterinus* (Rüppell, 1830) [*lapsus* for *pantherinus*]: Borodin (1930).

*Bothus pantherinus* (Rüppell, 1830): Norman (1934), Fowler (1949), Gosline & Brock (1960), Amaoka (1969), Struhsaker (1973a), Tinker (1982), Randall (1985a, 1996a), Uchida & Uchiyama (1986), Hensley *in* Smith & Heemstra (1986), Myers (1989), Winterbottom *et al.* (1989), Randall *et al.* (1993b, 1997a), Hoover (2003).

TAXONOMY: Norman (1934), Amaoka (1969).

COMMON NAMES: Pāki'i (Randall, 1996a), Paku (Gosline & Brock, 1960), 'Ui'ui (Gosline & Brock, 1960), Leopard flounder (AFS), Panther flounder (Hoover, 1993; Randall *et al.*, 1997a; Randall, 1996a).

HAWAIIAN RECORDS: Hawai'i Island to Kure Atoll at 1–338 m (Streets, 1877a; Jordan & Evermann, 1905; Struhsaker, 1973a; Tinker, 1982; Uchida & Uchiyama, 1986; Randall *et al.*, 1993b).

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to the Cocos-Keeling Islands, southern Japan, the Ogasawara Islands, Lord Howe Island, Micronesia, the Hawaiian Islands, the Society Islands, and the Marquesas. Benthic on sand and rock near sand at 1–338 m (Uchida & Uchiyama, 1986; Hensley *in* Smith & Heemstra, 1986; Myers, 1989; Winterbottom *et al.*, 1989; Randall *et al.*, 1997b).

### ***Bothus thompsoni* (Fowler)**

*Platophrys thompsoni* Fowler, 1923, p. 388, Honolulu, O'ahu, Hawaiian Islands.

*Platophrys thompsoni* Fowler, 1923: Fowler (1923, 1928).

*Bothus bleekeri* non Steindachner, 1861 [a valid species not found in the Hawaiian Islands]: Gosline & Brock (1960, in part).

*Bothus* sp. (poss. *bleekeri*) non Steindachner, 1861: Loeb (1979)?

*Bothus thompsoni* (Fowler, 1923): Struhsaker (1973a), Struhsaker & Moncrief (1974), Randall (1976a, 1985a), Tinker (1982), Uchida & Uchiyama (1986).

TAXONOMY: Struhsaker & Moncrief (1974).

HAWAIIAN RECORDS: Maui to Maro Reef at 66–113 m (Fowler, 1923, 1928; Struhsaker, 1973a; Struhsaker & Moncrief, 1974; Uchida & Uchiyama, 1986).

GENERAL RANGE: Hawaiian Islands endemic. Benthic at 66–113 m (Struhsaker, 1973a; Struhsaker & Moncrief, 1974; Uchida & Uchiyama, 1986).

***Chascanopsetta crumenalis*** (Gilbert & Cramer)

*Pelecanichthys crumenalis* Gilbert & Cramer, 1897, p. 433, pl. 47, off the Hawaiian Islands.

*Pelecanichthys crumenalis* Gilbert & Cramer, 1897: Gilbert & Cramer (1897), Gilbert (1905), Jordan & Evermann (1905), Fowler (1928, 1934, 1949), Gosline & Brock (1960), Struhsaker (1973a), Tinker (1982).

*Chascanopsetta crumenalis* (Gilbert & Cramer, 1897): Amaoka & Parin (1990), Foroshchuk (1991).

TAXONOMY: Amaoka & Parin (1990), Foroshchuk (1991).

HAWAIIAN RECORDS: Hawai'i Island to O'ahu at 335–686 m (Gilbert & Cramer, 1897; Gilbert, 1905; Gosline & Brock, 1960; Struhsaker, 1973a; Amaoka & Parin, 1990).

GENERAL RANGE: Indo-Pacific? Long thought to be a Hawaiian Islands endemic, but a specimen tentatively identified as this species has been collected off Madagascar (J.E. Randall, pers. comm., 1 Nov. 1996). Benthic on sand at 335–686 m (Gilbert, 1905; Struhsaker, 1973a; Amaoka & Parin, 1990; Foroshchuk, 1991).

***Chascanopsetta prorigera*** Gilbert

*Chascanopsetta prorigera* Gilbert, 1905, p. 689, Fig. 271, off the north coast of Maui, Hawaiian Islands.

*Chascomopsetta prorigera* Gilbert, 1905 [*lapsus* for *Chascanopsetta*]: Fowler (1928).

*Chascanopsetta prorigera* Gilbert, 1905: Gilbert (1905), Fowler (1949), Gosline & Brock (1960), Struhsaker (1973a), Tinker (1982), Borets (1983), Humphreys *et al.* (1984), Amaoka & Yamamoto (1984), Uchida & Uchiyama (1986), Borets (1986), Robins *et al.* (1986), Foroshchuk (1991), Chave & Mundy (1994), Hensley & Smale (1998).

TAXONOMY: Amaoka & Yamamoto (1984), Foroshchuk (1991), Hensley & Smale (1998).

HAWAIIAN RECORDS: Hawai'i Island to the Hancock and Koko seamounts at 66–450 m (Gilbert, 1905; Struhsaker, 1973a; Borets, 1983; Humphreys *et al.*, 1984; Uchida & Uchiyama, 1986; Borets, 1986; Chave & Mundy, 1994).

GENERAL RANGE: Disjunct, known from the Hawaiian Islands, the southern Emperor Seamounts, and the western North Atlantic and Gulf of Mexico from North Carolina to northern South America. Benthic on sand at 66–457 m (Struhsaker, 1973a; Borets, 1983; Uchida & Uchiyama, 1986; Borets, 1986; Robins *et al.*, 1986; Foroshchuk, 1991; Chave & Mundy, 1994; Hensley & Smale, 1998).

***Engyprosopon arenicola*** Jordan & Evermann

*Engyprosopon arenicola* Jordan & Evermann, 1903a, p. 207, Hilo, Hawai'i Island.

*Engyprosopon hawaiiensis* non Jordan & Evermann, 1903a [a valid endemic Hawaiian species]: Gosline & Brock (1960, in part), Tinker (1982, in part).

*Engyprosopon arenicola* Jordan & Evermann, 1903a: Jordan & Evermann (1903a, 1905), Fowler (1928), Norman (1934), Fowler (1949), Gosline (1965), Randall (1976a), Hensley & Suzumoto (1990).

TAXONOMY: Hensley & Suzumoto (1990) commented that this species might not belong in *Engyprosopon*.

HAWAIIAN RECORDS: Hawai'i Island at shallow depths in the surge zone (Jordan & Evermann, 1903a, 1905; Gosline, 1965).

GENERAL RANGE: Central Pacific endemic known from the Hawaiian Islands and Easter Island. Benthic in shallow water of the surge zone (Jordan & Evermann, 1903a, 1905; Norman, 1934; Gosline, 1965; Hensley & Suzumoto, 1990).

***Engyprosopon hawaiiensis*** Jordan & Evermann

*Engyprosopon hawaiiensis* Jordan & Evermann, 1903a, p. 207, Hilo, Hawai'i Island.

*Engyprosopon hawaiiensis* Jordan & Evermann, 1903a: Jordan & Evermann (1903a, 1905), Gilbert (1905), Fowler (1928, 1949), Gosline & Brock (1960, in part), Randall (1976a), Tinker (1982, in part), Hensley & Suzumoto (1990), Randall *et al.* (1993b).

TAXONOMY: Hensley & Suzumoto (1990).

HAWAIIAN RECORDS: Hawai'i Island to Midway at 1–26 m (Jordan & Evermann, 1903a, 1905; Gilbert, 1905; Tinker, 1982; Randall *et al.*, 1993b).

GENERAL RANGE: Hawaiian Islands endemic. Benthic on sand at 1–26 m (Jordan & Evermann, 1903a, 1905; Gilbert, 1905; Tinker, 1982; Randall *et al.*, 1993b).



***Engyprosopon xenandrus* Gilbert**

*Engyprosopon xenandrus* Gilbert, 1905, p. 687, Fig. 270, off the south coast of Moloka'i, Hawaiian Islands.

*Scaeops xenandrus* (Gilbert, 1905): Fowler (1928).

*Engyprosopon xenandrus* Gilbert, 1905: Gilbert (1905), Fowler (1949), Gosline & Brock (1960), Struhsaker (1973a), Tinker (1982), Hensley & Randall (1990).

TAXONOMY: Hensley & Randall (1990).

HAWAIIAN RECORDS: Hawai'i Island to Laysan at 13–201 m, 55–583 m fishing depths (Gilbert, 1905; Struhsaker, 1973a; J.E. Randall, pers. comm., Feb. 2003).

GENERAL RANGE: Hawaiian Islands endemic. Benthic on sand at 13–201 m, 55–583 m fishing depths (Gilbert, 1905; Struhsaker, 1973a; J.E. Randall, pers. comm., Feb. 2003).

***Parabothus chlorospilus* (Gilbert)**

*Platophrys chlorospilus* Gilbert, 1905, p. 684, Fig. 267, off the north coast of Maui, Hawaiian Islands.

*Platophrys inermis* Gilbert, 1905: Gilbert (1905).

*Platophrys chlorospilus* Gilbert, 1905: Gilbert (1905), Fowler (1928).

*Parabothus chlorospilus* (Gilbert, 1905): Fowler (1949), Gosline & Brock (1960), Amaoka (1969), Struhsaker (1973a), Novikov *et al.* (1981), Tinker (1982), Uchida & Uchiyama (1986), Amaoka & Shen (1993).

TAXONOMY: Amaoka (1969), Amaoka & Shen (1993).

HAWAIIAN RECORDS: Hawai'i Island to Laysan and Koko Seamount at 122–355 m (Gilbert, 1905; Gosline & Brock, 1960; Struhsaker, 1973a; Novikov *et al.*, 1981; Uchida & Uchiyama, 1986).

GENERAL RANGE: Hawaiian Islands and Emperor Seamounts endemic. Benthic at 122–355 m (Gilbert, 1905; Gosline & Brock, 1960; Struhsaker, 1973a; Novikov *et al.*, 1981; Uchida & Uchiyama, 1986; Amaoka & Shen, 1993).

***Parabothus coarctatus* (Gilbert)**

*Platophrys coarctatus* Gilbert, 1905, p. 686, Fig. 269, Pailolo Channel between Moloka'i and Maui, Hawaiian Islands.

*Platophrys coarctatus* Gilbert, 1905: Gilbert (1905), Fowler (1928).

*Parabothus coarctatus* (Gilbert, 1905): Fowler (1949), Gosline & Brock (1960), Amaoka (1969), Struhsaker (1973a), Iwai (1976), Tinker (1982), Okamura *et al.* (1982), Borets (1983), Humphreys *et al.* (1984), Masuda *et al.* (1984), Uchida & Uchiyama (1986), Borets (1986), Tsukamoto *et al.* (1991), Amaoka & Shen (1993), Chave & Mundy (1994), Amaoka *et al.* (1997).

TAXONOMY: Amaoka (1969), Tsukamoto *et al.* (1991), Amaoka & Shen (1993).

HAWAIIAN RECORDS: Hawai'i Island to the Hancock and Koko seamounts at 130–500 m (Gilbert, 1905; Struhsaker, 1973a; Iwai, 1976; Borets, 1983; Humphreys *et al.*, 1984; Uchida & Uchiyama, 1986; Borets, 1986; Chave & Mundy, 1994).

GENERAL RANGE: Western and central Pacific from the Coral Sea and New Caledonia to the South China Sea, southern Japan, the Kyushu-Palau Ridge, the Emperor Seamounts and the Hawaiian Islands. Benthic on sand at 130–580 m (Gilbert, 1905; Okamura *et al.*, 1982; Borets, 1983; Masuda *et al.*, 1984; Borets, 1986; Amaoka & Shen, 1993; Chave & Mundy, 1994; Amaoka *et al.*, 1997).

***Taeniopsetta radula* Gilbert**

*Taeniopsetta radula* Gilbert, 1905, p. 680, Fig. 266, Pailolo Channel between Moloka'i and Maui, Hawaiian Islands.

*Taeniopsetta ocellatus* non (Günther, 1880) [a valid species not found in the Hawaiian Islands]: Fowler (1928, in part).

*Taeniopsetta radula* Gilbert, 1905: Gilbert (1905), Norman (1934), Fowler (1949), Gosline & Brock (1960), Struhsaker (1973a), Tinker (1982), Uchida & Uchiyama (1986), Chave & Mundy (1994).

TAXONOMY: Norman (1934).

HAWAIIAN RECORDS: Hawai'i Island to Laysan at 65–402 m (Gilbert, 1905; Struhsaker, 1973a; Uchida & Uchiyama, 1986; Chave & Mundy, 1994).

GENERAL RANGE: Hawaiian Islands endemic. Benthic on sand at 65–402 m (Gilbert, 1905; Norman, 1934; Struhsaker, 1973a; Chave & Mundy, 1994).

**Pleuronectidae — Righteye flounders****[*Microstomus shuntovi* Borets]**

*Microstomus shuntovi* Borets, 1983, p. 718, Fig., Koko Seamount, Emperor Seamounts, central North Pacific, at 35°17'N, 171°19'E.

*Embassichthys* species: Novikov *et al.* (1981)?

*Microstomus pacificus* non (Lockington, 1879) [a valid species not found in the Hawaiian Islands]: Humphreys *et al.* (1984).

*Microstomus shuntovi* Borets, 1983: Borets (1983, 1986).

TAXONOMY: Borets (1983).

HAWAIIAN RECORDS: Records of this species from the Colahan Koko seamounts at 270–375 m (Borets, 1983, 1986) suggest that it could occur at the Hancock Seamounts as well. It is likely that specimens reported from the southern Emperor Seamounts as *Embassichthys* sp. by Novikov *et al.* (1981) and *Microstomus pacificus* by Humphreys *et al.* (1984) were this species. *Embassichthys bathybius* (Gilbert, 1890), the only species in its genus, is a deepwater (320–1370 m) transPacific species that is found in boreal waters of continental shelves (Amaoka *et al.*, 1981). (Cooper & Chapleau (1998) considered it to be the sister species of the *Microstomus* species and included *E. bathybius* in an expanded *Microstomus*, a decision that is likely correct but which has not yet been adopted in other publications.) The occurrence of *E. bathybius* at the Emperor Seamounts cannot be completely discounted, but its similarity to *M. shuntovi* suggests that the specimen from Milwaukee was the latter species.

GENERAL RANGE: Northern Hawaiian Ridge and Emperor Seamounts endemic. Benthic at 270–375 m (Borets, 1983, 1986).

***Poecilopsetta hawaiiensis* Gilbert**

*Poecilopsetta hawaiiensis* Gilbert, 1905, p. 679, pl. 95, Pailolo Channel between Moloka'i and Maui, Hawaiian Islands.

*Poecilopsetta hawaiiensis* Gilbert, 1905: Gilbert (1905), Fowler (1928), Norman (1934), Fowler (1949), Gosline & Brock (1960), Struhsaker (1973a), Novikov *et al.* (1981), Tinker (1982), Uchida & Uchiyama (1986), Quéro *et al.* (1988), Foroshchuk & Federov (1992), Chave & Mundy (1994).

TAXONOMY: Norman (1934), Quéro *et al.* (1988), Foroshchuk & Federov (1992). The placement of this genus and its relatives in a separate family, the Poecilopsettidae, has become more widely accepted since the publication of Nelson (1994).

HAWAIIAN RECORDS: Hawai'i Island to Laysan and Koko Seamount at 80–435 m (Gilbert, 1905; Norman, 1934; Struhsaker, 1973a; Novikov *et al.*, 1981; Uchida & Uchiyama, 1986; Foroshchuk & Federov, 1992; Chave & Mundy, 1994).

GENERAL RANGE: Hawaiian Islands and Emperor Seamounts endemic. Benthic on sand at 80–435 m (Norman, 1934; Struhsaker, 1973a; Quéro *et al.*, 1988; Foroshchuk & Federov, 1992; Chave & Mundy, 1994).

**Samaridae*****Samariscus corallinus* Gilbert**

*Samariscus corallinus* Gilbert, 1905, p. 682, pl. 96, off the south coast of Moloka'i, Hawaiian Islands.

*Samaris corallinus* (Gilbert, 1905): Fowler (1928).

*Samariscus corallinus* Gilbert, 1905: Gilbert (1905), Fowler (1949), Gosline & Brock (1960), Struhsaker (1973a), Madden (1973), Tinker (1982), Sakamoto (1984), Uchida & Uchiyama (1986), Quéro *et al.* (1989), Hensley (1993), Randall (1996a).

TAXONOMY: Sakamoto (1984), Quéro *et al.* (1989), Hensley (1993).

COMMON NAMES: Coralline-red flounder (Tinker, 1982).

HAWAIIAN RECORDS: Moloka'i to Maro Reef at 68–134 m (Gilbert, 1905; Struhsaker, 1973a; Madden, 1973; Uchida & Uchiyama, 1986).

GENERAL RANGE: Hawaiian Islands endemic. Benthic on live sponge bottom at 68–134 m (Gilbert, 1905; Struhsaker, 1973a; Madden, 1973; Uchida & Uchiyama, 1986; Quéro *et al.*, 1989; Hensley, 1993).

***Samariscus triocellatus*** Woods

*Samariscus triocellatus* Woods in Schultz *et al.*, 1966, p. 66, Fig. 149, Bikini Atoll, Marshall Islands.

?*Monochirus* species: Winterbottom *et al.* (1989).

*Samariscus triocellatus* Woods, 1966: Gosline & Brock (1960), Woods in Schultz *et al.* (1966), Tinker (1982), Sakamoto (1984), Heemstra in Smith & Heemstra (1986), Myers (1989), Winterbottom *et al.* (1989), Quéro *et al.* (1989), Kosaki *et al.* (1991), Hensley (1993), Randall (1996a).

TAXONOMY: Sakamoto (1984), Quéro *et al.* (1989), Hensley (1993). Gosline & Brock (1960) gave diagnostic information and the name for this species prior to Woods (*in* Schultz *et al.*, 1966). They attributed the description of the species to Woods, citing his manuscript they but did not give a publication date and gave the page number for the description as 00. It is therefore possible that this premature use of the name by Gosline & Brock (1960) is the original description of the species.

COMMON NAMES: Threespot flounder (Randall *et al.*, 1997a; Randall, 1996a; Myers, 1999).

HAWAIIAN RECORDS: Johnston Atoll and O'ahu at 5–30 m (Gosline & Brock, 1960; Tinker, 1982; Kosaki *et al.*, 1991).

GENERAL RANGE: Indo-Pacific from South Africa and the Chagos Archipelago to Micronesia, the Hawaiian Islands, the Society Islands, and the Marquesas. Benthic on coral, particularly in caves or ledges, or sand near coral at 5–30 m (Heemstra in Smith & Heemstra, 1986; Myers, 1989; Winterbottom *et al.*, 1989; Quéro *et al.*, 1989; Kosaki *et al.*, 1991; Hensley, 1993).

**Soleidae — Soles*****Aseraggodes borehami*** Randall

*Aseraggodes borehami* Randall, 1996b, p. 429, Figs. 1–3, Kāne'ohe Bay, O'ahu, Hawaiian Islands.

*Aseraggodes borehami* Randall, 1996: Randall (1996a, 1996b).

TAXONOMY: Randall (1996a). Records of *A. thepassii* non (Bleeker, 1854) from O'ahu (Pietschmann, 1938; Fowler, 1949) are based on a damaged specimen of one of the three Hawaiian *Aseraggodes* species (Clark & George, 1979; Springer, 1982). *Achirus thepassii* Bleeker, 1854, is a junior synonym of *Pardachirus poropterus* (Bleeker, 1851) a western Pacific species known from Malaysia, Indonesia, and the Philippines (Clark & George, 1979).

COMMON NAMES: Boreham's sole (Randall, 1996a).

HAWAIIAN RECORDS: Hawai'i Island to O'ahu at 6–29 m (Randall, 1996a, b).

GENERAL RANGE: Hawaiian Islands endemic. Benthic on sand or rubble at 6–29 m, usually in or at the entrances to caves (Randall, 1996a, b).

***Aseraggodes holcomi*** Randall

*Aseraggodes holcomi* Randall, 2002a, p. 248, Figs. 1–2, Ala Moana Beach Park, O'ahu, Hawaiian Islands.

*Aseraggodes* sp.: Greenfield (2003).

*Aseraggodes holcomi* Randall, 2002a: Randall (2002a).

TAXONOMY: Randall (2002a).

HAWAIIAN RECORDS: Known only from O'ahu at 0.6–10 m (Randall, 2002a; Greenfield, 2003).

GENERAL RANGE: Hawaiian Islands endemic. Benthic on sand near reefs at 0.6–10 m (Randall, 2002a).

***Aseraggodes therese*** Randall

*Aseraggodes therese* Randall, 1996b, p. 434, Figs. 4–6, Sand Island, Midway Atoll, Northwestern Hawaiian Islands.

*Aseraggodes kobensis* non (Steindachner, 1896) [a valid species that is probably not found in the Hawaiian Islands]: Gosline & Brock (1960)?, Tinker (1982)?, Ohta (1983), Masuda *et al.* (1984).

Undescribed *Aseraggodes* species: Randall *et al.* (1993b).

*Aseraggodes therese* Randall, 1996: Randall (1996a, 1996b).

TAXONOMY: Randall (1996b).

COMMON NAMES: Therese's sole (Randall, 1996a).

HAWAIIAN RECORDS: Hawai'i Island to Midway at 1.5–26 m (Gosline & Brock, 1960; Randall *et al.*, 1993b; Randall, 1996a, b).

GENERAL RANGE: Hawaiian Islands endemic. Benthic on sand, rubble, or reef at 1.5–26 m, often in caves (Randall, 1996a, b).

### Cynoglossidae — Tonguefishes

#### *Symphurus strictus* Gilbert

*Symphurus strictus* Gilbert, 1905, p. 691, Fig. 272, south coast of O'ahu, Hawaiian Islands.

*Symphurus strictus* Gilbert, 1905: Gilbert (1905), Fowler (1928), Gosline & Brock (1960), Tinker (1982), Masuda *et al.* (1984), Heemstra *in* Smith & Heemstra (1986), Munroe & Mahadeva (1989), Munroe (1992).

TAXONOMY: Munroe & Mahadeva (1989), Munroe (1992).

HAWAIIAN RECORDS: O'ahu to Kaua'i at 485–730 m (Gilbert, 1905).

GENERAL RANGE: Indo-Pacific but known only from east Africa, southern Japan, and the Hawaiian Islands. Benthic at 300–730 m (Masuda *et al.*, 1984; Heemstra *in* Smith & Heemstra, 1986; Munroe, 1992).

#### *Symphurus undatus* Gilbert

*Symphurus undatus* Gilbert, 1905, p. 690, pl. 98, northwest coast of O'ahu, Hawaiian Islands.

*Symphurus undatus* Gilbert, 1905: Gilbert (1905), Struhsaker (1973a), Fowler (1928), Gosline & Brock (1960), Tinker (1982), Munroe (1992).

TAXONOMY: Munroe (1992).

HAWAIIAN RECORDS: Kaho'olawe to O'ahu at 282–357 m (Gilbert, 1905; Struhsaker, 1973a).

GENERAL RANGE: Western and central Pacific endemic known only from the Philippines and the Hawaiian Islands. Benthic on mud at 282–357 m (Struhsaker, 1973a; Munroe, 1992).

## Tetraodontiformes

### Triacanthoidei

#### Triacanthodidae — Spikefishes

#### *Hollardia goslinei* Tyler

*Hollardia goslinei* Tyler, 1968, p. 108, Figs. 35–37, floating in the sea next to a lava flow from Moana Loa, Kona Coast of Hawai'i Island.

*Hollardia goslinei* Tyler, 1968: Tyler (1968), Clarke (1972), Tinker (1982), Randall (1976a), Humphreys *et al.* (1984), Randall *et al.* (1985a), Uchida & Uchiyama (1984), Chave & Mundy (1994).

TAXONOMY: Tyler (1968).

COMMON NAMES: Hawaiian spikefish.

HAWAIIAN RECORDS: Johnston Atoll, Cross Seamount, and Hawai'i Island to Necker and the Hancock Seamounts at 275–515 m (Tyler, 1968; Clarke, 1972; Humphreys *et al.*, 1984; Randall *et al.*, 1985b; Uchida & Uchiyama, 1984; Chave & Mundy, 1994).

GENERAL RANGE: Johnston Atoll and Hawaiian Islands endemic. Engybenthic over sand and rock, associated with soft corals, at 275–515 m (Tyler, 1968; Humphreys *et al.*, 1984; Chave & Mundy, 1994).

## Tetraodontoidei

### Balistoidea

#### Balistidae — Triggerfishes

#### [*Balistapus undulatus* (Park)]

*Balistes undulatus* Park, 1797, p. 37, Sumatra, Indonesia.

*Balistapus undulatus* (Park, 1797): Clark (1949), Smith & Heemstra *in* Smith & Heemstra (1986), Myers (1989), Randall *et al.* (1990a).

TAXONOMY: Randall *et al.* (1990a).

COMMON NAMES: Orange-lined triggerfish (Randall *et al.*, 1997a), Orange-striped triggerfish (Myers, 1999).

HAWAIIAN RECORDS: Clark (1949) included this species in her key and illustrations of Hawaiian triggerfish but there are no other records of this species from the region.

GENERAL RANGE: Indo-Pacific South Africa and the Red Sea to southern Japan, Australia, Micronesia, the Line Islands, the Marquesas and the Tuamotu Archipelago. Engybenitic over coral reefs and adjacent rubble and sand at 1–50 m (Smith & Heemstra *in* Smith & Heemstra, 1986; Myers, 1989; Randall *et al.*, 1990a).

***Balistes polylepis*** Steindachner

*Balistes polylepis* Steindachner, 1876, p. 69, Magdalena Bay, Baja California, Mexico.

*Balistes fuscus* non (Bloch & Schneider, 1801) [a valid *Pseudobalistes* species not found in the Hawaiian Islands]: Fowler (1928), Gosline & Brock (1960), Tinker (1982).

*Balistes polylepis* Steindachner, 1876: Berry & Baldwin (1966), Springer (1982), Randall (1985a, 1996a), Chave & Mundy (1994), Allen & Robertson (1994), Randall & Mundy (1998), Robertson & Allen (2002).

TAXONOMY: Berry & Baldwin (1966), Springer (1982), Randall & Mundy (1998).

COMMON NAMES: Finescale triggerfish (AFS; Randall, 1996).

HAWAIIAN RECORDS: Hawai'i Island to O'ahu at 12–60 m (Fowler, 1928; Chave & Mundy, 1994; Randall & Mundy, 1998).

GENERAL RANGE: Eastern and central Pacific endemic from central California (and Washington in El Niño years) to Chile, the offshore islands of the eastern tropical Pacific, and the Hawaiian Islands. A waif has been recorded from the Marquesas. Engybenitic over rock, coral, rubble, and sand at 1–60 m, usually >10 m; juveniles can be pseudo-pelagic, associating with drifting materials at the sea surface (Berry & Baldwin, 1966; Springer, 1982; Chave & Mundy, 1994; Allen & Robertson, 1994; Randall & Mundy, 1998; Robertson & Allen, 2002).

***Canthidermis maculatus*** (Bloch)

*Balistes maculatus* Bloch, 1786, p. 25, pl. 151, “American Seas”.

*Balistes angulosus* Quoy & Gaimard, 1824: Quoy & Gaimard (1824).

*Balistes senticosus* Richardson, 1848: Wetmore (1890).

*Balistes* (*Linrus*) *aureolus* Richardson, 1845: Steindachner (1900).

*Canthidermus angulosus* (Quoy & Gaimard, 1824): Jordan & Evermann (1905, in part).

*Canthidermus aureolus* (Richardson, 1845): Jordan & Evermann (1905).

*Canthidermis maculatus* (Bloch, 1786): Fowler (1928, 1931), Gosline & Brock (1960), Berry & Baldwin (1966), Fedoryako (1979), Tinker (1982), Randall (1985a, 1996a), Smith & Heemstra (1986), Myers (1989), Harmelin-Vivien & Quéro *in* Quéro *et al.* (1990), Chave & Mundy (1994), Allen & Robertson (1994), Randall & Mundy (1998).

TAXONOMY: Fedoryako (1979) split this nominally circumglobal species into several species with more restricted ranges. The genus is being reexamined by A. Gill (Mus. Nat. Hist., London) to address this problem (see comments in Randall & Mundy, 1998).

COMMON NAMES: Rough triggerfish (AFS; Myers, 1999), Spotted oceanic triggerfish, Oceanic triggerfish.

HAWAIIAN RECORDS: Hawai'i Island to the Hancock Seamounts at 1–20 m (Quoy & Gaimard, 1824; Jordan & Evermann, 1905; Chave & Mundy, 1994; Randall & Mundy, 1998).

GENERAL RANGE: Circumtropical and subtropical in the Atlantic, Indian, and Pacific oceans. Epipelagic and oceanic at 1–40 m (Berry & Baldwin, 1966; Fedoryako, 1979; Smith & Heemstra, 1986; Myers, 1989; Harmelin-Vivien & Quéro *in* Quéro *et al.*, 1990; Chave & Mundy, 1994; Allen & Robertson, 1994; Randall & Mundy, 1998).

[*Canthidermis rotundatus* (Marion de Procé)]

*Balistes rotundatus* Marion de Procé, 1822, p. 130, Manila Bay, Philippines.

*Canthidermis oculus* (Gray, 1831) [a junior synonym of either *C. maculatus* (Bloch, 1786) or *C. rotundatus* (Marion de Procé, 1822)]: Fowler (1900).

*Canthidermis angulosus* non (Quoy & Gaimard, 1824) [a junior synonym of *C. maculatus* (Bloch, 1786), a valid species that occurs in the Hawaiian Islands]: Jordan & Evermann (1905, in part).

*Canthidermis rotundatus* (Marion de Procé, 1822): Fowler (1928), Randall & Mundy (1998).

TAXONOMY: Randall & Mundy (1998).

**HAWAIIAN RECORDS:** The records of this species from the Hawaiian Islands by Fowler (1900, 1928) and Jordan & Evermann (1905), based upon the same two specimens, cannot be assigned to any of Fedoryako's (1979) nominal *Canthidermis* species. The counts of Fowler (1900, 1928) do not match those of *C. maculatus* (Bloch, 1786), however. These records may be due to a locality error for an Atlantic *C. sufflamen* (Mitchill, 1815) specimen or more than one species of *Canthidermis* may be present in the Hawaiian Islands. Resolution of this problem will depend upon the collection of more Hawaiian Island specimens and on a worldwide revision of *Canthidermis* (see Randall & Mundy, 1998).

**GENERAL RANGE:** If *C. rotundatus* (Marion de Procé, 1822) is a valid species distinct from *C. maculatus* (Bloch, 1786), it is an Indo-Pacific species from the Indian Ocean to the Philippines and perhaps the Hawaiian Islands. Probably epipelagic (Fedoryako, 1979; Randall & Mundy, 1998).

### *Melichthys niger* (Bloch)

*Balistes niger* Bloch, 1786, p. 27, pl. 152, China.

*Balistes buniva* non Lacépède, 1803 [a junior synonym of *Balistes capriscus* Gmelin, 1789, an Atlantic Ocean species]: Streets (1877), Günther (1880), Smith & Swain (1882), Steindachner (1900).

*Balistes fuscolineatus* Seale, 1901: Seale (1901), Jordan & Evermann (1905).

*Melichthys radula* (Solander in Richardson, 1848): Jenkins (1903), Snyder (1904), Jordan & Evermann (1905).

*Melichthys buniva* non (Lacépède, 1803): Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960).

*Melichthys niger* (Bloch, 1786): Randall (1971, 1985a, 1996a), Randall & Klauswitz (1973), Hobson (1974), Tinker (1982), Okamoto & Kanenaka (1984), Randall *et al.* (1985a, 1993b), Uchida & Uchiyama (1986), Smith & Heemstra (1986), Myers (1989), Harmelin-Vivien & Quéro in Quéro *et al.* (1990), Hoover (1993, 2003), Chave & Mundy (1994), Allen & Robertson (1994), Randall & Mundy (1998), Robertson & Allen (2002).

**TAXONOMY:** Randall (1971), Randall & Klauswitz (1973), Smith & Heemstra (1986), Randall & Mundy (1998).

**COMMON NAMES:** Humuhumu-'ele'ele (Hoover, 1993, 2003; Randall, 1996a), Black durgon (AFS; Hoover, 1993, 2003; Randall, 1996a), Black triggerfish (Hoover, 1993, 2003; Myers, 1999).

**HAWAIIAN RECORDS:** Johnston Atoll and Hawai'i Island to Kure Atoll at 6–52 m (Streets, 1877a; Smith & Swain, 1882; Jordan & Evermann, 1905; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Hoover, 1993; Chave & Mundy, 1994).

**GENERAL RANGE:** Circumtropical and subtropical in the Atlantic, Indian, and Pacific oceans; in the Pacific known eastward to the offshore eastern tropical Pacific islands, and Baja California to Colombia, with anomalous records as far north as Alaska in El Niño years. Benthopelagic over coral and rock at 4–75 m, juveniles epipelagic (Randall & Klauswitz, 1973; Smith & Heemstra, 1986; Myers, 1989; Harmelin-Vivien & Quéro in Quéro *et al.*, 1990; Chave & Mundy, 1994; Allen & Robertson, 1994; Randall & Mundy, 1998; Robertson & Allen, 2002).

### *Melichthys vidua* (Richardson)

*Balistes vidua* Richardson, 1845c, p. 128, pl. 59 (figs. 9–12), "Polynesia" and Tahiti, Society Islands.

*Balistes vidua* Richardson, 1845c: Streets (1877), Steindachner (1900), Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949).

*Pachynathus nycteris* Jordan & Evermann, 1903: Jordan & Evermann (1903a).

*Balistes nycteris* (Jordan & Evermann, 1903): Jordan & Evermann (1905), Fowler (1928).

*Melichthys nycteris* (Jordan & Evermann, 1903): Gosline & Brock (1960).

*Melichthys vidua* (Richardson, 1845c): Gosline & Brock (1960), Randall (1971, 1976a, 1985a, 1996a), Randall & Klauswitz (1973), Hobson (1974), Tinker (1982), Okamoto & Kanenaka (1984), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Uchida & Uchiyama (1986), Smith & Heemstra (1986), Myers (1989), Hoover (1993, 2003), Chave & Mundy (1994), Robertson & Allen (2002).

**TAXONOMY:** Randall (1971), Randall & Klauswitz (1973), Smith & Heemstra (1986).

**COMMON NAMES:** Humuhumu-hi'u-kole (Hoover, 1993, 2003; Randall, 1996a), Humuhumu-uli, Pinktail durgon (Hoover, 1993, 2003; Randall, 1996a), Pinktail triggerfish (Hoover, 1993, 2003; Myers, 1999).

**HAWAIIAN RECORDS:** Johnston Atoll and Hawai'i Island to Kure Atoll at 12–140 m (Streets, 1877a; Jordan

& Evermann, 1905; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall, 1985a; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Chave & Mundy, 1994).

GENERAL RANGE: Indo-transPacific from South Africa to Indonesia, southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, the Society Islands, the Marquesas, Clipperton, Cocos, and the Galapagos Islands, and Panama. Benthopelagic over coral and rock at 4–145 m (Randall & Klauswitz, 1973; Smith & Heemstra, 1986; Myers, 1989; Randall *et al.*, 1990a, 1997b; Chave & Mundy, 1994; Robertson & Allen, 2002).

### ***Rhinecanthus aculeatus*** (Linnaeus)

*Balistes aculeatus* Linnaeus, 1758, p. 328, “Habitat in India”.

*Balistes aculeatus* Linnaeus, 1758: Smith & Swain (1882), Steindachner (1900).

*Balistapus aculeatus* (Linnaeus, 1758): Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1931, 1934).

*Balistapus aculeatus* var. *obscurus* Borodin, 1930: Borodin (1930).

*Rhinecanthus aculeatus* (Linnaeus, 1758): Fowler (1949), Gosline & Brock (1960), Tinker (1982), Randall & Steene (1983), Okamoto & Kanenaka (1984), Masuda *et al.* (1984), Randall (1985a, 1996a), Randall *et al.* (1985a, 1990a, 1997a), Uchida & Uchiyama (1986), Smith & Heemstra (1986), Myers (1989), Winterbottom *et al.* (1989), Harmelin-Vivian & Quéro *in* Quéro *et al.* (1990), Hoover (1993, 2003).

TAXONOMY: Randall & Steene (1983).

COMMON NAMES: Humuhumu-nukunuku-a-pua‘a (Hoover, 1993, 2003; Randall, 1996a), Lagoon triggerfish (Hoover, 1993, 2003; Randall, 1996a), Picassofish (Myers, 1999), Whitebanded triggerfish (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Johnston Island and Hawai‘i Island to Laysan at 6–40 m (Smith & Swain, 1882; Jordan & Evermann, 1905; Fowler, 1928; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b; Uchida & Uchiyama, 1986; Hoover, 1993).

GENERAL RANGE: Eastern Atlantic and Indo-Pacific from Senegal and South Africa to southern Japan, the Ogasawara Islands, Australia, Lord Howe Island, Micronesia, the Hawaiian Islands, French Polynesia, and the Pitcairn Group. Engybenitic over coral and rock at 1–50 m (Randall & Steene, 1983; Masuda *et al.*, 1984; Smith & Heemstra, 1986; Myers, 1989; Winterbottom *et al.*, 1989; Harmelin-Vivian & Quéro *in* Quéro *et al.*, 1990; Randall *et al.*, 1990a, 1997b).

### ***Rhinecanthus rectangulus*** (Bloch & Schneider)

*Balistes rectangulus* Bloch & Schneider, 1801, p. 465, “Indian Ocean”.

*Balistes rectangulus* Bloch & Schneider, 1801: Steindachner (1900).

*Balistapus rectangulus* (Bloch & Schneider, 1801): Fowler (1900), Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1931, 1934).

*Rhinecanthus rectangulus* (Bloch & Schneider, 1801): Fowler (1949), Gosline & Brock (1960), Hobson (1974), Tinker (1982), Randall & Steene (1983), Okamoto & Kanenaka (1984), Masuda *et al.* (1984), Randall (1985a, 1996a), Smith & Heemstra (1986), Myers (1989), Winterbottom *et al.* (1989), Randall *et al.* (1990a, 1997a), Hoover (1993, 2003).

TAXONOMY: Randall & Steene (1983).

COMMON NAMES: Humuhumu-nukunuku-a-pua‘a (Hoover, 1993, 2003; Randall, 1996a), Picasso triggerfish (Hoover, 1993, 2003), Reef triggerfish (Hoover, 1993, 2003; Randall, 1996a), Wedge picassofish (Myers, 1999), Wedge-tail triggerfish (Randall *et al.*, 1997a), Saddle-shoe fish.

HAWAIIAN RECORDS: Hawai‘i Island to Gardner Pinnacles at 1–8 m (Steindachner, 1900; Jordan & Evermann, 1905; Hobson, 1974; Okamoto & Kanenaka, 1984; Hoover, 1993).

GENERAL RANGE: Indo-Pacific from East Africa and the Red Sea to southern Japan, the Ogasawara Islands, Australia, Lord Howe Island, Micronesia, the Hawaiian Islands, French Polynesia, and the Pitcairn Group. Engybenitic over coral and rock at 1–8 m (Randall & Steene, 1983; Masuda *et al.*, 1984; Smith & Heemstra, 1986; Winterbottom *et al.*, 1989; Randall *et al.*, 1990a, 1997b; Hoover, 1993).

### ***Sufflamen bursa*** (Bloch & Schneider)

*Balistes bursa* Bloch & Schneider, 1801, p. 476, “Indian Ocean”.

*Balistapus bursa* (Bloch & Schneider, 1801): Fowler (1900).

*Pachynathus bursa* (Bloch & Schneider, 1801): Jenkins (1903), Snyder (1904).

*Balistes bursa* Bloch & Schneider, 1801: Jordan & Evermann (1905), Gilbert (1905), Fowler (1928, 1931, 1934), Gosline & Brock (1960).

*Hemibalistes bursa* (Bloch & Schneider, 1801): Fowler (1949).

*Sufflamen bursa* (Bloch & Schneider, 1801): Hobson (1974), Tinker (1982), Okamoto & Kanenaka (1984), Masuda *et al.* (1984), Randall (1985a, 1996a), Randall *et al.* (1985a, 1990a, 1990b, 1993b, 1997a), Smith & Heemstra (1986), Myers (1989), Winterbottom *et al.* (1989), Hoover (1993, 2003).

TAXONOMY: Smith & Heemstra (1986).

COMMON NAMES: Humuhumu-lei (Hoover, 1993, 2003; Randall, 1996a), Lei triggerfish (Hoover, 1993, 2003; Randall, 1996a), Whiteline triggerfish (Hoover, 1993, 2003), Scythe triggerfish (Myers, 1999), Boomerang triggerfish, Scimitar triggerfish (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at 3–91 m (Fowler, 1900; Jordan & Evermann, 1905; Gilbert, 1905; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall, 1985a; Randall *et al.*, 1985b, 1993b).

GENERAL RANGE: Indo-Pacific from South Africa and the Chagos Archipelago to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, the Marquesas, Ducie, and Rapa. Engy-benthic over coral and rock at 3–91 m (Masuda *et al.*, 1984; Smith & Heemstra, 1986; Myers, 1989; Winterbottom *et al.*, 1989; Randall *et al.*, 1990a, b, 1997b).

### *Sufflamen fraenatum* (Latreille)

*Balistes fraenatus* Latreille, 1804, p. 74, no type locality given.

*Pachygnathus capistratus* (Shaw, 1804): Jenkins (1903), Snyder (1904).

*Balistes capistratus* Shaw, 1804: Jordan & Evermann (1905), Fowler (1928, 1949, in part), Gosline & Brock (1960).

*Sufflamen capistratus* (Shaw, 1804): Tinker (1982).

*Sufflamen fraenatum* (Latreille, 1804): Fowler (1949), Tinker (1982), Okamoto & Kanenaka (1984), Randall (1985a, 1996a), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Uchida & Uchiyama (1986), Smith & Heemstra (1986), Myers (1989), Winterbottom *et al.* (1989), Hoover (1993, 2003), Kuitert (1993), Chave & Mundy (1994).

TAXONOMY: Smith & Heemstra (1986).

COMMON NAMES: Humuhumu-mimi (Hoover, 1993, 2003; Randall, 1996a), Hage (DLNR), Bridled triggerfish (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at 9–186 m (Jenkins, 1903; Jordan & Evermann, 1905; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Hoover, 1993; Chave & Mundy, 1994).

GENERAL RANGE: Indo-Pacific from South Africa and the Chagos Archipelago to southern Japan, the Ogasawara Islands, Australia, Lord Howe Island, Micronesia, the Hawaiian Islands, the Tuamotu Archipelago, and the Marquesas. Engy-benthic over coral, rock, rubble, and sand at 8–186 m (Randall, 1985a; Smith & Heemstra, 1986; Myers, 1989; Winterbottom, 1989; Randall *et al.*, 1990a, 1997b; Kuitert, 1993; Chave & Mundy, 1994).

### *Xanthichthys auromarginatus* (Bennett)

*Balistes auromarginatus* Bennett, 1832, p. 168, Mauritius, western Indian Ocean.

*Balistes* (*Parabalistes*) *ringens* non Linnaeus, 1758 [a valid Atlantic endemic *Xanthichthys* species]: Steindachner (1900)?

*Xanthichthys ringens* non (Linnaeus, 1758): Hobson (1974).

*Xanthichthys auromarginatus* (Bennett, 1832): Randall *et al.* (1978, 1985a, 1990a, 1993b), Randall (1980a, 1996a), Myers (1989), Hoover (1993, 2003), Chave & Mundy (1994).

TAXONOMY: Randall *et al.* (1978).

COMMON NAMES: Humuhumu (Hoover, 1993, 2003), Gilded triggerfish (Hoover, 1993, 2003; Randall, 1996a), Bluechin triggerfish (males).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at 9–161 m (Steindachner, 1900?; Hobson, 1974; Randall *et al.*, 1985b, 1993b; Hoover, 1993; Chave & Mundy, 1994).

GENERAL RANGE: Indo-Pacific from Mauritius, Réunion, and the Maldives to the Cocos-Keeling Islands,



the Ryukyu Islands, Australia, Micronesia, and the Hawaiian Islands. Benthopelagic over rock and coral at 8–161 m, usually at >30 m (Randall *et al.*, 1978, 1990a; Myers, 1989; Hoover, 1993; Chave & Mundy, 1994).

***Xanthichthys caeruleolineatus*** Randall, Matsuura, & Zama

*Xanthichthys caeruleolineatus* Randall, Matsuura & Zama, 1978, p. 701, Figs. 2D, 7, Manihi Atoll, Tuamotu Archipelago, central South Pacific.

*Xanthichthys caeruleolineatus* Randall, Matsuura & Zama, 1978: Randall *et al.* (1978, 1997a, 1997b), Masuda *et al.* (1984), Myers (1989), Randall (1996a), Randall & Mundy (1998), Robertson & Allen (2002).

TAXONOMY: Randall *et al.* (1978).

COMMON NAMES: Blueline triggerfish (Myers, 1999; Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Hawai'i Island to O'ahu at 46–165 m (Randall 1996a, Randall & Mundy 1998).

GENERAL RANGE: Indo-transPacific from St. Brandon's Shoals north of Mauritius, the Agalega and Maldivé Islands to Cocos-Keeling, Indonesia, the Ryukyu and Ogasawara Islands, Minami-Tori-Shima, northern Australia, the Coral Sea, Samoa, Micronesia, the Line Islands, the Hawaiian Islands, French Polynesia, and the Galapagos and Cocos Islands in the eastern Pacific. Benthopelagic at 13–250 m (Randall *et al.*, 1978, 1996, 1997b; Myers, 1989; Randall, 1996a; Randall & Mundy, 1998; Robertson & Allen, 2002).

***Xanthichthys mento*** (Jordan & Gilbert)

*Balistes mento* Jordan & Gilbert, 1882a, p. 228, Clarion Island, Revillagigedo Islands, eastern tropical Pacific.

*Xanthichthys lineopunctatus* non (Hollard, 1854) [a valid species not found in the Hawaiian Islands]: Jordan & Evermann (1905), Jordan & Dickerson (1908), Fowler (1949, in part).

*Balistes ringens* non Linnaeus, 1758 [a valid Atlantic endemic *Xanthichthys* species]: Fowler (1928, 1931, 1949). *Xanthichthys ringens* non (Linnaeus, 1758): Gosline & Brock (1960).

*Xanthichthys mento* (Jordan & Gilbert, 1882a): Randall *et al.* (1978, 1993b, 1997a), Randall (1980a, 1981a, 1996a), Tinker (1982), Okamoto & Kanenaka (1984), Uchida & Uchiyama (1986), Myers (1989), Hoover (1993, 2003), Chave & Mundy (1994), Allen & Robertson (1994), Robertson & Allen (2002).

TAXONOMY: Randall *et al.* (1978).

COMMON NAMES: Redtail triggerfish (AFS), Crosshatch triggerfish (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Hawai'i Island to Kure Atoll at 15–131 m (Jordan & Evermann, 1905; Okamoto & Kanenaka, 1984; Uchida & Uchiyama, 1986; Randall *et al.*, 1993b; Chave & Mundy, 1994).

GENERAL RANGE: Antitropical transPacific endemic known from southern Japan, the Ogasawara Islands, Minami-Tori-Shima, the Hawaiian Islands, Pitcairn, Easter Island, and the eastern Pacific from the offshore islands and southern California to Colombia (but rare on the mainland). Benthopelagic over coral and rock at 6–131 m (Randall *et al.*, 1978, 1997b; Randall, 1982; Myers, 1989; Chave & Mundy, 1994; Allen & Robertson, 1994; Robertson & Allen, 2002).

## Monacanthidae — Leatherjackets, Filefishes

***Aluterus monoceros*** (Linnaeus)

*Balistes monoceros* Linnaeus, 1758, p. 327, "Habitat in Asia, America".

*Alutera monoceros* (Linnaeus, 1758): Jordan & Evermann (1905), Fowler (1928, 1931, 1934), Tinker (1982).

*Aluterus monoceros* (Linnaeus, 1758): Gosline & Brock (1960), Masuda *et al.* (1984), Randall (1985a, 1996a), Uchida & Uchiyama (1986), Hutchins *in* Smith & Heemstra (1986), Myers (1989), Harmelin-Vivien & Quéro *in* Quéro *et al.* (1990), Randall *et al.* (1990a), Robertson & Allen (2002).

TAXONOMY: Hutchins *in* Smith & Heemstra (1986).

COMMON NAMES: Loulu, Unicorn filefish (AFS; Randall, 1996a; Myers, 1999), Unicorn leatherjacket (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: O'ahu to Laysan at 33 m (Jordan & Evermann, 1905; Uchida & Uchiyama, 1986).

GENERAL RANGE: Circumtropical and subtropical in the Gulf of Mexico, Atlantic, Indian, and Pacific oceans. Epipelagic and enygbenthic at 1–50 m (Masuda *et al.*, 1984; Hutchins *in* Smith & Heemstra, 1986; Myers, 1989; Harmelin-Vivien & Quéro *in* Quéro *et al.*, 1990; Randall *et al.*, 1990a; Robertson & Allen, 2002).

***Aluterus scriptus*** (Osbeck)

*Balistes scriptus* Osbeck, 1765, p. 145, "China Sea".

*Osbeckia scripta* (Osbeck, 1765): Jenkins (1903), Jordan & Evermann (1905), Tinker (1982).

*Alutera scripta* (Osbeck, 1765): Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960).

*Aluterus scriptus* (Osbeck, 1765): Hobson (1974), Okamoto & Kanenaka (1984), Masuda *et al.* (1984), Randall (1985a, 1996a), Randall *et al.* (1985a, 1990a, 1993b), Uchida & Uchiyama (1986), Hutchins *in* Smith & Heemstra (1986), Myers (1989), Harmelin-Vivien & Quéro *in* Quéro *et al.* (1990), Hoover (1993, 2003), Chave & Mundy (1994), Allen & Robertson (1994).

TAXONOMY: Hutchins *in* Smith & Heemstra (1986).

COMMON NAMES: Loulu (Hoover, 1993, 2003; Randall, 1996a), 'O'ili-lepa (DLNR), Ohua, Scrawled filefish (AFS; Myers, 1999; Hoover, 2003), Scribbled filefish (Hoover, 1993, 2003; Randall, 1996a), Scrawled leatherjacket (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 1–120 m (Jenkins, 1903; Jordan & Evermann, 1905; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Hoover, 1993; Chave & Mundy, 1994).

GENERAL RANGE: Circumglobal in the tropical and subtropical Atlantic, Indian, and Pacific oceans. Epibenthic and benthic at 1–120 m (Masuda *et al.*, 1984; Hutchins *in* Smith & Heemstra, 1986; Myers, 1989; Harmelin-Vivien & Quéro *in* Quéro *et al.*, 1990; Randall *et al.*, 1990a, 1993b; Chave & Mundy, 1994; Allen & Robertson, 1994).

***Cantherhines dumerilii*** (Hollard)

*Monacanthus dumerilii* Hollard, 1854, p. 361, possibly from Mauritius, western Indian Ocean.

*Monacanthus albopunctatus* Seale, 1901: Seale (1901).

*Cantherhines albopunctatus* (Seale, 1901): Jordan & Evermann (1905).

*Amanes sandwichiensis* non (Quoy & Gaimard, 1824) [a valid *Cantherhines* species also found in the Hawaiian Islands]: Jordan & Evermann (1905, in part).

*Amanes albopunctatus* (Seale, 1901): Gosline & Brock (1960).

*Amanes carolae* (Jordan & McGregor *in* Jordan & Evermann, 1898): Gosline & Brock (1960).

*Cantherhines dumerilii* (Hollard, 1854): Randall (1964, 1976a, 1985a, 1996a), Hobson (1974), Tinker (1982), Okamoto & Kanenaka (1984), Randall *et al.* (1985a, 1990a, 1990b, 1993b, 1997a), Uchida & Uchiyama (1986), Hutchins *in* Smith & Heemstra (1986), Myers (1989), Hoover (1993, 2003), Allen & Robertson (1994), Robertson & Allen (2002).

TAXONOMY: Randall (1964).

COMMON NAMES: 'O'ili (Hoover, 1993, 2003; Randall, 1996a), Barred filefish (Hoover, 1993, 2003; Randall, 1996a), Yelloweye leatherjacket (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 9–69 m (Jordan & Evermann, 1905; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Hoover, 1993). The *Amanes* species recorded from Midway by Humphreys *et al.* (1984) was not identified, but other monacanthids from Hawaiian waters initially identified as *Amanes* are referable to *Cantherhines*.

GENERAL RANGE: Indo-transPacific from South Africa and Mauritius to Indonesia, southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, French Polynesia, the offshore eastern tropical Pacific islands, and the tip of Baja California to Colombia. Epibenthic over coral and rock at 1–69 m (Randall, 1964; Uchida & Uchiyama, 1986; Hutchins *in* Smith & Heemstra, 1986; Myers, 1989; Randall *et al.*, 1990a, b, 1997b; Hoover, 1993; Allen & Robertson, 1994; Robertson & Allen, 2002).

***Cantherhines sandwichiensis*** (Quoy & Gaimard)

*Balistes sandwichiensis* Quoy & Gaimard, 1824, p. 214, "Hawaiian Islands".

*Balistes sandwichiensis* Quoy & Gaimard, 1824: Quoy & Gaimard (1824).

*Monacanthus nasutus* Swainson, 1839: Swainson (1839).

*Amanes sandwichiensis* (Quoy & Gaimard, 1824): Gosline & Brock (1960).

*Cantherhines sandwichiensis* (Quoy & Gaimard, 1824): Fowler (1900), Jenkins (1903), Jordan & Snyder (1904a), Snyder (1904), Jordan & Evermann (1905), Gilbert (1905), Fowler (1928, 1949), Randall (1964, 1976a, 1985a), Hobson (1974), Tinker (1982), Okamoto & Kanenaka (1984), Randall *et al.* (1985a), Uchida & Uchiyama (1986), Hoover (1993, 2003).

TAXONOMY: Randall (1964).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Lisianski at 2–73 m (Quoy & Gaimard, 1824; Jordan & Evermann, 1905; Gilbert, 1905; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b).

GENERAL RANGE: Johnston Atoll and Hawaiian Islands endemic, with one questionable record from the Cook Islands. Engybenthic over coral and rock at 2–73 m (Randall, 1964, 1985a; Uchida & Uchiyama, 1986; Hoover, 1993).

### *Cantherhines verecundus* Jordan

*Cantherhines verecundus* E.K. Jordan, 1925, p. 40, pl. 2 (fig.3), Honolulu market, O'ahu, Hawaiian Islands.

*Monacanthus pardalis* non Rüppell, 1837 [a valid *Cantherhines* species not found in the Hawaiian Islands]: Steindachner (1900).

*Cantherhines howensis* non (Ogilby, 1889) [a junior synonym of *C. dumerilii* (Hollard, 1854), a valid species also found in the Hawaiian Islands]: Fowler (1928, in part).

*Cantherhines pardalis* non (Rüppell, 1837): Fowler (1928, 1949, in part), Tinker (1982, in part).

*Amanes pardalis* non (Rüppell, 1837): Gosline & Brock (1960).

*Cantherhines verecundus* Jordan, 1925: E.K. Jordan (1925), Randall (1964, 1976a, 1985a, 1996a), Tinker (1982), Uchida & Uchiyama (1986), Hoover (1993, 2003), Randall *et al.* (1993b).

TAXONOMY: Randall (1964).

COMMON NAMES: 'O'ili (Hoover, 1993, 2003; Randall, 1996a), Shy filefish (Hoover, 1993, 2003; Randall, 1996a), Roundtail filefish.

HAWAIIAN RECORDS: O'ahu to Midway at 6–99 m (Steindachner, 1900; E.K. Jordan, 1925; Fowler, 1928; Uchida & Uchiyama, 1986; Randall *et al.*, 1993b; Hoover, 1993).

GENERAL RANGE: Hawaiian Islands endemic. Engybenthic over coral and rock, often under ledges, at 6–99 m (Randall, 1964, 1985a; Uchida & Uchiyama, 1986; Hoover, 1993).

### *Pervagor aspricaudus* (Hollard)

*Monacanthus aspricaudus* Hollard, 1854, p. 330, type locality unknown.

*Monacanthus melanocephalus* non (Bleeker, 1853) [a valid *Pervagor* species not found in the Hawaiian Islands]: Fowler (1928, 1934, 1949).

*Pervagor melanocephalus* non (Bleeker, 1853): Gosline & Brock (1960), Hobson (1974), Tinker (1982), Uchida & Uchiyama (1986).

*Pervagor aspricaudus* (Hollard, 1854): Randall (1985a, 1996a), Randall *et al.* (1985a, 1990a), Hutchins (1986), Myers (1989), Hoover (1993, 2003).

TAXONOMY: Hutchins (1986).

COMMON NAMES: 'O'ili (Hoover, 1993, 2003; Randall, 1996a), Yellowtail filefish (Hoover, 1993, 2003; Randall, 1996a), Lacefin filefish (Hoover, 1993, 2003), Orangetail filefish (Myers, 1999), Orangetail leatherjacket (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Maro Reef at 2–33 m (Gosline & Brock, 1960; Hobson, 1974; Uchida & Uchiyama, 1986; Randall, 1985a; Randall *et al.*, 1985b).

GENERAL RANGE: Indo-Pacific and antiequatorial from Mauritius to northern Australia, and New Caledonia in the south, and Indonesia to southern Japan, Micronesia, and the Hawaiian Islands in the north. Engybenthic in or over coral at 2–33 m (Uchida & Uchiyama, 1986; Hutchins, 1986; Myers, 1989; Randall *et al.*, 1990a).

### *Pervagor spilosoma* (Lay & Bennett)

*Monacanthus spilosoma* Lay & Bennett, 1839, p. 70, pl. 22 (fig. 1), O'ahu, Hawaiian Islands.

*Monacanthus spilosoma* Lay & Bennett, 1839: Lay & Bennett (1839), Günther (1870), Steindachner (1900), Fowler (1900, 1928, 1931, 1934, 1949).

*Stephanolepis spilosomus* (Lay & Bennett, 1839): Jenkins (1903), Jordan & Snyder (1904a), Snyder (1904), Gilbert (1905), Jordan & Evermann (1905).

*Stephanolepis pricei* Snyder, 1904: Snyder (1904), Gilbert (1905), Jordan & Evermann (1905).

*Pervagor spilosoma* (Lay & Bennett, 1839): Gosline & Brock (1960), Hobson (1974), Tinker (1982), Okamoto & Kanenaka (1984), Randall (1985a, 1996a), Randall *et al.* (1985a, 1993b), Uchida & Uchiyama (1986), Hutchins (1986), Hoover (1993, 2003), Chave & Mundy (1994).

TAXONOMY: Hutchins (1986).

COMMON NAMES: 'O'ili-uwī'uwī (Hoover, 1993, 2003; Randall, 1996a), Fantail filefish (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 6–138 m, 33–730 m fishing depths (Lay & Bennett, 1839; Jordan & Evermann, 1905; Gilbert, 1905; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986).

GENERAL RANGE: Johnston Atoll and Hawaiian Islands endemic. Engybenthic over coral, rock, rubble, and sand at 6–138 m, 33–730 m fishing depths; juveniles epi- and benthopelagic (Gilbert, 1905; Hutchins, 1986; Chave & Mundy, 1994).

***Thamnaconus garretti*** (Fowler)

*Paramonacanthus garretti* Fowler, 1928, p. 459, Fig. 78, "Hawaiian Islands".

*Paramonacanthus garretti* Fowler, 1928: Fowler (1928).

*Pseudomonacanthus garretti* (Fowler, 1928): Randall (1975b, 1980a), Tinker (1982), Uchida & Uchiyama (1986).

*Thamnaconus garretti* (Fowler, 1928): Springer (1982), Randall (1996a).

TAXONOMY: Randall (1981a), Springer (1982) for generic allocation.

HAWAIIAN RECORDS: O'ahu to Nero Bank at 29–187 m (Fowler, 1928; Randall, 1981a; Uchida & Uchiyama, 1986).

GENERAL RANGE: Hawaiian Islands endemic. Engybenthic over sand at 29–187 m (Randall, 1981a; Uchida & Uchiyama, 1986).

**Tetraodontoidea**

**Ostraciidae — Boxfishes, Trunkfishes, Cowfishes**

***Kentrocapros aculeatus*** (Houttuyn)

*Ostracion Cubicus aculeatus* Houttuyn, 1782, p. 346, Japan.

*Aracana spilonota* Gilbert, 1905: Gilbert (1905).

*Aracana aculeata* (Houttuyn, 1782): Fowler (1928), Gosline & Brock (1960), Struhsaker (1973a), Uchida & Uchiyama (1986), Tinker (1982).

*Kentrocapros spilonotus* (Gilbert, 1905): Fowler (1949).

*Kentrocapros aculeatus* (Houttuyn, 1782): Matsuura & Yamakawa (1982), Ohta (1983), Winterbottom & Tyler (1983), Masuda *et al.* (1984), Randall (1985a), Okamura (1985), Randall *et al.* (1997a).

TAXONOMY: Matsuura & Yamakawa (1982), Winterbottom & Tyler (1983).

HAWAIIAN RECORDS: Moloka'i to Laysan at 108–298 m (Gilbert, 1905; Struhsaker, 1973a; Uchida & Uchiyama, 1986).

GENERAL RANGE: Western and central North Pacific endemic known from the East China Sea, Japan, the Ogasawara Islands and the Hawaiian Islands. Engybenthic at 99–298 m (Ohta, 1983; Masuda *et al.*, 1984; Okamura *et al.*, 1985; Randall *et al.*, 1997b).

***Lactoria diaphana*** (Bloch & Schneider)

*Ostracion diaphanus* Bloch & Schneider, 1801, p. 501, no type locality given.

*Ostracion diaphanus* Bloch & Schneider, 1801: Steindachner (1900), Fowler (1928, 1931).

*Lactoria schlemmeri* Jordan & Snyder, 1904: Jordan & Snyder (1904a), Jordan & Evermann (1905).

*Lactoria diaphanus* (Bloch & Schneider, 1801): Struhsaker (1973a), Tinker (1982), Uchida & Uchiyama (1986).

*Lactoria diaphana* (Bloch & Schneider, 1801): Fowler (1949), Gosline & Brock (1960), Masuda *et al.* (1984), Randall (1985a, 1996a), Okamura (1985), Smith *in* Smith & Heemstra (1986), Myers (1989), Randall *et al.* (1990a, 1997a), Robertson & Allen (2002).

TAXONOMY: Smith *in* Smith & Heemstra (1986). The eastern Pacific population is known only from pelagic individuals and from this it has been suggested that these may belong to a distinct, pelagic, eastern tropical Pacific species (see Robertson & Allen, 2002).

COMMON NAMES: Spiny boxfish (AFS), Spiny cowfish (Randall, 1996a; Myers, 1999), Roundbelly cowfish (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Maui to Lisianski at 29–124 m (Steindachner, 1900; Jordan & Evermann, 1905; Fowler, 1928; Struhsaker, 1973a; Uchida & Uchiyama, 1986).

GENERAL RANGE: Indo-transPacific from South Africa to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, Easter Island, and perhaps the eastern Pacific from southern California to Peru plus the offshore tropical islands. Engyberthic and epipelagic at 1–135 m (Masuda *et al.*, 1984; Okamura *et al.*, 1985; Smith *in* Smith & Heemstra, 1986; Myers, 1989; Randall *et al.*, 1990a, 1997b; Robertson & Allen, 2002).

### *Lactoria fornasini* (Bianconi)

*Ostracion fornasini* Bianconi, 1846, p. 115, Pl. 1 (figs. 1–2), Mozambique, eastern Africa.

*Lactoria galeodon* Jenkins, 1903: Jenkins (1903), Jordan & Snyder (1904a), Snyder (1904), Jordan & Evermann (1905).

*Ostracion fornasini* Bianconi, 1846: Fowler (1928, 1931, 1934, 1949).

*Lactoria fornasini* (Bianconi, 1846): Gosline & Brock (1960), Struhsaker (1973a), Tinker (1982), Okamoto & Kanenaka (1984), Masuda *et al.* (1984), Randall (1985a, 1996a), Okamura (1985), Uchida & Uchiyama (1986), Smith *in* Smith & Heemstra (1986), Myers (1989), Randall *et al.* (1990a, 1993b, 1997a), Hoover (1993, 2003).

TAXONOMY: Smith *in* Smith & Heemstra (1986).

COMMON NAMES: Makukana (Hoover, 1993, 2003; Randall, 1996a), Thornback boxfish, Thornback cowfish (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Hawai'i Island to Kure Atoll at 9–132 m (Jenkins, 1903; Jordan & Evermann, 1905; Struhsaker, 1973a; Okamoto & Kanenaka, 1984; Uchida & Uchiyama, 1986; Hoover, 1993; Randall *et al.*, 1993b). The *Lactoria* species recorded from Midway by Humphreys *et al.* (1984) was not identified to species.

GENERAL RANGE: Indo-Pacific from South Africa to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, and Rapa (but unknown from most Pacific Plate islands). Engyberthic over rubble and sand at 5–132 m (Masuda *et al.*, 1984; Randall, 1985a; Okamura *et al.*, 1985; Smith *in* Smith & Heemstra, 1986; Myers, 1989; Randall *et al.*, 1990a, b, 1997b).

### *Ostracion cubicus* Linnaeus

*Ostracion cubicus* Linnaeus, 1758, p. 332, "Habitat in India".

*Ostracion tuberculatus* Linnaeus, 1758: Fowler (1949, in part).

*Ostracion cubicus* Linnaeus, 1758: Fowler (1923, 1928, 1931, 1934), Randall (1972b, 1976a, 1985a, 1996a), Tinker (1982), Masuda *et al.* (1984), Randall *et al.* (1985a, 1990a, 1990b, 1997a), Smith *in* Smith & Heemstra (1986), Myers (1989), Kuitert (1993).

TAXONOMY: Randall (1972b).

COMMON NAMES: Yellow boxfish (Randall *et al.*, 1997a; Myers, 1999), Cube trunkfish.

HAWAIIAN RECORDS: Known from the region only by a specimen from Johnston Atoll, one from O'ahu, and a juvenile sighted at an unrecorded Hawaiian locality. This species may occur in the region only as a waif (Fowler, 1923, 1928; Randall, 1972b, 1985a; Randall *et al.*, 1985b).

GENERAL RANGE: Indo-Pacific from east Africa and the Red Sea to the Ryukyu and Ogasawara Islands, Australia, Micronesia, Marcus, the Hawaiian Islands, and French Polynesia. Engyberthic over coral and rock at 1–35 m (Masuda *et al.*, 1984; Smith *in* Smith & Heemstra, 1986; Myers, 1989; Randall *et al.*, 1990a, b, 1997b; Kuitert, 1993).

### *Ostracion meleagris camurum* Jenkins

*Ostracion camurum* Jenkins, 1901b, p. 396, Fig. 9, Honolulu, O'ahu, Hawaiian Islands.

*Ostracion punctatum* Bloch & Schneider, 1801: Smith & Swain (1882).

*Ostracion punctatus* Bloch & Schneider, 1801: Steindachner (1900).

*Ostracion camurum* Jenkins, 1901b: Jenkins (1901b, 1903), Jordan & Snyder (1904a), Snyder (1904).

*Ostracion lentiginosum* Bloch & Schneider, 1801: Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1931, 1934).

*Ostracion oahuensis* Jordan & Evermann, 1903: Jordan & Evermann (1903a, 1905), Jenkins (1903), Snyder (1904).

*Ostracion sebae* (Bleeker, 1851): Jordan & Snyder (1904b), Jordan & Evermann (1905), Fowler (1928, 1931, 1934).

*Ostracion lentiginosus* Bloch & Schneider, 1801: Fowler (1949), Gosline & Brock (1960).

*Ostracion meleagris* Shaw in Shaw & Nodder, 1796: Randall (1972b, 1976a, 1985a, 1996a), Hobson (1974), Tinker (1982), Okamoto & Kanenaka (1984), Masuda *et al.* (1984), Randall *et al.* (1985a, 1990a, 1990b, 1993b, 1997a), Uchida & Uchiyama (1986), Smith in Smith & Heemstra (1986), Myers (1989), Hoover (1993, 2003), Allen & Robertson (1994), Robertson & Allen (2002).

TAXONOMY: Randall (1972b) reviewed the Hawaiian species of *Ostracion* but did not fully resolve the status and distributions of the subspecies of *O. meleagris* Shaw, 1796 (see Roberston & Allen, 2002). J.E. Randall (pers. comm.) noted that genetic evidence does not support recognition of subspecies for the spotted boxfish.

COMMON NAMES: Moa (Hoover, 1993, 2003; Randall, 1996a), Moamoa waa (Gosline & Brock, 1960), Oopakaku (Gosline & Brock, 1960), Spotted boxfish (Hoover, 1993, 2003; Randall, 1996a), Spotted trunkfish (Randall, 1985).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 1–71 m (Smith & Swain, 1882; Jordan & Evermann, 1905; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986). The *Ostracion* sp. recorded by Borets & Sokolovsky (1978) was not identified to species.

GENERAL RANGE: The subspecies *O. m. camurum* Jenkins, 1901, is a Johnston Atoll and Hawaiian Islands endemic. *Ostracion m. meleagris* Shaw in Shaw & Nodder, 1796, is Indo-Pacific, from east Africa to southern Japan, the Ogasawara Islands, Australia, Micronesia, and French Polynesia. *Ostracion m. clippertonense* Snodgrass & Heller, 1905, occurs in the eastern tropical Pacific but its distribution has not been fully described and documented; in the eastern tropical Pacific the species as a whole has been recorded from the southernmost Gulf of California to Colombia plus all of the off-shore islands. Engyobenthic over coral, rock, rubble, or sand at 1–71 m (Randall, 1972b; Masuda *et al.*, 1984; Uchida & Uchiyama, 1986; Smith in Smith & Heemstra, 1986; Myers, 1989; Randall *et al.*, 1990a, b, 1997b; Allen & Robertson, 1994; Robertson & Allen, 2002).

### *Ostracion whitleyi* Fowler

*Ostracion whitleyi* Fowler, 1931, p. 366, Marquesas Islands [a replacement name for the preoccupied name *Ostracion ornatus* Hollard, 1856].

*Ostracion solorensis* non Bleeker, 1853 [a valid species not found in the Hawaiian Islands]: Fowler (1928, in part), Gosline & Brock (1960).

*Ostracion whitleyi* Fowler, 1931: Fowler (1931), Randall (1972b, 1976a, 1996a), Tinker (1982), Okamoto & Kanenaka (1984), Randall *et al.* (1985a, 1993b), Hoover (1993, 2003).

TAXONOMY: Randall (1972b). Eschmeyer (1998) misspelled the specific name as *whitleyi*, but this unfortunate *lapsus* was corrected in the website for Eschmeyer's (1998) catalog.

COMMON NAMES: Moa (Randall, 1996a), Whitley's boxfish (Hoover, 1993, 2003), Whitley's trunkfish (Randall, 1996a), Whitesided boxfish.

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 3–27 m (Fowler, 1928; Randall, 1972b; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Hoover, 1993).

GENERAL RANGE: Central Pacific endemic from Johnston Atoll, the Hawaiian Islands, the Society Islands, the Tuamotu Archipelago, and the Marquesas. Engyobenthic over reefs and sand next to reefs at 3–27 m (Randall, 1972a; Randall *et al.*, 1985b).

## Tetraodontidae — Puffers

### *Arothron hispidus* (Linnaeus)

*Tetraodon hispidus* Linnaeus, 1758, p. 333, "Habitat in India".

*Tetraodon stellatus* Eydoux & Souleyet, 1850 [attributed in that work Lacépède, 1803, but this name by that author is not listed in Eschmeyer's Catalog of Fishes; Eydoux & Souleyet's (1850) illustration of this fish is clearly of *A. hispidus*]: Eydoux & Souleyet (1850).

*Tetrodon implutus* Jenyns, 1842 [a species of unknown identity]: Streets (1877).

*Tetrodon hispidus* Linnaeus, 1758: Wetmore (1890).

*Tetraodon hispidus* Linnaeus, 1758: Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949).

*Arothron hispidus* (Linnaeus, 1758): Gosline & Brock (1960), Struhsaker (1973a), Hobson (1974), Tinker (1982), Masuda *et al.* (1984), Randall (1985a, 1996a), Randall *et al.* (1985a, 1990a, 1990b, 1993b, 1997a), Uchida & Uchiyama (1986), Smith & Heemstra (1986), Myers (1989), Hoover (1993, 2003), Chave & Mundy (1994), Allen & Robertson (1994), Robertson & Allen (2002).

TAXONOMY: Smith & Heemstra (1986).

COMMON NAMES: Makimaki (Gosline & Brock, 1960), Keke (Gosline & Brock, 1960; Randall, 1985), 'O'opu-hue (Hoover, 1993, 2003; Randall, 1996a), Stripebelly puffer (Hoover, 1993, 2003; Randall, 1996a), White-spotted puffer (Myers, 1999), Stars and stripes puffer (Randall *et al.*, 1997a; Hoover, 2003), Balloon fish (DLNR).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at 9–121 m (Eydoux & Souyelet, 1850; Jordan & Evermann, 1905; Struhsaker, 1973a; Hobson, 1974; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Hoover, 1993; Chave & Mundy, 1994).

GENERAL RANGE: Indo-transPacific from South Africa and the Red Sea to southern Japan, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, Rapa, and the eastern Pacific from southern California to Ecuador. Engybenitic over rubble and sand at 1–121 m (Masuda *et al.*, 1984; Smith & Heemstra, 1986; Myers, 1989; Randall *et al.*, 1990a, b, 1997b; Chave & Mundy, 1994; Allen & Robertson, 1994; Robertson & Allen, 2002).

### *Arothron manilensis* (Marion de Procé)

*Tetrodon manilensis* Marion de Procé, 1822, p. 130, Manila Bay, Philippines.

*Arothron manillensis* (Marion de Procé, 1822): Masuda *et al.* (1984).

*Arothron manilensis* (Marion de Procé, 1822): Randall (1985b, 1996a), Myers (1989), Randall *et al.* (1990a, 1990b, 1993a), Kuiter (1993).

TAXONOMY: Randall *et al.* (1985b).

COMMON NAMES: Striped puffer (Randall *et al.*, 1997a; Myers, 1999), Narrow-lined puffer.

HAWAIIAN RECORDS: The single specimen collected off Lē'ahi (Diamond Head), O'ahu, at 2 m was probably a waif (Randall *et al.*, 1993a).

GENERAL RANGE: Pacific endemic from eastern Indonesia, Borneo, the Philippines, the Ryukyus, Australia, Micronesia, Samoa, the Hawaiian Islands as a waif, the Society Islands, and Rapa. Engybenitic over sand, mud, coral, or algae at 1–17 m (Masuda *et al.*, 1984; Randall *et al.*, 1985b; Myers, 1989; Randall *et al.*, 1990a, b, 1993a; Kuiter, 1993).

### *Arothron meleagris* (Lacépède)

*Tetrodon meleagris* Lacépède, 1798, p. 505, "Asia".

*Tetraodon lacrymatus* Quoy & Gaimard, 1824: Quoy & Gaimard (1824), Jordan & Snyder (1904a), Jordan & Evermann (1905).

*Tetrodon meleagris* Lacépède, 1798: Smith & Swain (1882).

*Ovoides latifrons* Jenkins, 1901: Jenkins (1901a).

*Tetraodon meleagris* Lacépède, 1798: Fowler (1928, 1931, 1934, 1949).

*Arothron meleagris* (Lacépède, 1798): Gosline & Brock (1960), Hobson (1974), Tinker (1982), Masuda *et al.* (1984), Randall (1985a, 1996a), Randall *et al.* (1985a, 1993b, 1997a), Uchida & Uchiyama (1986), Smith & Heemstra (1986), Myers (1989), Hoover (1993, 2003), Chave & Mundy (1994), Allen & Robertson (1994).

TAXONOMY: Smith & Heemstra (1986). The authorship of this name is usually attributed to Bloch & Schneider but Lacépède published the name first (Eschmeyer, 1998).

COMMON NAMES: 'O'opu-hue (Randall, 1996a), Spotted puffer (Randall, 1996a), Guineafowl puffer (Myers, 1999), Velcro-fish (all from Hoover, 1993, 2003).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at 9–73 m (Quoy & Gaimard, 1824; Smith & Swain, 1882; Jordan & Evermann, 1905; Hobson, 1974; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Hoover, 1993; Chave & Mundy, 1994).

GENERAL RANGE: Indo-transPacific from South Africa to southern Japan, the Ogasawara Islands, Lord Howe Island, Micronesia, the Hawaiian Islands, Easter Island, and the eastern Pacific from the Gulf of California to Ecuador. Engybenitic over coral, rock, and sand at 1–73 m (Masuda *et al.*, 1984;

Smith & Heemstra, 1986; Myers, 1989; Chave & Mundy, 1994; Allen & Robertson, 1994; Randall *et al.*, 1997b).

***Canthigaster amboinensis*** (Bleeker)

*Pseudonotus amboinensis* Bleeker, 1864b, p. 180, Ambon Island, Moluccas Islands, and Manado, northern Sulawesi, Indonesia.

*Tetrodon insignitus* Richardson, 1848 [a junior synonym of *Canthigaster compressa* (Marion de Procé, 1822), a valid species not found in the Hawaiian Islands]; Wetmore (1890)?

*Tropidichthys oahuensis* Jenkins, 1903; Jenkins (1903).

*Tropidichthys psegma* Jordan & Evermann, 1903; Jordan & Evermann (1903b), Jordan & Snyder (1904b).

*Canthigaster oahuensis* (Jenkins, 1903): Jordan & Evermann (1905).

*Canthigaster psegma* (Jordan & Evermann, 1903): Jordan & Evermann (1905).

*Canthigaster amboinensis* (Bleeker, 1864): Fowler (1928, 1949), Gosline & Brock (1960), Hobson (1974), Allen & Randall (1977), Randall (1985a, 1996a), Tinker (1982), Okamoto & Kanenaka (1984), Uchida & Uchiyama (1986), Smith & Heemstra (1986), Myers (1989), Randall *et al.* (1990a), Hoover (1993, 2003), Robertson & Allen (2002).

*Canthigaster polyophthalmus* Pietschmann, 1938; Pietschmann (1938), Fowler (1949).

TAXONOMY: Allen & Randall (1977).

COMMON NAMES: Pu'u-ola'i (Gosline & Brock, 1960), Ambon toby (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Hawai'i Island to Lisianski at 1–165 m (Wetmore, 1890?, Jordan & Evermann, 1903b; Jordan & Evermann, 1905; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall, 1985a; Uchida & Uchiyama, 1986).

GENERAL RANGE: Indo-Pacific from South Africa and the Seychelles to southern Japan, Australia, Micronesia, the Hawaiian Islands, the Society Islands, and the Marquesas. Waifs have been recorded from the Galapagos Islands. Engyobenthic over coral and rocks at 1–165 m (Allen & Randall, 1977; Uchida & Uchiyama, 1986; Smith & Heemstra, 1986; Myers, 1989; Randall *et al.*, 1990a; Robertson & Allen, 2002).

***Canthigaster coronata*** (Vaillant & Sauvage)

*Tetraodon (Anosmius) coronatus* Vaillant & Sauvage, 1875, p. 286, "Hawaiian Islands".

*Tetraodon (Anosmius) coronatus* Vaillant & Sauvage, 1875: Vaillant & Sauvage (1875).

*Canthigaster cinctus* Jordan & Evermann, 1905; Gilbert (1905), Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Humphreys *et al.* (1984).

*Canthigaster coronatus* (Vaillant & Sauvage, 1875): Struhsaker (1973a), Hobson (1974).

*Canthigaster coronata* (Vaillant & Sauvage, 1875): Allen & Randall (1977), Tinker (1982), Okamoto & Kanenaka (1984), Randall (1985a, 1996a), Uchida & Uchiyama (1986), Smith & Heemstra (1986), Myers (1989), Randall *et al.* (1990a, 1993b, 1997a), Kosaki *et al.* (1991), Hoover (1993, 2003), Chave & Mundy (1994).

TAXONOMY: Allen & Randall (1977).

COMMON NAMES: Pu'u olai (Hoover, 1993, 2003), Crowned toby (Hoover, 1993, 2003; Randall, 1996a), Three-barred toby (Randall *et al.*, 1997a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Midway at 6–165 m (Vaillant & Sauvage, 1875; Gilbert, 1905; Jordan & Evermann, 1905; Struhsaker, 1973a; Hobson, 1974; Okamoto & Kanenaka, 1984; Uchida & Uchiyama, 1986; Kosaki *et al.*, 1991; Hoover, 1993; Randall *et al.*, 1993b; Chave & Mundy, 1994).

GENERAL RANGE: Indo-Pacific from South Africa and the Red Sea to southern Japan, the Ogasawara Islands, Australia, Micronesia, and the Hawaiian Islands. Engyobenthic over coral, rock, rubble, and sand at 6–165 m, usually at >15 m (Allen & Randall, 1977; Randall, 1985a; Smith & Heemstra, 1986; Myers, 1989; Randall *et al.*, 1990a, 1997b; Chave & Mundy, 1994).

***Canthigaster epilampra*** (Jenkins)

*Tropidichthys epilamprus* Jenkins, 1903, p. 485, Fig. 33, near Kihei, Maui, Hawaiian Islands.

*Tropidichthys epilamprus* Jenkins, 1903: Jenkins (1903).

*Canthigaster epilamprus* (Jenkins, 1903): Jordan & Evermann (1905), Struhsaker (1973a).



*Canthigaster epilampra* (Jenkins, 1903): Allen & Randall (1977), Randall (1976a, 1985a, 1996a), Tinker (1982), Uchida & Uchiyama (1986), Myers (1989), Randall *et al.* (1990a, 1997a), Hoover (1993, 2003), Chave & Mundy (1994).

TAXONOMY: Allen & Randall (1977).

COMMON NAMES: Pu'u olai, Lantern toby (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Maui to Middle Bank at 20–125 m (Jenkins, 1903; Jordan & Evermann, 1905; Struhsaker, 1973a; Uchida & Uchiyama, 1986; Hoover, 1993; Chave & Mundy, 1994).

GENERAL RANGE: Eastern Indian and western-central Pacific from Christmas Island to Taiwan, the Philippines, the Ogasawara Islands, Australia, Micronesia, the Hawaiian Islands, and the Society Islands. Engybenthic over sand and rock near sand at 6–125 m, rare at <20 m (Allen & Randall, 1977; Randall, 1985a; Myers, 1989; Randall *et al.*, 1990a, 1997b; Chave & Mundy, 1994).

### *Canthigaster inframacula* Allen & Randall

*Canthigaster inframacula* Allen & Randall, 1977, p. 493, Fig. 7c, north shore of O'ahu, Hawaiian Islands.

*Canthigaster inframacula* Allen & Randall, 1977: Allen & Randall (1977), Randall (1980a, 1996a), Tinker (1982), Matsuura & Yoshino (1984), Randall *et al.* (1985a), Chave & Mundy (1994).

TAXONOMY: Allen & Randall (1977).

HAWAIIAN RECORDS: Johnston Atoll and O'ahu at 124–274 m (Allen & Randall, 1977; Randall *et al.* 1985a; Chave & Mundy, 1994).

GENERAL RANGE: Western and central North Pacific endemic from Japan, Johnston Atoll, and the Hawaiian Islands. Engybenthic over rock and sand at 124–274 m (Allen & Randall, 1977; Matsuura & Yoshino, 1984; Chave & Mundy, 1994).

### *Canthigaster jactator* (Jenkins)

*Tropidichthys jactator* Jenkins, 1901b, p. 399, Fig. 11, Honolulu, O'ahu, Hawaiian Islands.

*Tetraodon margaritatus* var. *solandri* non (Richardson, 1845) [a valid *Canthigaster* species known from the Hawaiian Islands only as waifs]: Steindachner (1900).

*Tropidichthys jactator* Jenkins, 1901b: Jenkins (1901b, 1903), Snyder (1904).

*Canthigaster janthinopterus* non (Bleeker, 1855) [a valid species not found in the Hawaiian Islands]: Okamoto & Kanenaka (1984).

*Canthigaster jactator* (Jenkins, 1901b): Jordan & Evermann (1905), Fowler (1928), Gosline & Brock (1960), Hobson (1974), Allen & Randall (1977), Tinker (1982), Randall (1985a, 1996a), Randall *et al.* (1985a, 1993b), Uchida & Uchiyama (1986), Hoover (1993, 2003), Chave & Mundy (1994).

TAXONOMY: Allen & Randall (1977).

COMMON NAMES: Hawaiian whitespotted toby (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 1–89 m (Steindachner, 1900; Jenkins, 1901b; Jordan & Evermann, 1905; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Chave & Mundy, 1994).

GENERAL RANGE: Johnston Atoll and Hawaiian Islands endemic. Engybenthic over coral, rock, rubble, and sand at 1–89 m (Allen & Randall, 1977; Randall, 1985a; Chave & Mundy, 1994).

### *Canthigaster rivulata* (Temminck & Schlegel)

*Tetraodon rivulatus* Temminck & Schlegel, 1850, p. 285, pl. 124 (fig. 3), Nagasaki Bay, Japan.

*Tetrodon caudofasciatus* Günther, 1870: Steindachner (1900).

*Eumycterus bitaeniatus* Jenkins, 1901: Jenkins (1901b, 1903).

*Canthigaster bitaeniatus* (Jenkins, 1901): Jordan & Evermann (1905).

*Canthigaster rivulatus* (Temminck & Schlegel, 1850): Jordan & Dickerson (1908), Fowler (1928, 1949), Gosline & Brock (1960), Struhsaker (1973a).

*Canthigaster rivulata* (Temminck & Schlegel, 1850): Allen & Randall (1977), Tinker (1982), Okamoto & Kanenaka (1984), Randall (1985a, 1996a), Okamura (1985), Uchida & Uchiyama (1986), Smith & Heemstra (1986), Hoover (1993, 2003), Randall *et al.* (1993b, 1997a), Chave & Mundy (1994), Matsuura & Tyler (1997).

TAXONOMY: Allen & Randall (1977).

COMMON NAMES: Maze toby (Hoover, 1993, 2003; Randall, 1996a).

HAWAIIAN RECORDS: Maui to Midway at 1–278 m (Steindachner, 1900; Jordan & Evermann, 1905; Fowler, 1928; Struhsaker, 1973a; Okamoto & Kanenaka, 1984; Randall, 1985a; Uchida & Uchiyama, 1986; Randall *et al.*, 1993b; Chave & Mundy, 1994).

GENERAL RANGE: Indo-Pacific from South Africa and the Seychelles to southern Japan, the Ogasawara Islands, Australia, New Caledonia and the Hawaiian Islands. Engyberthentic over coral, rock, rubble, and sand at 1–357 m (Allen & Randall, 1977; Randall, 1985a; Okamura *et al.*, 1985; Smith & Heemstra, 1986; Chave & Mundy, 1994; Randall *et al.*, 1997b; Matsuura & Tyler, 1997).

***Canthigaster solandri* (Richardson)**

*Tetrodon solandri* Richardson, 1845c, p. 125, pl. 57 (figs. 4–6), “Polynesia”.

*Canthigaster margaritatus* non (Rüppell, 1829) [a valid species not found in the Hawaiian Islands]: Fowler (1928, 1949, in part).

*Canthigaster striolatus* non (Quoy & Gaimard, 1824) [a junior synonym of *C. compressa* (Marion de Procé, 1822), a valid species not found in the Hawaiian Islands]: Fowler (1928, 1949, in part).

*Canthigaster solandri* (Richardson, 1845c): Allen & Randall (1977), Randall (1976a, 1996a), Tinker (1982), Smith & Heemstra (1986), Myers (1989).

TAXONOMY: Allen & Randall (1977).

COMMON NAMES: Spotted toby (Myers, 1999).

HAWAIIAN RECORDS: Known from the Hawaiian Islands only by two specimens collected at O‘ahu (Fowler, 1928; Allen & Randall, 1977).

GENERAL RANGE: Indo-Pacific from South Africa, the Seychelles, and Sri Lanka to Indonesia, the Philippines, New Guinea, Micronesia, the Line Islands, the Society Islands, the Tuamotu Archipelago, and the Hawaiian Islands as waifs. Engyberthentic over coral and rock at 1–36 m (Allen & Randall, 1977; Smith & Heemstra, 1986; Myers, 1989).

***Lagocephalus lagocephalus* (Linnaeus)**

*Tetraodon lagocephalus* Linnaeus, 1758, p. 332, “Habitat in India”.

*Tetraodon (Anosmius) janthinus* Vaillant & Sauvage, 1875: Vaillant & Sauvage (1875).

*Lagocephalus oceanicus* Jordan & Evermann, 1903: Jordan & Evermann (1903a, 1905).

*Canthigaster janthinus* (Vaillant & Sauvage, 1875): Jordan & Evermann (1905).

*Sphoeroides lagocephalus* (Linnaeus, 1758): Fowler (1928, 1934, 1949).

*Lagocephalus lagocephalus* (Linnaeus, 1758): Gosline & Brock (1960), Tinker (1982), Masuda *et al.* (1984), Whitehead *et al.* (1984), Uchida & Uchiyama (1986), Smith & Heemstra (1986), Myers (1989), Shipp in Quéro *et al.* (1990), Randall (1996a).

TAXONOMY: Smith & Heemstra (1986). The subspecies *Lagocephalus lagocephalus oceanicus* (Jordan & Evermann, 1903) is sometimes recognized for Pacific populations of the species (e.g., Masuda *et al.*, 1984) but *Tetraodon janthinus* Vaillant & Sauvage, 1875, seems to be the oldest available name for the subspecies as both taxa were described from the Hawaiian Islands (see Eschmeyer, 1998). There has been no global review of potential subspecies of *L. lagocephalus*, however, and mention of other subspecies from other oceans has not been found. The subspecies is therefore not used in this checklist.

COMMON NAMES: Oceanic puffer (AFS).

HAWAIIAN RECORDS: O‘ahu to Maro Reef at 33–165 m, 33–296 m fishing depths (Vaillant & Sauvage, 1875; Jordan & Evermann, 1905; Uchida & Uchiyama, 1986).

GENERAL RANGE: Circumtropical through temperate in the Mediterranean Sea, Atlantic, Indian, and Pacific oceans. Epipelagic at 1–165 m (Masuda *et al.*, 1984; Whitehead *et al.*, 1984; Smith & Heemstra, 1986; Myers, 1989; Shipp in Quéro *et al.*, 1990).

***Sphoeroides pachygaster* (Müller & Troschel)**

*Tetrodon (Cheilichthys) pachygaster* Müller & Troschel in Schomburgk, 1848, p. 677, Barbados, West Indies, Caribbean Sea.

*Liosaccus cutaneus* (Günther, 1870): Fowler (1928).

*Sphoeroides cutaneus* (Günther, 1870): Gosline & Brock (1960), Struhsaker (1973a), Tinker (1982), Humphreys *et al.* (1984), Whitehead *et al.* (1984).

*Sphoeroides cutanesu* (Günther, 1870) [a misspelling of *cutaneus*]: Borets (1986).

*Sphoeroides pachygaster* (Müller & Troschel, 1848): Shipp (1974), Hardy (1981), Tinker (1982), Okamura *et al.*

(1982), Masuda *et al.* (1984), Okamura (1985), Smith & Heemstra (1986), Shipp *in* Quéro *et al.* (1990), Chave & Mundy (1994), Randall (1996a), Randall *et al.* (1997a), Matsuura & Tyler (1997).

TAXONOMY: Shipp (1974).

COMMON NAMES: Blunthead puffer (AFS).

HAWAIIAN RECORDS: Hawai'i Island to Ladd Seamount at 10–367 m, usually at 115–367 m (Fowler, 1928; Struhsaker, 1973a; Humphreys *et al.*, 1984; Borets, 1986; Chave & Mundy, 1994).

GENERAL RANGE: Circumtropical and subtropical in the Mediterranean Sea, Atlantic, Indian, and Pacific oceans. In the Pacific known from Japan, the Kyushu-Palau Ridge, the Okinawa Trough, the Ogasawara Islands, the Philippines, Australia, the region of New Caledonia, New Zealand, and the Hawaiian Islands. Engybenitic over sand at 10–480 m, usually at >100 m (Shipp, 1974; Hardy, 1981; Okamura *et al.*, 1982; Masuda *et al.*, 1984; Whitehead *et al.*, 1984; Okamura *et al.*, 1985; Smith & Heemstra, 1986; Shipp *in* Quéro *et al.*, 1990; Chave & Mundy, 1994; Randall *et al.*, 1997b; Matsuura & Tyler, 1997).

### *Torquigener florealis* (Cope)

*Tetrodon florealis* Cope, 1871, p. 479, "Hawaiian Islands".

*Tetrodon florealis* Cope, 1871: Cope (1871).

*Spheroides florealis* (Cope, 1871): Fowler (1900), Jordan & Evermann (1905).

*Sphoeroides hypselogenion* non (Bleeker, 1852) [a valid *Torquigener* species not found in the Hawaiian Islands]: Fowler (1928, 1931, 1934, 1949).

*Lagocephalus hypselogenion* non (Bleeker, 1852): Gosline & Brock (1960), Struhsaker (1973a), Tinker (1982).

*Torquigener randalli* non Hardy, 1983 [a valid endemic Hawaiian Islands species]: Uchida & Uchiyama (1986) in part? (see below).

*Torquigener florealis* (Cope, 1871): Hardy (1983b, 1989), Randall (1996a).

TAXONOMY: Hardy (1983b, 1989).

COMMON NAMES: Floral puffer (Randall, 1996a).

HAWAIIAN RECORDS: Hawai'i Island to Pearl and Hermes Reef at 3–238 m, usually at 90–128 m (Cope, 1871; Jordan & Evermann, 1905; Fowler, 1928, 1934; Struhsaker, 1973a; Hardy, 1983b).

GENERAL RANGE: Western and central North Pacific endemic from the East China Sea, Japan, and the Hawaiian Islands. Engybenitic over sand at 3–238 m (Struhsaker, 1973a; Hardy, 1983b, 1989).

### *Torquigener randalli* Hardy

*Torquigener randalli* Hardy, 1983b, p. 71, Fig. 4, Haleiwa, O'ahu, Hawaiian Islands.

*Torquigener randalli* Hardy, 1983b: Hardy (1983b), Uchida & Uchiyama (1986) in part?, Hardy (1989), Randall (1996a).

TAXONOMY: Hardy (1983b, 1989).

COMMON NAMES: Randall's puffer (Randall, 1996a).

HAWAIIAN RECORDS: O'ahu to Kure Atoll at 29–132 m (Hardy, 1983b; Uchida & Uchiyama, 1986).

GENERAL RANGE: Hawaiian Islands endemic. Engybenitic over sand at 29–132 m (Hardy, 1983b, 1989; Uchida & Uchiyama, 1986).

## Diodontidae — Porcupinefishes, Burrfishes

### *Chilomycterus reticulatus* (Linnaeus)

*Diodon reticulatus* Linnaeus, 1758, p. 334, "Habitat in India".

*Chilomycterus affinis* Günther, 1870: Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1931), Gosline & Brock (1960), Struhsaker (1973a), Tinker (1982), Springer (1982), Masuda *et al.* (1984), Randall (1985a), Uchida & Uchiyama (1986).

*Chilomycterus reticulatus* (Linnaeus, 1758): Leis *in* Smith & Heemstra (1986), Randall *et al.* (1990a, 1993b, 1997a), Duron & Quéro *in* Quéro *et al.* (1990), Chave & Mundy (1994), Allen & Robertson (1994), Robertson & Allen (2002), Hoover (2003).

TAXONOMY: Leis *in* Smith & Heemstra (1986) stated that *C. reticulatus* is the only species in the genus. Randall *et al.* (1990a).

COMMON NAMES: 'O'opu-hui (Gosline & Brock, 1960), Pacific burrfish (AFS), Fewspine porcupinefish,

Spotfin burrfish (Randall, 1996a; Hoover, 2003), Spotted burrfish (Myers, 1999).

HAWAIIAN RECORDS: Moloka'i to Midway at 61–141 m (Snyder, 1904; Jordan & Evermann, 1905; Struhsaker, 1973a; Uchida & Uchiyama, 1986; Randall *et al.*, 1993b; Chave & Mundy, 1994).

GENERAL RANGE: Circumglobal in the Gulf of Mexico, Atlantic, Indian and Pacific oceans but reported only from the Hawaiian Islands and Easter Island in the central Pacific. Engyobenthic over coral, rock, and sand at 1–141 m, juveniles are epipelagic (Springer, 1982; Masuda *et al.*, 1984; Leis *in* Smith & Heemstra, 1986; Duron & Quéro *in* Quéro *et al.*, 1990; Randall *et al.*, 1990a, 1997b; Chave & Mundy, 1994; Allen & Robertson, 1994; Robertson & Allen, 2002).

### *Diodon eydouxi* Brisout de Barneville

*Diodon eydouxi* Brisout de Barneville, 1846, p. 142, "eastern Pacific".

*Diodon eydouxi* Brisout de Barneville, 1846: Leis (1978), Masuda *et al.* (1984), Matsuura & Yoshino (1984), Leis *in* Smith & Heemstra (1986), Myers (1989), Duron & Quéro *in* Quéro *et al.* (1990).

TAXONOMY: Leis (1978).

COMMON NAMES: Pelagic porcupinefish.

HAWAIIAN RECORDS: Hawai'i Island to O'ahu at ca. 1 m (Leis, 1978).

GENERAL RANGE: Circumtropical and subtropical between 35°N–35°S in the Gulf of Mexico, Atlantic, Indian, and Pacific oceans. Epipelagic from 1 m to unknown depths (Leis, 1978; Masuda *et al.*, 1984; Matsuura & Yoshino, 1984; Leis *in* Smith & Heemstra, 1986; Duron & Quéro *in* Quéro *et al.*, 1990).

### *Diodon holocanthus* Linnaeus

*Diodon holocanthus* Linnaeus, 1758, p. 335, "Habitat in India".

*Diodon holocanthus* Linnaeus, 1758: Snyder (1904), Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Hobson (1974), Leis (1978), Tinker (1982), Okamoto & Kanenaka (1984), Masuda *et al.* (1984), Randall (1985a, 1996a), Uchida & Uchiyama (1986), Leis *in* Smith & Heemstra (1986), Duron & Quéro *in* Quéro *et al.* (1990), Randall *et al.* (1990a, 1993b, 1997a), Hoover (1993, 2003), Kuitert (1993), Allen & Robertson (1994), Robertson & Allen (2002).

*Diodon maculatus* Günther, 1870: Günther (1870), Steindachner (1900).

*Diodon holocanthus* Jordan & Evermann, 1905 [an unjustified emendation of *holocanthus* Linnaeus, 1758]: Jordan & Evermann (1905).

TAXONOMY: Leis (1978).

COMMON NAMES: Kōkala (Hoover, 1993, 2003; Randall, 1996a), Balloonfish (AFS), Spiny porcupinefish (Hoover, 1993), Spiny balloonfish (Randall, 1996a; Myers, 1999, Hoover, 2003), Freckled porcupinefish (Randall *et al.*, 1997a), Longspine porcupinefish (Hoover, 2003).

HAWAIIAN RECORDS: Hawai'i Island to Kure Atoll at 9–104 m (Günther, 1870; Jordan & Evermann, 1905; Hobson, 1974; Okamoto & Kanenaka, 1984; Uchida & Uchiyama, 1986; Hoover, 1993; Randall *et al.*, 1993b).

GENERAL RANGE: Circumtropical and subtropical between 35°N–35°S in the Gulf of Mexico, Gulf of California, Atlantic, Indian, and Pacific oceans, but known only from the Hawaiian Islands, the Line Islands, Pitcairn, and Easter Island in the central Pacific. Engyobenthic over coral, rock, rubble and sand at 9–104 m (Leis, 1978; Masuda *et al.*, 1984; Uchida & Uchiyama, 1986; Leis *in* Smith & Heemstra, 1986; Duron & Quéro *in* Quéro *et al.*, 1990; Randall *et al.*, 1990a, 1997b; Kuitert, 1993; Allen & Robertson, 1994; Robertson & Allen, 2002).

### *Diodon hystrix* Linnaeus

*Diodon hystrix* Linnaeus, 1758, p. 335, "Habitat in India".

*Diodon hystrix* Linnaeus, 1758: Smith & Swain (1882), Jenkins (1903), Snyder (1904), Jordan & Evermann (1905), Fowler (1928, 1931, 1934, 1949), Gosline & Brock (1960), Hobson (1974), Leis (1978), Tinker (1982), Okamoto & Kanenaka (1984), Masuda *et al.* (1984), Whitehead *et al.* (1984), Randall (1985a, 1996a), Randall *et al.* (1985a, 1990a, 1993b, 1997a), Uchida & Uchiyama (1986), Leis *in* Smith & Heemstra (1986), Myers (1989), Winterbottom *et al.* (1989), Duron & Quéro *in* Quéro *et al.* (1990), Hoover (1993, 2003), Allen & Robertson (1994).

*Diodon nudifrons* Jenkins, 1903: Jenkins (1903), Jordan & Evermann (1905).

TAXONOMY: Leis (1978).

COMMON NAMES: Kōkala (Hoover, 1993, 2003; Randall, 1996a), 'O'opu-kawa (Gosline & Brock, 1960),

Porcupinefish (AFS; Hoover, 1993, 2003; Randall, 1996a), Giant porcupinefish (Hoover, 2003).

HAWAIIAN RECORDS: Johnston Atoll and Hawai'i Island to Kure Atoll at 19–137 m (Smith & Swain, 1882; Jordan & Evermann, 1905; Hobson, 1974; Okamoto & Kanenaka, 1984; Randall *et al.*, 1985b, 1993b; Uchida & Uchiyama, 1986; Hoover, 1993).

GENERAL RANGE: Circumtropical and subtropical between 35°N–25°S in the Gulf of Mexico, Mediterranean Sea, Red Sea, Gulf of California, Atlantic, Indian, and Pacific oceans. Epi- and mesopelagic over coral, rock, rubble, and sand at 1–137 m (Leis, 1978; Masuda *et al.*, 1984; Whitehead *et al.*, 1984; Uchida & Uchiyama, 1986; Leis *in* Smith & Heemstra, 1986; Myers, 1989; Winterbottom *et al.*, 1989; Duron & Quéro *in* Quéro *et al.*, 1990; Randall *et al.*, 1990a, 1997b; Allen & Robertson, 1994).

## Molidae — Molas

### *Masturus lanceolatus* (Liénard)

*Orthogoriscus lanceolatus* Liénard, 1840, p. 291, Port Louis, Mauritius, western Indian Ocean.

*Mola lanceolata* (Liénard, 1840): Balart *et al.* (2000).

*Masturus lanceolatus* (Liénard, 1840): Fowler (1928, 1934), Gosline & Brock (1960), Tinker (1982), Masuda *et al.* (1984), Whitehead *et al.* (1984), Heemstra *in* Smith & Heemstra (1986).

TAXONOMY: Heemstra *in* Smith & Heemstra (1986).

COMMON NAMES: Sharptail mola (AFS).

HAWAIIAN RECORDS: O'ahu to St. Rogatien Bank (Fowler, 1928; Balart *et al.*, 2000).

GENERAL RANGE: Circumtropical and subtropical in the Atlantic, Indian, and Pacific oceans. Epipelagic (Masuda *et al.*, 1984; Whitehead *et al.*, 1984; Heemstra *in* Smith & Heemstra, 1986; Balart *et al.*, 2000).

### *Mola mola* (Linnaeus)

*Tetraodon mola* Linnaeus, 1758, p. 334, "Habitat in M. Mediterraneo".

*Orthogoriscus mola* (Linnaeus, 1758): Wetmore (1890).

*Mola mola* (Linnaeus, 1758): Jordan (1921b), Fowler (1928), Gosline & Brock (1960), Borets & Sokolovsky (1978), Tinker (1982), Masuda *et al.* (1984), Whitehead *et al.* (1984), Heemstra *in* Smith & Heemstra (1986).

TAXONOMY: Heemstra *in* Smith & Heemstra (1986).

COMMON NAMES: Ocean sunfish (AFS), Mola mola (DLNR).

HAWAIIAN RECORDS: O'ahu to Kaua'i (Wetmore, 1890; Jordan, 1921b; Fowler, 1928).

GENERAL RANGE: Cosmopolitan in the tropical through temperate Mediterranean Sea, Atlantic, Indian, and Pacific oceans. Epi- and mesopelagic at 1–360 m (Masuda *et al.*, 1984; Whitehead *et al.*, 1984; Heemstra *in* Smith & Heemstra, 1986).

### *Ranzania laevis* (Pennant)

*Ostracion laevis* Pennant, 1776, p. 129, pl. 19, Cornwall, England.

*Ranzania makua* Jenkins, 1895: Jenkins (1895, 1903), Fowler (1900), Jordan & Evermann (1905), Jordan *et al.* (1927).

*Ranzania truncata* (Retzius, 1785): Fowler (1928).

*Triurus truncatus* (Retzius, 1785): Fowler (1949).

*Ranzania* species: Loeb (1979).

*Ranzania laevis* (Pennant, 1776): Gosline & Brock (1960), Sherman (1961), Leis (1977), Tinker (1982), Masuda *et al.* (1984), Whitehead *et al.* (1984), Heemstra *in* Smith & Heemstra (1986).

TAXONOMY: Heemstra *in* Smith & Heemstra (1986).

COMMON NAMES: 'Apahu (Gosline & Brock, 1960), Makua (Gosline & Brock, 1960), Slender mola (AFS).

HAWAIIAN RECORDS: Hawai'i Island to Kaua'i at 1–140 m fishing depths (Jenkins, 1895; Jordan & Evermann, 1905; Fowler, 1928; Sherman, 1961; Leis, 1977).

GENERAL RANGE: Circumtropical through warm-temperate in the Mediterranean Sea, Atlantic, Indian, and Pacific oceans. Epipelagic at 1–140 m fishing depths (Masuda *et al.*, 1984; Whitehead *et al.*, 1984; Heemstra *in* Smith & Heemstra, 1986).



## ENDNOTES

1. Poss & Boschung (1996) included all lancelets in a single family, the Branchiostomatidae.
2. Alternative classifications of the Elasmobranchii were proposed by Shirai (1996), de Carvalho (1996), and McEachran *et al.* (1996) in more recent phylogenetic analyses than those used by Nelson (1994).
3. Nelson (1994) and Shirai (1996) included the hammerhead sharks, traditionally placed in the family Sphyrnidae, in an expanded Carcharhinidae.
4. Shirai (1996) considered the Cetorhinidae and Lamnidae to be subfamilies in an expanded Alopiidae.
5. See Shirai (1996) and de Carvalho (1996) for alternative classifications of the families included in the Squaliformes by Nelson (1994).
6. Shirai (1996) and de Carvalho (1996) separate the genera included in the Dalatiidae by Nelson (1994) into several families, including Etmopteridae, Somniosidae, and Dalatiidae.
7. See Shirai (1996) and McEachran *et al.* (1996) for alternative classifications of the Rajiformes.
8. McEachran *et al.* (1996) did not recognize the Plesiobatidae, placing *Plesiobatis* as *incertae sedis*.
9. Nelson (1994) and Shirai (1996) included the genera that follow in the Myliobatidae but McEachran *et al.* (1996) included the Myliobatidae as a subfamily in an expanded Dasyatidae.
10. Forey *et al.* (1996) recognized Notacanthiformes as an order distinct from Albuliformes.
11. The use of Chlopsidae instead of Xenocoegradae for this family was discussed by Lavenberg (1988) and Smith (1989a).
12. There has been no global review of the Serrivomeridae since Bauchot (1959); the family is in need of revision.
13. The classification of the Bathylagidae by Ahlstrom *et al.* (1984a) is used in preference to that of Kobylanskiy (1986), as discussed by Olivar *et al.* (1993). Johnson & Patterson (1996) placed the Bathylagidae in an expanded Microstomatidae and found that the results of their character analysis supported Kobylanskiy's (1986) classification.
14. The Alepocephalidae is in need of worldwide revision. Alepocephalids are abyssal, bottom-associated fishes found in habitats that are not well sampled in Hawai'i. *Alepocephalus tenebrosus* Gilbert, 1892, *Alepocephalus* sp., *Bajacalifornia megalops* (Lütken, 1898), *Talismania antillarum* (Goode & Bean, 1896), and *Rouleina attrita* (Vallant, 1888), were recorded from the Emperor Seamounts north of Hawai'i by Borets (1986).
15. Nelson's (1994) recognition of the Platytroctidae as a family distinct from the Alepocephalidae was supported by the analysis of Johnson & Patterson (1996).
16. The classification of the Stomiiformes was reviewed by Harold & Weitzman (1996).
17. *Diplophos* and *Manducus* were traditionally placed in the Gonostomatidae prior to 1984. Ahlstrom *et al.* (1984b) restricted the Gonostomatidae to *Bonapartia*, *Cyclothone*, *Gonostoma*, and *Margrethia*, an action followed by subsequent workers (see Harold & Weitzman 1996). Despite this, Nelson (1994) placed *Diplophos* and *Manducus* in subfamily of the Gonostomatidae although the family as so constituted is not monophyletic (Ahlstrom *et al.*, 1984b; Harold & Weitzman, 1996). *Diplophos* and *Manducus* together may be the sister group to all other stomiiform taxa (Fink & Weitzman, 1982; Harold & Weitzman, 1996).
18. Recent evaluations of the generic classification of the Gonostomatinae have resulted in conflicting results. Harold (1998) suggested from morphological data that *Gonostoma* is paraphyletic with *Cyclothone* species being more closely related to some *Gonostoma* species than those *Gonostoma* species are to other species traditionally placed in *Gonostoma*. Miya & Nishida (2000) suggested from DNA evidence that only *G. denudatum* and *G. atlanticum* are sister species to *Cyclothone* and that the other "Gonostoma" species form a monophyletic clade that could be recognized as another genus, *Sigmops*. The classification of Miya & Nishida (2000) is used here because both classifications present convincing evidence that *Gonostoma* as traditionally composed is not a monophyletic and because Harold (1998) did not propose an alternative nomenclature.
19. The spellings of the Phosichthyoidei and Phosichthyidae follow those in Eschmeyer (1990). The Phosichthyidae is probably not a monophyletic family (Harold & Weitzman 1996).
20. The Astronesthidae, Stomiidae, Chauliodontidae, Melanostomiidae, Malacosteidae, and Idiacanthidae of most authors are here included in an enlarged Stomiidae (Fink, 1984, 1985). For convenience, this section is divided into the more traditional units, following Nelson (1994), with the older family units recognized as "subfamilies". These "subfamilies" are not equivalent to monophyletic units identified by Fink (1984, 1985), however.
21. Astronesthine larvae from the Hancock Seamounts (Boehlert & Mundy, 1992) and Johnston Atoll (Boehlert *et al.*, 1992) were not identified.
22. The malacosteine larvae collected at Hancock could not be identified to genus (Boehlert & Mundy, 1992).

23. Baldwin & Johnson (1996) included the Auloipoidei in an expanded Synodontoidei.
24. The Chlorophthalmidae as defined by Merrett & Nielsen (1987) and Baldwin & Johnson (1996) is in need of review and great confusion exists about the numbers and identities of species in the Emperor Seamounts, the Hawaiian Ridge, and elsewhere. At least two distinct forms traditionally placed in *Chlorophthalmus* (see Mead 1966 and Okamura *in* Okamura *et al.* 1982) occur in the northern part of the Hawaiian Archipelago, and six names for these appear in the literature. Sato & Nakabo (2002a) made substantial progress in the revision of the group when they reclassified the two forms of *Chlorophthalmus* as two genera in two unrelated families: *Chlorophthalmus* in the Chlorophthalmidae and *Paraulopus* in the Paraulopidae. They later (Sato and Nakabo 2002b, 2003) reviewed the species of *Paraulopus*. All of these species are included here within the Chlorophthalmidae in keeping with this checklist's use of Nelson's (1994) classification as its format, even though Sato & Nakabo's (2002a) classification is accepted as valid. While main Hawaiian Island specimens are probably correctly identified as *C. proridens*, the Hawai'i Undersea Research Laboratory has video records of at least two species from the islands. It remains uncertain if only one *Paraulopus* species occurs at the seamounts in the northern part of the region.
25. The Ipnopidae, as used here, was defined by Merrett & Nielsen (1987) and Baldwin & Johnson (1996).
26. Baldwin & Johnson (1996) included the Scopelarchidae in the Alepisauridae.
27. Baldwin & Johnson (1996) included the Synodontidae in the suborder Synodontoidei.
28. The Paralepididae is greatly in need of revision. Most paralepidid specimens are larvae and adults are unknown for several species. Many paralepidids collected in Hawaiian waters seem to have been identified as *Lestidium nudum* simply because this was the only species mentioned in early papers on fishes of Hawai'i and because most researchers have been unaware that many species occur in the region. Larvae of several paralepidid species from Johnston Atoll and the Hancock Seamounts were not identified to genus (Boehlert *et al.*, 1992; Boehlert & Mundy, 1992). Larvae tentatively identified as the unidentified paralepidid types 1 and 4 described by Ozawa (1986) have been collected off O'ahu (B. Mundy, unpubl. data). Loeb (1979) listed an undescribed genus and species of paralepidid, as Paralepididae Type D, from the central North Pacific Ocean.
29. Baldwin & Johnson (1996) gave persuasive evidence that *Anotopterus* should be included within the Paralepididae. The traditional recognition of Anotopteridae as a distinct family is followed here to conform with the classification of Nelson (1994).
30. Evermannellid larvae recorded from Hancock were not identified to genus (Boehlert & Mundy, 1992).
31. Baldwin & Johnson (1996) included *Omosudis* within an expanded Alepisauridae.
32. Stiassny (1996) corroborated the monophyly of the Myctophiformes and its two families, the Neoscopelidae and the Myctophidae.
33. It is likely that more than three species in the Trachipteridae occur in Hawaiian waters but no well-documented published records, with detailed justifications for their identification, exist of trachipterids from specific localities within the Hawaiian 200-nmi EEZ. The identities of Hawaiian trachipterid specimens therefore need to be confirmed with voucher specimens placed in museums, along with records of their exact locations of capture. The Trachipteridae Gen. sp. of Borets & Sokolovsky (1978) was not identified.
34. Carapid larvae from 28°N, 155°W and Johnston Atoll were not identified to genus or species (Loeb, 1979; Boehlert *et al.*, 1992).
35. Recognition of the Bathygadidae as a family distinct from the Macrouridae follows Howes & Crimmon (1990). Unresolved questions remain about the taxonomy of this family (Sazanov & Iwamoto, 1992).
36. Although much progress has been made in recent decades on the taxonomy of the Macrouridae, a few genera are still in need of worldwide revision. See Eschmeyer (1990, 1998) for verification of the correct spelling of genus *Caelorinchus*.
37. Antennariid larvae from Johnston Atoll were not identified to species (Boehlert *et al.*, 1992).
38. Oneirodid larvae collected at the Hancock Seamounts were not identified to species (Boehlert & Mundy, 1992). Tinker (1982) listed the Oneirodidae, but did not assign species to the Hawaiian records.
39. Gigantactinid larvae collected at the Hancock Seamounts were not identified to species (Boehlert & Mundy, 1992).
40. The Linophryinidae gen. sp. of Borets & Sokolovsky (1978) and linophrynid larvae collected at the Hancock Seamounts (Boehlert & Mundy, 1992) were not identified to species.
41. Two revisions of the Mugilidae are in conflict in their generic allocations of several species (Senou *in* Nakabo, 1993, and Harrison & Senou, 1999, vs. Thomson, 1997). In this checklist, the classification of Thomson (1997) is followed because he presented more detailed documentation of the characters and histories of the generic names used in both revisions.
42. Belonid larvae collected at the Hancock Seamounts were not identified to species (Boehlert & Mundy, 1992).



43. The taxonomy of poeciliids introduced to the Hawaiian Islands is currently under review by R. Englund (BPBM).
44. The unidentified *Melamphaes* larvae collected at Johnston Atoll were not identified to species (Boehlert *et al.*, 1992).
45. The spelling of the Anoplogasteridae follows Eschmeyer (1998) instead of Nelson (1994) to be consistent with the spelling of the genus from which it is derived.
46. Stiassny & Moore (1992) have suggested that the Holocentridae are the sister group to a clade containing the Zeiformes, Tetraodontiformes, Scorpaeniformes, Perciformes, and Pleuronectiformes, and not a component of the Beryciformes. Johnson & Patterson (1993) disputed the analysis upon which this suggestion was made and retained the Holocentridae within the Beryciformes.
47. Tyler, O'Toole, & Winterbottom (2003) suggested a substantial rearrangement of families within the Zeiformes resulting from a phylogenetic analysis. Results of their study applicable to Hawaiian Islands species are mentioned under individual genera.
48. Rosen (1973), Johnson & Patterson (1993), and Tyler, O'Toole, & Winterbottom (2003), among others, have questioned the inclusion of the Caproidae in the Zeiformes, placing the family instead within the Perciformes (Rosen, 1973) or as *incertae sedis* (Johnson & Patterson, 1993; Tyler, O'Toole, & Winterbottom, 2003).
49. Paxton *et al.* (1989) noted that Macroramphosidae and *Macroramphosus* are the correct spelling of the family and genus that have been spelled Macrorhamphosidae and *Macrorhamphosus* in the past.
50. The Scorpaeniformes was reduced to a suborder, the Scorpaenoidei, within the Perciformes, by Mooi & Gill (1995). Imamura (2000) suggested that the Dactylopteroidei should be excluded entirely from this group. Further analysis suggested that the group was polyphyletic and should be split into two perciform suborders, the Scorpaenoidei and Cottoidei, generally congruent with those suborders in the rejected taxon Scorpaeniformes (Imamura & Yabe, 2002). The older classification is used in this checklist to follow that of Nelson (1994) even though Mooi & Gill's (1995) and Imamura & Yabe's (2002) recommendations seem well supported.
51. The phylogenetic relationships of the Dactylopteridae have long been uncertain. The Dactylopteroidei was proposed as a suborder within the Scorpaeniformes as a compromise between conflicting proposals of the families relationships (Nelson, 1994). Imamura (2000) proposed a novel hypothesis for the family's relationships, suggesting that the Dactylopteridae, as traditionally recognized, is the sister taxon of the percoid family Malacanthidae and that both families could be included in an expanded Dactylopteridae. This hypothesis was corroborated by character analysis but the nomenclatural suggestion is likely to be controversial.
52. An alternative classification for the Scorpaenidae was proposed by Ishida (1994).
53. Placement of *Howella* in its own family follows Roberts (1993) as mentioned in Nelson (1994). *Brephostoma* and *Brinkmanella* were placed *incertae sedis* by Fraser (1972). These and other genera are included here on the basis of their similarity to *Howella* as discussed by Fedoryako (1976).
54. The classification of the Serranidae follows Johnson (1988). The presentation of species within this family is further subdivided into subfamilies and tribes because this has become a standard format in faunal reviews of Indo-Pacific fishes (i.e., Randall *et al.*, 1997a; Myers, 1999).
55. The Pseudochromidae was falsely recorded from the Hawaiian Islands in the original description of *Congrogadus marginatus* Vaillant & Sauvage, 1875, and again by Jordan & Evermann (1905). *Congrogadus marginatus* is the congrid eel later described as *Congrellus bowersi* Jenkins, 1903. *Ariosoma marginatum* (Vaillant & Sauvage, 1875) is the current name for this species (Castle, 1980). The family was later recorded from the Hawaiian Islands based on one occurrence of a *Pseudochromis* on a drydock that had been moved to O'ahu from Guam (see text). Pseudochromids, including congridines, are not indigenous to the Hawaiian Islands (Springer, 1982).
56. The Caristiidae is very badly in need of revision (Scott *et al.*, 1970; Heemstra in Smith & Heemstra, 1986; Janssen *et al.*, 1989; Post in Quéro *et al.*, 1990; Tolley *et al.*, 1990). Nothing certain can be said about the species composition of the Caristiidae in Hawaiian waters, except that at least one species occurs in the region.
57. Fowler (1928) listed *Abudegduf leucozonus* non (Bleeker, 1859) [a valid *Plectroglyphidodon* species], *A. melas* non (Cuvier (ex Kuhl & van Hasselt) in Cuvier & Valenciennes, 1830) [a valid *Neoglyphidodon* species], *A. biocellatus* non (Quoy & Gaimard, 1825) [a valid *Chrysiptera* species], *A. leucopomus* non (Cuvier in Cuvier & Valenciennes, 1830) [a junior synonym of *Chrysiptera brownriggi* (Bennett, 1828)], *A. uniocellatus* non (Quoy & Gaimard, 1825) [a junior synonym of *Chrysiptera cyanea* (Quoy & Gaimard, 1825)], and *A. amabilis* non (De Vis, 1884) [another junior synonym of *Chrysiptera brownriggi* (Bennett, 1828)] from the Hawaiian Islands but questioned the validity of some of these records. No references to the occurrence of these species in the archipelago have been found in more recent literature (Allen, 1975, 1991a), and the Hawaiian records are considered false.
58. In their review of the Labridae, Parenti & Randall's (2000) listing of the Hawaiian Islands as within the range of the genus *Paracheilinus* was an error. They did not include the Hawaiian Islands in the range of any of the individual species of the genus and there are no other records of *Paracheilinus* from the region.

59. The identities of the Hawaiian scarid specimens recorded by Fowler (1928, 1949) as *Callyodon nuchipunctatus* non Valenciennes, 1840, (= *Scarus niger* non Forsskål, 1775) were not determined. Loeb (1979) listed an unidentified scarid larvae from 28°N, 155°W, far from the nearest adult habitat.
60. Mooi & Johnson (1997) removed the Champsodontidae from the Trachinoidei and placed it in the perciform suborder Scorpaenoidei, itself recategorized from the Scorpaeniformes by Mooi & Gill (1995). Further analysis of the phylogenetic relationships of the Champsodontidae failed to corroborate its placement in the Scorpaenoidei or Cottoidei (Imamura & Yabe, 2002). Because the classification in this checklist follows Nelson (1994) the older placements of the Champsodontidae and Scorpaenoidei are used here.
61. Pinguipedidae has precedence over the older familial name, Mugiloididae (see Rosa & Rosa, 1987).
62. Conflicting classifications of the Callionymidae have been proposed by Fricke (1983) and Nakabo (1982a). This checklist uses the taxonomy from in the most recent revision of the Hawaiian callionymids (Randall, 1999b).
63. Thacker (2000) redefined the Microdesmidae and removed *Ptereleotris*, *Nemateleotris*, and other genera in the Ptereleotrinae to a new family, Ptereleotridae. The classification of Nelson (1994) is followed here as the standard for this checklist.
64. The classification of the Xiphiidae (sensu lato) follows Nelson (1994), in keeping with the convention used throughout this checklist. Most other classifications, including Nakamura (1985), recognize the Istiophoridae and Xiphiidae as distinct families.
65. The Belontiidae as used by Nelson (1994) is now considered to be paraphyletic and included in an enlarged Osphronemidae (see Britz, 2001, and references cited therein).
66. Unpublished notes by J. Leis and W. Watson on the identification of larval bothids from the Hawaiian Islands included an illustration by T. Nakata of a bothid larva that has counts and characters matching none of the species known from the region (W. Watson, pers. comm., 1987). This indicates that an unidentified, perhaps undescribed, species in the family may exist in the archipelago. The illustration was one of a series done for P. Struhsaker of flatfish larvae from the NMFS PIFSC collection. All of Nakata's bothid illustrations included in Leis and Watson's notes were published in Moser *et al.* (1984), except for that of the unidentified species. The specimen from which the illustration was done has not been found and its collection locality cannot be determined.

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## INDEX TO SCIENTIFIC AND COMMON NAMES

Taxon names are listed alphabetically. Names at the rank of family and higher are in capitalized letters. Genera and subgenera are also shown in **boldface**, and page numbers refer to the first page on which a species account within that genus or subgenus appears. Species names represented by full accounts (with their own species heading) in the checklist appear in **boldface**, and are listed in this index twice; both indented under the genus heading, and also separately in the appropriate alphabetical location. Species names that appear in the synonym listings are in regular (non-boldface) type, and may appear multiple times (once for each genus combination that appears in the synonym listings). Pagination in **boldface** indicates the page on which the main species account appears.

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