Fishes of Terengganu

East coast of Malay Peninsula, Malaysia

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Preface

Tropical seas in Southeast Asian countries are well known for their rich fish diversity found in various environments such as beautiful coral reefs, mud flats, sandy beaches, mangroves, and estuaries around river mouths. The South China Sea is a major water body containing a large and diverse fish fauna. However, many areas of the South China Sea, particularly in Malaysia and Vietnam, have been poorly studied in terms of fish taxonomy and diversity. Local fish scientists and students have frequently faced difficulty when trying to identify fishes in their home countries.

During the International Training Program of the Japan Society for Promotion of Science (ITP of JSPS), two graduate students of Kagoshima University, Mr. Mizuki Matsunuma (the first editor of this book) and Mr. Masatoshi Meguro, were provided with the opportunity to survey marine fishes along the east coast of peninsular Malaysia at the Institute of Oceanography and Environment (INOS), Universiti Malaysia Terengganu (UMT). Their faunal study succeeded through cooperative activities between Malaysian and Japanese ichthyologists, and resulted in this field guide, "Fishes of Terengganu – East coast of Malay Peninsula, Malaysia", that includes taxonomic accounts with color photographs of 441 species belonging to 276 genera of 108 families. This field guide could not have been completed without the help of Prof. Noor Azhar bin Mohamed Shazili, Deputy Vice-Chancellor (Academic and Internationalization) of UMT, Dr. Zainudin bin Bachok, Deputy Director of INOS, Mr. Yusri bin Yusuf, Lecturer of INOS and Mrs. Siti Tafzilmeriam bt. Sheikh Abdul Kadir, Research Officer of South China Sea Reference Center & Repository at INOS. Funds to publish this field guide were provided through grants from UMT and the National Museum of Nature and Science.

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Preface

This field guide to the fishes of Terengganu was intended to assist local fisheries biologists in the identification of fishes in the coastal zone of Malaysia and the publication of this book is timely as there has always been a shortage of such guides in this region. This publication is the culmination of collaborative efforts of scientists from Universiti Malaysia Terengganu and Kagoshima University, and is another significant milestone in the long history of collaboration between the two institutions. This effort would not have been possible without the support of Kagoshima University and their students who spent many months in Terengganu, and the support of the Institute of Oceanography and Environment, Universiti Malaysia Terengganu for providing the laboratories, equipment and logistical support. Our sincere gratitude also goes to scientists from University Malaysia Sabah and Universiti Kebangsaan Malaysia for their chapter contributions. Universiti Malaysia Terengganu especially appreciates the effort of Prof. Hiroyuki Motomura in leading the study in Malaysia from the very beginning.

This work shows that taxonomic studies of fishes in this region still have important contributions to be made, as a number of new species were identified in the coastal zone. We hope this field guide will be useful in assisting scientists in fish identification in the Malaysian context.

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Left to right: **Hiroyuki Motomura**, Professor of Kagoshima University Museum, **Noor Azhar bin Mohamed Shazili**, Deputy Vice-Chancellor (Academic and International Affairs) of Universiti Malaysia Terengganu (UMT), Aziz bin Deraman, Vice-Chancellor of UMT, **Mohd Azmi bin Ambak**, Professor of Department of Fisheries Science and Aquaculture, UMT and Yahaya bin Ibrahim, Deputy Vice-Chancellor (Student Affairs and Alumni) of UMT

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Contents

Introduction

By Mizuki Matsunuma and Hiroyuki Motomura

The South China Sea lies in the tropical zone of the western Pacific Ocean, off the southeast corner of the Asian continent, and is known for both its high productivity and the rich diversity of plants and animals. Randall and Lim (2000) listed at least 3,365 species of marine fishes from the South China Sea. Recently, several pictorial books of fishes in Malaysian waters were published. Mohsin and Ambak (1996) reported 710 species of marine fishes from Malaysian waters and adjacent seas. Adrim et al. (2004) recorded 430 marine fish species from the Anambas and Natuna islands on the Sunda Shelf between the Malay Peninsula and Borneo in the South China Sea. More recently, Ambak et al. (2010) estimated 2,243 fish species occurring in Malaysian waters.

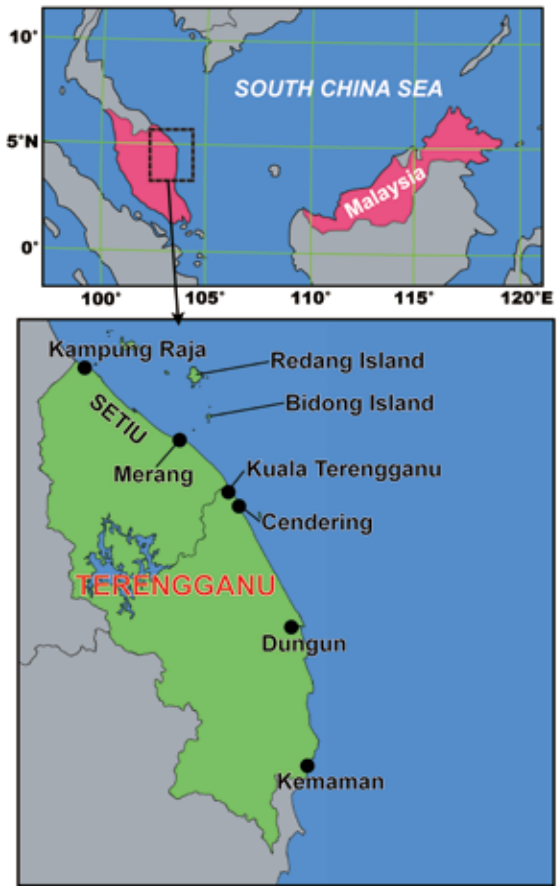
Terengganu, a State of Malaysia, is located on the east coast of the Malay Peninsula and faced to the South China Sea. The coastal environment of Terengganu is characterized by having long sandy beaches with only a few rocky or coral reefs. This is because it is strongly influenced by the large amount of fresh water discharge from two large rivers, e.g., the Terengganu and Dungun rivers. These rivers have wide estuaries with mud flats and mangroves. In particular for coral reefs, these ecosystems are well developed on islands, i.e., Bidong and Redang islands, which are distant from the influences of river discharge, turbidity, and siltation. These marine and coastal habitats are a vital support for a vast variety of marine and estuarine biota, including fishes.

We carried out field surveys of fishes in Terengganu in 2008–2009 to produce a field guide for marine and estuarine fishes of the area. As a result of the surveys, 441 marine and estuarine fish species of 108 families were recorded. They make up around 13 % of over 3,365 fish species recorded by Randall and Lim (2000) from the South China Sea. Among these, four species including *Dasyatis parvonigra* Last & White, 2008 (family Dasyatidae), *Larimichthys crocea* (Richardson, 1846) (Sciaenidae), *Iniistius trivittatus* (Randall & Cornish, 2000) and *Leptojulis lambdastigma* Randall & Ferraris, 1981 (Labridae) are recorded for the first time in the east coast of the Malay Peninsula [the latter two species were reported by Matsunuma et al. (2011)]. This book is produced based on the above surveys and cover most of the diversity of coastal fishes occurring in marine and estuarine habitats, and commercial fishes available at fish markets and ports in Terengganu. Species reported in this book are based on the collected specimens and are deposited in the South China Sea Natural History Museum at Institute of Oceanography, Universiti Malaysia Terengganu and the Kagoshima University Museum to make them available for future scientific studies. We intend this book to be useful for the study and research of ichthyology and fishery science by researchers, students and local government administrators.

This project was supported by the International Training Program of the Japan Society for Promotion of Science (ITP of JSPS), Universiti Malaysia Terengganu (UMT), the National Museum of Nature and Science (NSMT), and the Kagoshima University Museum (KAUM).

Collection Sites

Surveys of fishes in Terengganu were made during two periods from 2008 to 2009. The first survey, carried out from September to November 2008, mainly focused on fishes inhabiting shallow coastal waters of coral or rocky reefs, mangroves, and estuaries. The collection of fishes in the survey was made at several localities in Terengganu, including Bidong Island, Setiu, Merang, Cendering, Dungun, and Kemaman. Coral and rocky reef associated fishes were obtained at Bidong Island. Fishes occurring in mangrove-lined estuary were obtained in Setiu. Cendering, located just south of Kuala Terengganu, has rocky coasts; shallow water fishes found in tide pools were collected here. Fishes were also caught at the beaches and estuaries near Universiti Malaysia Terengganu and at Merang, Dungun, and Kemaman. Fishes were collected mainly by using hand-net and fence-net while SCUBA diving or snorkeling. Cast-net, small bottom trawl, and gill nets were also used for collecting in estuaries and mangroves.



Collection Sites

The second survey observed from December 2008 to January 2009, highlighted fishes in commercial catches, obviously by trawlers, at the port or those of artisanal fisheries (mainly by traps, hand lines, and gill nets) sold at local fish markets in Kuala Terengganu and Kampung Raja. A small number of fishes captured around Redang Island were obtained from a fishing port at Kampung Raja.

The systematic arrangement of families generally follows Nelson (2006). Species in families are arranged in alphabetical order by species name. Each species record was compiled from voucher specimens. Records of the Zebra Shark (Stegostomatidae), *Stegostoma fasciatum* (Hermann, 1783), and the Blotched Fantail Stingray (Dasyatidae), *Taeniurops meyeni* (Müller & Henle, 1841), are based on photographs; these photographs are cataloged at the Fish Image Database of Kagoshima University Museum (KAUM–II). On figure legends of photographs of fish specimens which were obtained at ports or fish markets during the second survey, sampling localities are shown as "off Terengganu"; "KT" and "KR" in parentheses indicates the specimens were obtained in Kuala Terengganu and Kampung Raja, respectively. Specimens obtained during the surveys are deposited at the South China Sea Natural History Museum at Institute of Oceanography, Universiti Malaysia Terengganu (UMTF), Malaysia and the Kagoshima University Museum (KAUM), Japan.

Bidong Island

Coral reefs around Bidong Island

Fish market in Kuala Terengganu

Mangroves at Setiu

Fish landing port in Kuala Terengganu

Cast netting in estuary at Setiu

Methods of Measurements and Counts

Methods of measurements and counts generally follow Nakabo (2002). For fin formulae, the number of spinous and soft fin rays are described by Roman numerals (I, II, III, ...) and Arabic numerals (1, 2, 3, ...), respectively. The unbranched soft rays are sometimes expressed in small Roman numerals (i, ii, iii, ...). Spinous fin rays are generally called spines. In the case of the dorsal or anal (sometimes pectoral or pelvic) fins containing spine and soft rays, the number of spines and soft rays are separated by a comma. When the dorsal (or anal) fin consists of two or more fins (i.e. first dorsal fin, second dorsal fin, ...), each fin is separated by a "+" sign. Gill rakers on the first gill arch on the right side of the body are used for counting. Number of gill rakers on the upper and lower limbs are separated by a "+" sign. When present, the one or more gill rakers between the limbs are included in the lower limb counts. Number of vertebrae includes the urostyle. Counts of abdominal and caudal vertebrae are separated by a "+" sign.

A – number of anal-fin rays.

BR – number of branchiostegal rays

D – number of dorsal-fin rays.

DW – disc width: extremities of the left and right pectoral fins.

DPC – number of dorsal procurrent caudal-fin rays.

FL – fork length: linear distance from most anterior point of head to bottom of concave margin of caudal fin.

GR – number of gill rakers.

LGR – number of gill rakers on lower limb.

LL – number of lateral line scales: number of scales on lateral line from the scale behind the posttemporal to the caudal-fin base.

LLp – number of pored scales on lateral line: only the number of pored scales on lateral line is counted.

LR – number of scales in longitudinal row: number of scales in longitudinal row from the dorsal end of the opercular membrane to the caudal-fin base.

MP – number of mandibular pores.

P_1 – number of pectoral-fin rays.

P_2 – number of pelvic-fin rays.

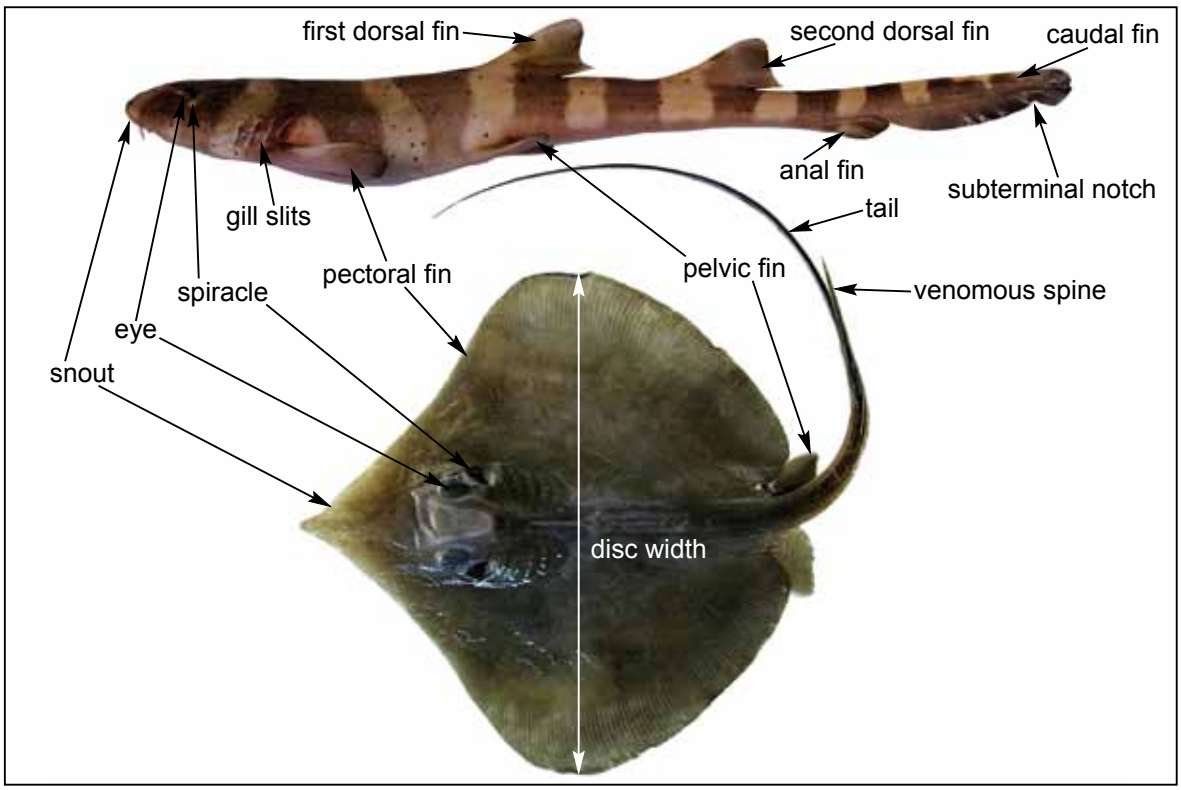
PDS – number of predorsal scales: number of scales on the dorsal midline from the origin of dorsal fin forward to occipital region.

PLp – preanal lateral-line pores: number of pores along lateral line behind gill opening to just above the anus.

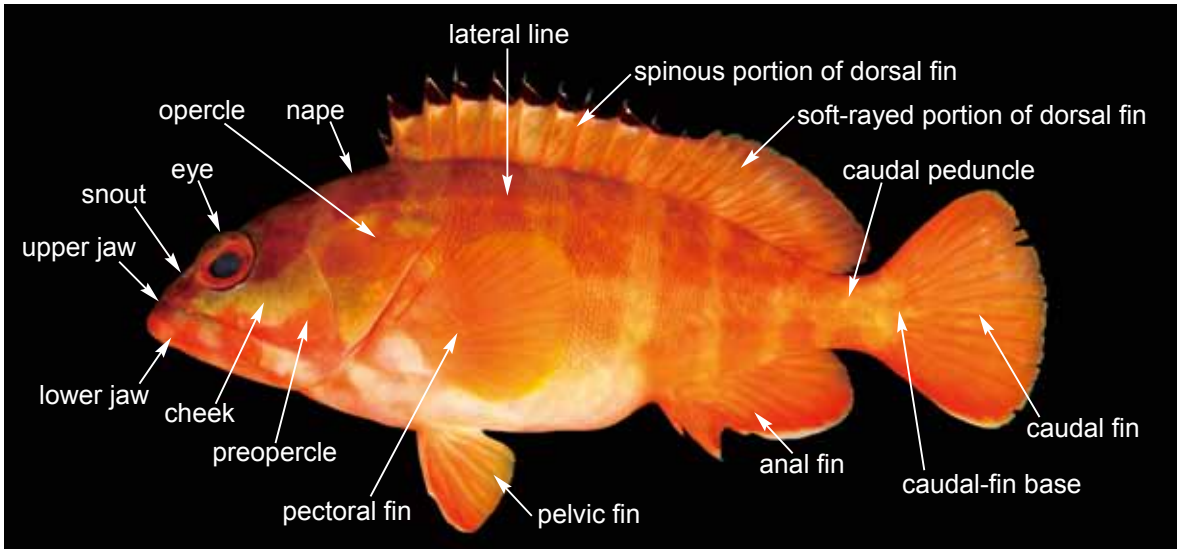
SL – standard length: linear distance from most anterior point of upper jaw (or snout) with mouth closed to caudal fin base (posterior end of hypurals, roughly where fold formed by bending caudal fin).

TL – total length: greatest linear distance between most anteriorly projecting part of head with mouth closed and farthest tip of caudal fin when caudal rays squeezed together. All unspecified lengths are assumed to be total lengths.

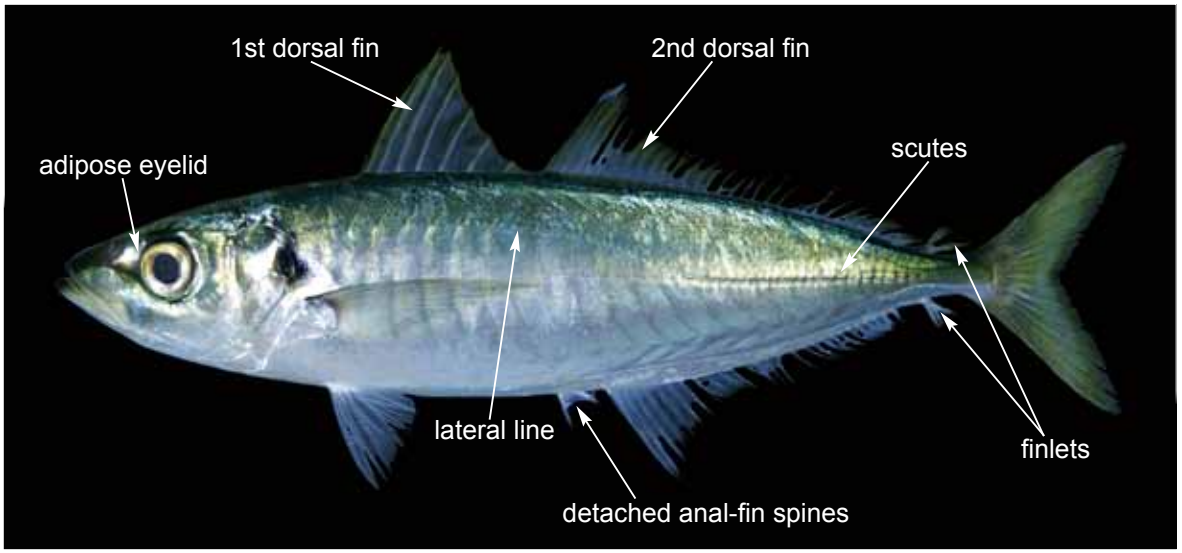
V – number of vertebrae.



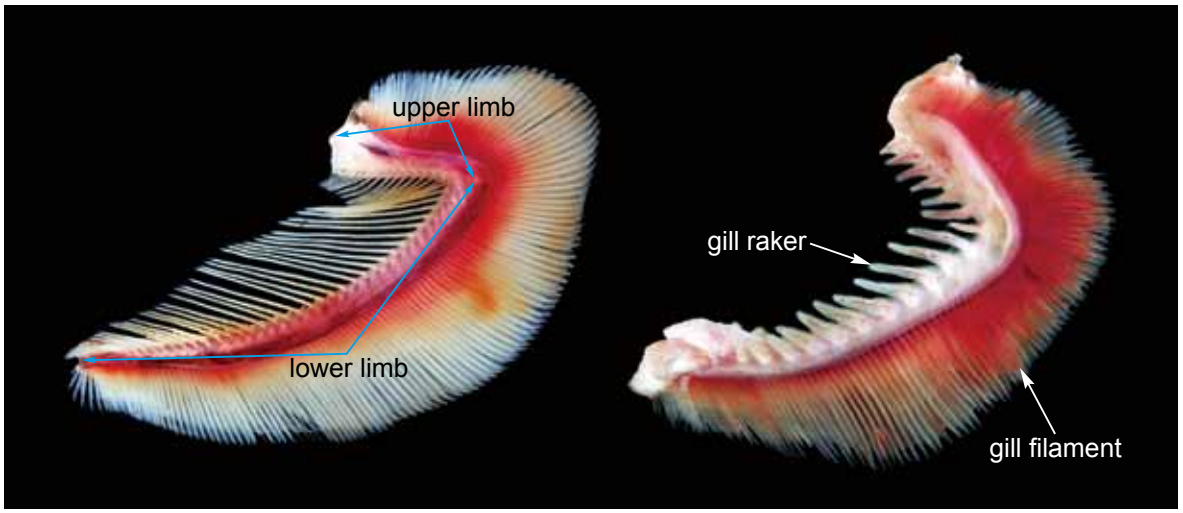
Body parts of elasmobranchs



Body parts of bony fish



Body parts of carangid



Gill arches of carangid (left) and sparid (right)

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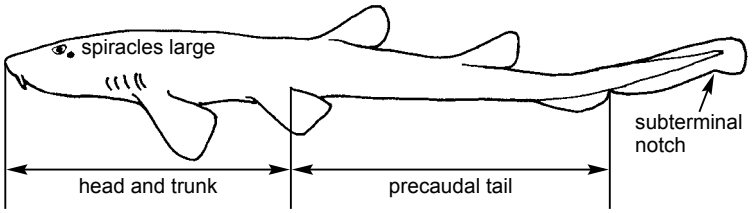
HEMISCYLLIIDAE

Longtail Carpetsharks (Bambоosharks)

By B. Mabel Manjaji-Matsumoto



Small sharks; maximum size to about 130 cm; around 70 cm in most species. Body cylindrical, elongated; precaudal tail somewhat longer than head and trunk. Nostrils with barbels; nasoral grooves and circumnarial grooves present. Mouth small, subterminal (located well anterior to eye); teeth small, not blade-like, monocuspid, similar in both jaws. Eyes without nictitating eyelids. Spiracles large, situated behind and below eyes. Five small gill slits, the posterior 3 over the pectoral-fin base. Two dorsal fins, without spines; first dorsal-fin origin above or posterior to pelvic-fin base; second dorsal fin subequal and similar in shape as the first, well anterior to anal-fin origin; anal-fin base connected with caudal fin, with a deep notch between the fins; caudal fin strongly asymmetrical, with a strong subterminal notch. **Color:** adults dark gray to light brown, plain; head and body with numerous dark spots and faint bands in some species. Juveniles more intensely spotted, usually with black-edged saddlemarkings.

Remarks: occurring in tropical and subtropical coastal areas, from Madagascar to Japan and Australia. Bottom dwellers. Feed on polychaetes, crustaceans and small fishes. Oviparous.

Similar families occurring in the area: Hemiscyllиidae is distinguished from other Indo-Pacific orectolobiform shark families in having an almost cylindrical body, a long precaudal tail (longer than head and body), second dorsal fin located anterior to anal fin, and anal-fin base connected with lower lobe of caudal fin. Orectolobidae – nasal barbels numerous, branched; head and body with elaborate variegated pattern. Ginglymostomatidae and Stegostomatidae – no circumnarial grooves; caudal fin elongate, blade-like; precaudal tail shorter than head and trunk. Scyliorhinidae (carcharhiniform shark) – eyes with weakly differentiated nictitating lower eyelids; second dorsal fin located posterior to anal fin; anal-fin base not connected with lower lobe of caudal fin; head and body with light spots, dark blotches, bars, and saddles.

Chiloscyllium griseum Müller & Henle, 1839

Gray Bambooshark

Body elongated, moderately slender, without lateral ridges. Nostrils subterminal on snout; mouth closer to eyes than snout tip. Dorsal fins smaller than pelvic fins, without free posterior projection; interspace between dorsal fins usually more than 9.3% TL; first dorsal-fin height more than 6.6% TL; second dorsal-fin height usually more than 5.8% TL. **Color:** pale brown to gray brown dorsally, cream ventrally; with 12 or 13 saddle markings in juveniles, markings not outlined in black. **Size:** maximum length 74 cm. **Distribution:** Indo-West Pacific, from the Arabian Sea to New Guinea, north to Japan. However, not recorded from Borneo. **Remarks:** reef associated; inshore bottom dweller; marketed fresh.

Chiloscyllium griseum, KAUM–I. 16868, 54.0 cm TL
off Terengganu (KT), 5 Dec. 2008

Chiloscyllium punctatum Müller & Henle, 1838

Brownbanded Bambooshark

Body elongated, moderately stout, without lateral ridges. Nostrils subterminal on snout; mouth closer to eyes than snout tip. Dorsal fins larger than pelvic fins, with free posterior projections, posterior margins of dorsal fins straight or distinctly concave; anal-fin base shorter than caudal-fin lobe between lower origin and subterminal notch. **Color:** plain dark gray or with faint grayish bands; with dark transverse bands usually with a scattering of small dark spots in juveniles. **Size:** maximum length ca. 1 m. **Distribution:** Indo-West Pacific, from India to northern Australia, north to Japan. **Remarks:** inshore bottom dweller; very tenacious of life, can survive out of water for a long period (half a day); marketed fresh, or as fillets in fish markets of Sabah.

Chiloscyllium punctatum, KAUM–I. 16869, 41.0 cm TL
off Terengganu (KT), 5 Dec. 2008

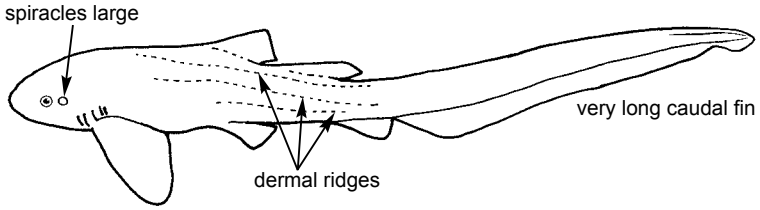
STEGOSTOMATIDAE

Zebra Shark

By Seishi Kimura and B. Mabel Manjaji-Matsumoto

This family is represented by a single species; see the following species account.

Similar families occurring in the area: Stegostomatidae is distinguished from other Indo-Pacific orectolobiform shark families in having a very long caudal fin, almost a half of total length. Hemiscylliidae – origin of second dorsal fin well anterior to origin of anal fin. Ginglymostomatidae – spiracles much smaller than eyes; body without lateral ridge. Rhinco-dontidae – head very wide and flattened; mouth very wide, almost terminal on the head.

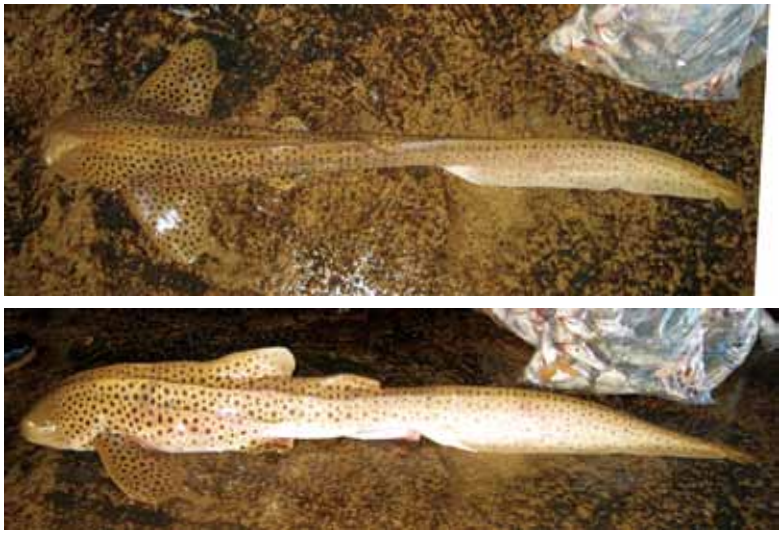


Stegostoma fasciatum (Hermann, 1783)

Zebra Shark

A large shark; maximum size to about 235 cm. Body moderately stout with prominent ridges on dorsal surface and sides; caudal fin very long, blade-like. Nostrils close to anterior margin of snout, with barbels; connected with mouth by nasoral grooves; no circumnarial grooves and folds. Mouth small, located well anterior to eye; teeth small, tricuspid. Eyes without nictitating eyelids. Spiracle similar in size to eye. Two dorsal fins, without spines; first dorsal-fin origin anterior to pelvic-fin origin; second dorsal fin smaller than the first, located just posterior to the first and anterior to anal-fin origin; anal fin present, rounded; caudal fin very long, almost as long as the body, with a deep subterminal notch but with the lower lobe hardly developed. **Color:** adults yellowish brown with numerous, dark brown spots. Juveniles darker, head and body dark brown or blackish, with vertical yellow bars, spots and reticulations. **Distribution:** Indo-West Pacific, from South Africa to New Caledonia, north to Japan. **Remarks:** occurring in tropical and subtropical coastal areas. Feeds usually on mollusks and small fishes. Oviparous.

(S. Kimura & B. M. Manjaji-Matsumoto)



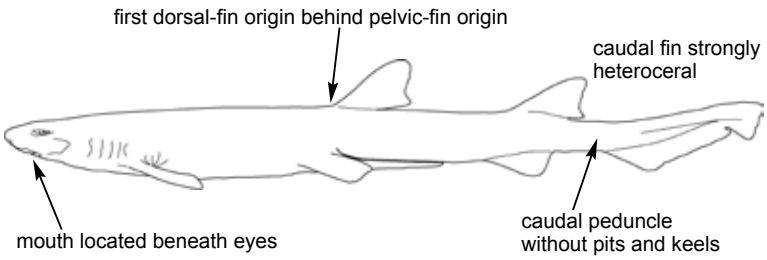
Stegostoma fasciatum, KAUM–II. 39, ca. 100 cm TL off Terengganu (KT), 19 Jan. 2009

SCYLIORHINIDAE

Catsharks

By B. Mabel Manjaji-Matsumoto

Small sized sharks; maximum size to about 70 cm; around 45 cm in most species. Body slender, elongated; tail very slender. Head small, depressed; snout short to moderately long; eyes with weakly differentiated nictitating lower eyelids; nostrils with or without nasoral or circumnarial grooves; mouth moderately large, subterminal (located below eye); teeth very small, numerous, with a single medial cusp and usually 1 or more cusplets on each side near the center of mouth; 5 small gill slits, the posterior 2 over the pectoral-fin base. Two dorsal fins, without spines, both fins of similar shape; first dorsal-fin origin above or posterior to pelvic-fin base; second dorsal-fin origin posterior to anal-fin origin; caudal fin strongly asymmetrical, with a strong subterminal notch. Caudal peduncle without lateral keels or precaudal pits. **Color:** head and body gray, brown, yellowish, or black, often with light or dark spots and dark blotches, bars and saddles.



Remarks: occurring in tropical and subtropical areas. Bottom dwellers, ranging from shallow coastal waters to depths greater than 2,000 m. Feed on polychaetes, crustaceans and small fishes. Used for fishmeal, oil and lobster bait.

Similar families occurring in the area: Scyliorhinidae is distinguished from other Indo-Pacific carcharhiniform shark families in having a small slender body, location of the last 2 gill slits behind pectoral-fin origin, the posterior position of the first dorsal fin, and the absence of keels or precaudal pits on the caudal peduncle. Also distinguishable from the superficially similar orectolobiform shark (Hemiscylliidae) by the presence of weakly differentiated nictitating lower eyelids; and anal-fin base not connected with lower lobe of caudal fin.

Atelomycterus marmoratus (Bennett, 1830)

Coral Catshark

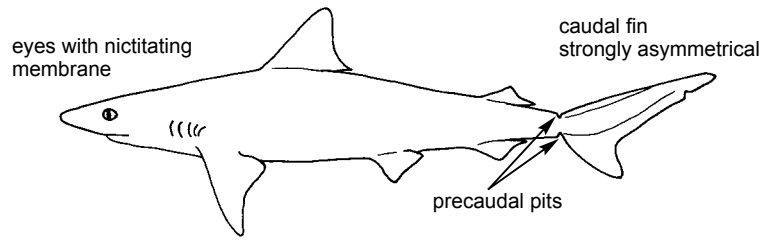
Body elongated, very slender. Nostrils subterminal on snout; nasoral grooves present; anterior nasal flaps greatly expanded, reaching mouth. Mouth large, located below eyes; labial furrows very long. Dorsal fins large, subequal in shape and size, angled rearwards. **Color:** adults and adolescents with marbled appearance; head and body with numerous light gray and white spots; saddles obsolete. Juveniles darker, head and body dark gray with pale vertical lines, black spots with pale margins along dorsal body. **Size:** maximum length 70 cm. **Distribution:** tropical Indo-West Pacific, from Pakistan to New Guinea and southern China and Taiwan. **Remarks:** a common, inshore bottom dweller, often found in crevices and holes on rocky reefs; oviparous; feed mainly on bony fishes; marketed fresh, or as fillets in fish markets of Sabah.

Atelomycterus marmoratus, KAUM–I. 17214, 46.8 cm TL off Terengganu (KT), 10 Jan. 2009

CARCHARHINIDAE

Whaler Sharks (Requiem Sharks)

By B. Mabel Manjaji-Matsumoto and Seishi Kimura



Small to large sharks; maximum size 7.5 m; around 1–3 m in most species. Body cylindrical, weak lateral keels on caudal peduncle in some genera; precaudal tail much shorter than head and trunk. Head conical to depressed; snout very short to long; spiracles large. Nostrils without barbels, nasoral grooves or circumnarial grooves. Mouth usually large, arched, and extending well behind eyes; teeth small to large, blade-like, with a single cusp and cusplets variably developed; anterior teeth in upper jaw smaller than lateral teeth and not separated from them by smaller teeth. Eyes on sides of head, with developed nictitating lower eyelid. Spiracles usually absent. Five small to medium sized gill slits, the last 1 to 3 behind pectoral-fin origin. Two dorsal fins, without spines, the first larger than the second or subequal; first dorsal-fin base located above interspace between pectoral and pelvic-fin bases; anal fin moderately large; caudal fin strongly asymmetrical, much less than a half of total length, with an undulated dorsal margin, a strong subterminal notch, and a well-defined lower lobe; precaudal pits well developed. Intestine with scroll valve, lacking spiral valve. **Color:** head and body gray, yellowish, or bluish dorsally, white or pale yellow ventrally, sometimes with prominent dark or light marking on fins.

Remarks: circumglobal in the tropic and temperate areas of Pacific, Atlantic, and Indian Oceans. Marine, occasionally in freshwater lakes or rivers. Typical predator, feed on almost all aquatic animals. Dominant in tropical waters; the larger species are dangerous to people.

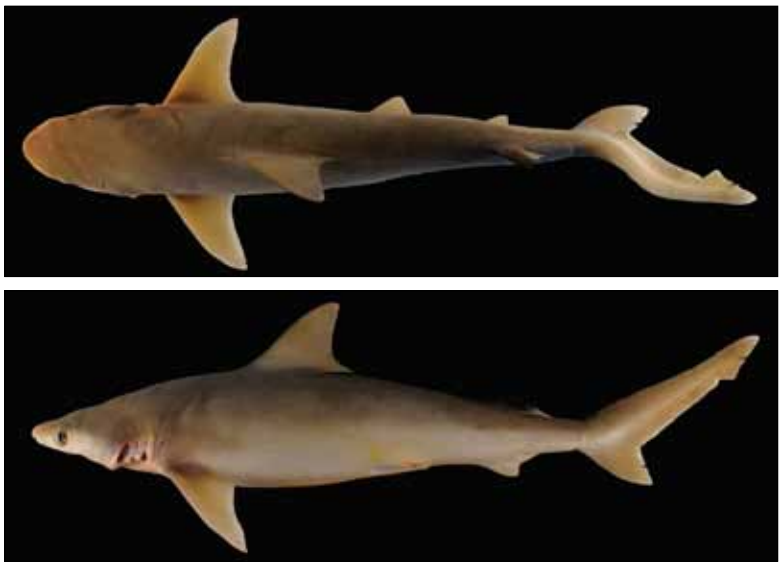
Similar families occurring in the area: Carcharhinidae is distinguished from other Indo-Pacific carcharhiniform shark families in having a character combination of a long snout, spiracles, upper teeth with cusplets, lower teeth well differentiated from uppers, long labial furrows, and second dorsal fin subequal to first dorsal fin, its origin anterior to that of the slightly smaller anal fin. Scyliorhinidae – head and body small, slender, location of the last 2 gill slits behind the pectoral-fin origin, the posterior position of the first dorsal fin, and the absence of keels or precaudal pits on the caudal peduncle. Triakidae – dorsal margin of caudal fin not undulated; precaudal pits absent; intestine with spiral valve. Hemigaleidae – intestine with spiral valve; spiracle present but minute; upper teeth with strong distal cusplets. Sphyrnidae – head hammer-shaped. Lamnidae (lamniform shark) – caudal peduncle with large lateral keels.

Carcharhinus dussumieri (Müller & Henle, 1839)

Whitecheek Shark

Body moderately stout. Snout long, broadly parabolic. Upper teeth with strongly oblique cusp, flanked on one side by strong serrated cusplets; lower teeth narrow, upright, no cusplets. First dorsal fin moderately tall, broad, not falcate. Low interdorsal ridge usually present. **Color:** grayish; second dorsal fin tip black (usually covering about half of fin). **Size:** maximum length at least 94 cm. **Distribution:** tropical waters of the Indo-West Pacific, from the Red Sea to northern Australia, New Guinea and Japan. **Remarks:** a common demersal inshore species from close inshore to about 170 m depth. Viviparous. Used for its fins and meat but of limited value due to its small size.

(B. M. Manjaji-Matsumoto)



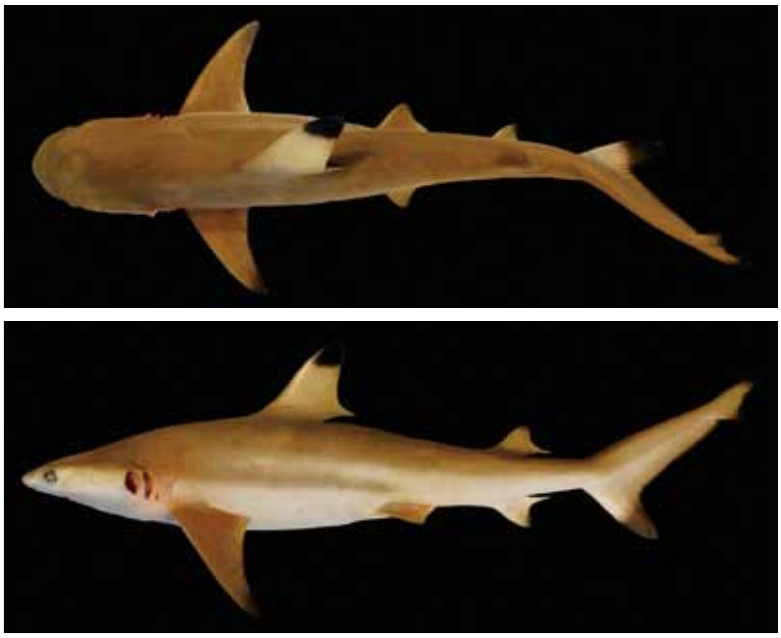
Carcharhinus dussumieri, KAUM–I. 17084, 45.4 cm TL
off Terengganu (KT), 28 Dec. 2008

Carcharhinus melanopterus (Quoy & Gaimard, 1824)

Blacktip Reef Shark

Body moderately stout. Snout very short, broadly rounded, preoral length subequal to internarial space. Upper teeth with narrow oblique central cusp and low basal cusplets; lower teeth narrow, upright to oblique, finely serrated edges. First dorsal fin large, its apex narrowly rounded, its origin over inner margins of pectoral fins; second dorsal fin high, its inner margin less than twice the fin height. Interdorsal ridge absent. **Color:** yellow brown dorsally, distinct pale stripe along each flank; first dorsal fin with a thick black tip; caudal fin lower lobe with thick black tip; other fins often with smaller black tips. **Size:** maximum length at least 142 cm. **Distribution:** tropical Indo-West Pacific and Central Pacific, from southeastern Africa to the Central Pacific Islands, and eastern Mediterranean. **Remarks:** a common reef shark, living in lagoons and near fringes of reefs. Viviparous.

(B. M. Manjaji-Matsumoto)



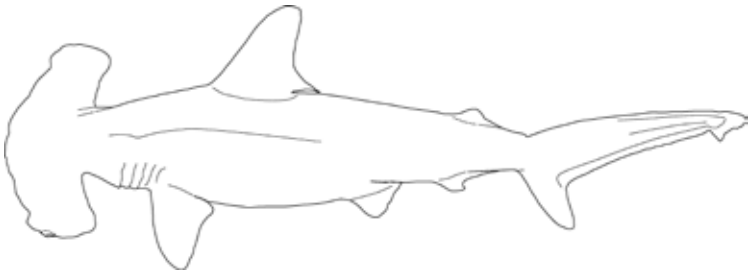
Carcharhinus melanopterus, KAUM–I. 17237, 55.8 cm TL off Terengganu (KT), 14 Jan. 2009

SPHYRNIDAE

Hammerhead Sharks

By B. Mabel Manjaji-Matsumoto

Medium- to large-sized sharks; maximum size to about 600 cm; around 450 cm in most species. Body elongate, moderately slender. Head broad, its anterior portion flattened dorsoventrally and widely expanded laterally in "hammer" form, with the eyes at its outer edges; eyes with well-developed nictitating lower eyelids; teeth blade-like, monocuspid. Two dorsal fins, the first high and pointed, its base much shorter than caudal fin and anterior to pelvic-fin origin; caudal fin asymmetrical, with a strong subterminal notch and a small, but well-defined lower lobe. Caudal peduncle not strongly flattened dorsoventrally or widely expanded laterally, without longitudinal ridges but with precaudal pits. **Color:** gray to brassy.



head hammer-shaped;
eyes located at tips of lateral blades

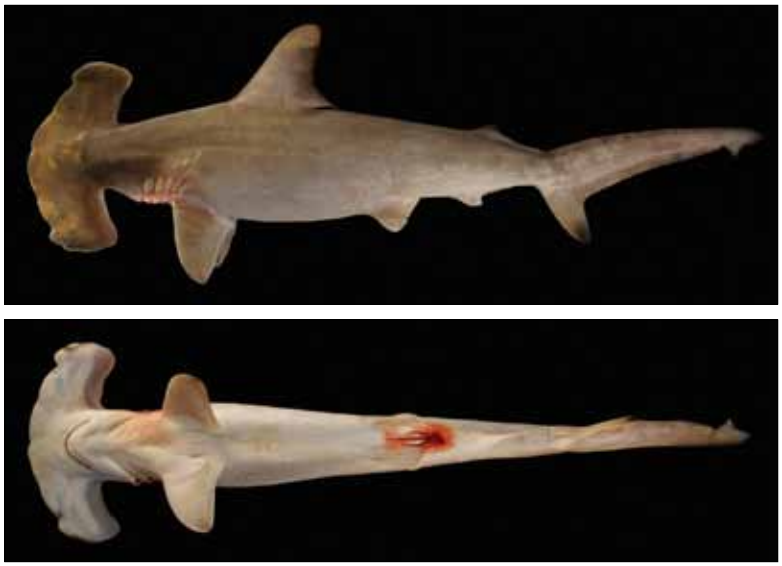
Remarks: cosmopolitan in coastal tropical and warm temperate seas. Viviparous.

Similar families occurring in the area: none. Not other shark family has the characteristic hammer-shaped head of the Sphyrnidae.

Sphyrna lewini (Griffith & Smith, 1834)

Scalloped Hammerhead

Body elongate, laterally compressed. Head broad, hammer-shaped, anterior margin arched, indented at midline. Upper teeth triangular, anteriorly upright, posteriorly oblique. First dorsal fin tall, moderately falcate; second dorsal fin short with long rear tip and weakly concave posterior margin. Precaudal pit present, crescent-shaped. **Color:** plain gray to olivaceous; pectoral fins tip gray, black ventrally. **Size:** maximum length 350 cm. **Distribution:** cosmopolitan in all tropical and warm temperate seas. **Remarks:** occurs over continental and insular shelves and adjacent deep water, to 275 m depth; feed mainly on bony fishes and cephalopods, but also sharks and rays; potentially dangerous to humans.

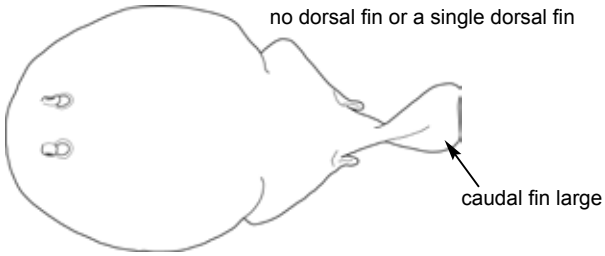


Sphyrna lewini, KAUM–I. 17006, 56.6 cm TL
off Terengganu (KT), 14 Dec. 2008

NARKIDAE

Sleeper Rays

By B. Mabel Manjaji-Matsumoto



Small batoids; maximum size 9–46 cm in total length. Head and greatly enlarged pectoral fins fully fused to form a strongly flattened oval, circular, or pear-shaped disc; trunk short and stout, fully fused with enlarged pelvic fins; tail stout, shark-like, narrower than trunk. Five pairs of gill openings on ventral side of disc. Body entirely naked above and below, without dermal denticles or thorns. Large kidney-shaped electric organs present at bases of pectoral fins (visible through skin). Tail without stinging spine (stings), or electric organs. **Color:** brownish or reddish brown dorsally, white or brownish ventrally; dorsal surface either plain or with a few large dark spots or blotches, paired white spots, and white side bands on the tail and posterior pelvic bases.

Remarks: a small group of inshore to deep-water batoids confined to the temperate and tropical Indo-West Pacific from South Africa to Japan and Indonesia. Occur on the intertidal and subtidal zone to offshore on the outer shelf and upper slope on soft bottom down to 330 m.

Similar families occurring in the area: Narcinidae – 2 dorsal fins; snout supported by a broad, trough-shaped rostral cartilage, nasal curtain broader and shorter; snout longer, deep labial groove present. Torpedinidae – 2 dorsal fins; snout truncate; pectoral disc transversely elliptical; mouth strongly arched, without labial folds or groove. Hypnidae – 2 dorsal fins; pectoral disc longitudinally pear-shaped; mouth strongly arched, without labial folds or groove; teeth tricuspidate; tail, dorsal, and caudal fins very small.

Temera hardwickii Gray, 1831

Finless Sleeper Ray

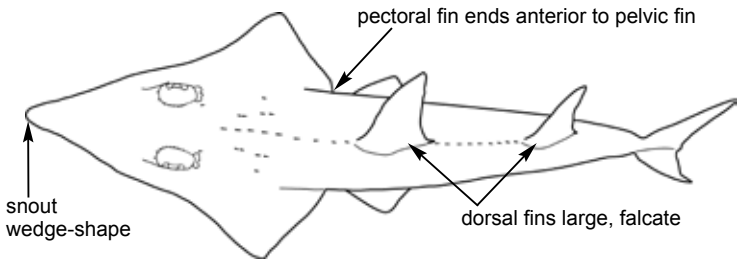
Disc greatly enlarged, its length (measured to cloaca) much longer than tail. Eyes bulging, not embedded in skin. Spiracle posterior to eye. Nostrils circular. Mouth small, straight. No dorsal fins. Caudal fins about as long as deep. **Color:** dorsally plain brown; ventral surfaces of disc and pelvic fins with broad brownish margins. **Size:** maximum size dubiously reported to about 46 cm, but mostly less than 15 cm. **Distribution:** tropical Indo-West Pacific, from the Andaman Sea off Myanmar to Singapore, and Vietnam. **Remarks:** demersal on the continental shelf. Paired electric organs in the disc are capable of delivering a moderate shock on direct contact.

Temera hardwickii, KAUM–I. 17198, 6.7 cm DW
off Terengganu (KR), 5 Jan. 2009

RHYNCHOBATIDAE

Wedgefishes

By B. Mabel Manjaji-Matsumoto



Large shark-like batoids; maximum size 270 cm. Head and greatly enlarged pectoral fins fully fused to form a small pectoral disc; trunk thick, shark-like, tail long and stout. Head narrow and depressed; snout moderately elongated, angular and supported by a stout rostral cartilage; eyes and spiracles dorsolateral on head. Five pairs of gill openings on ventral side of disc. Body covered with small dermal denticles; enlarged denticles present on dorsal surface on orbits, and midline of trunk and tail. **Color:** yellowish, brownish, gray-brown, or greenish dorsally, white ventrally; dorsal surface with small to large white spots and sometimes dark spots on pectoral fins.

Remarks: a small group of inshore tropical batoids, from tropical West Africa, and the Indo-West Pacific. Feed on polychaetes, crustaceans and small fishes. Ovoviviparous.

Similar families occurring in the area: Rhinidae – snout broadly rounded; no spiracular folds; mouth with prominent knobs and depressions; enlarged thorns present on dorsal surface on snout, orbits, shoulders, and midline of trunk. Rhinobatidae – pectoral fins with origins in front of nostrils and with free rear tips posterior to pelvic-fin origin; lower lobe of caudal fin short. Pristidae – snout with a rostral saw; no thorns around eyes, on back, or on tail; dorsal surface plain, without spots or ocelli.

Rhynchobatus australiae Whitley, 1939

Whitespotted Wedgefish

Snout bottle-shaped, constricted near tip; spiracles with two skin folds on posterior margin; first dorsal fin less than 1.5 times height of second (in adults), its origin slightly posterior to pelvic-fin origin. **Color:** disc gray or brown with inconspicuous white margin; adults with a faint (sometimes absent) black spot on each pectoral fin, spot diffused-edged in juveniles (less than 60 cm), diagonal row of three equidistant white spots usually above black pectoral spot. **Size:** maximum size 270 cm. **Distribution:** tropical Indo-West Pacific, from Taiwan to northern Australia, including the Philippines. **Remarks:** demersal on soft bottoms near the coast and sand patches on coral reefs, inshore to depths of at least 60 m; feeds on bottom crustaceans and molluscs; marketed fresh, fins prized for the sharkfin trade. Species listing in Rhynchobatidae follows Last and Stevens (2009) and Compagno and Last (2010). Listed in Rhinobatidae by Nelson (1994), and in Rhinidae by Compagno and Last (1999).

Rhynchobatus australiae, KAUM–I. 16870, 41.0 cm TL
off Terengganu (KT), 5 Dec. 2008

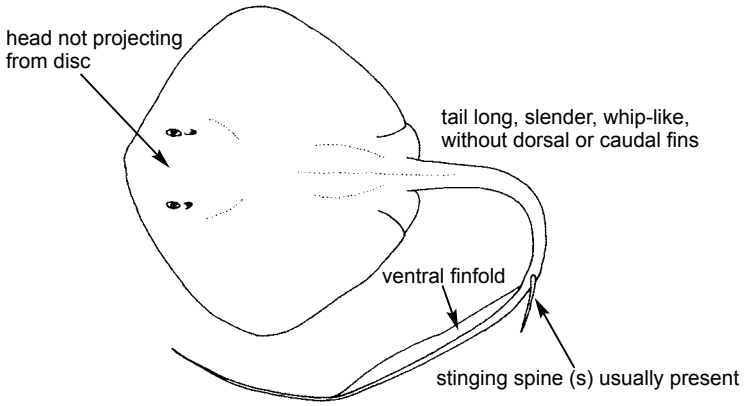
DASYATIDAE

Stingrays

By B. Mabel Manjaji-Matsumoto

Small to very large batoids; maximum size 5 m in total length, 2 m in disc width. Head, trunk, and greatly enlarged pectoral fins fully fused to form a strongly flattened oval, circular, or rhomboidal disc; tail moderately depressed and or cylindrical, whip-like. Head not projecting from disc; eyes and spiracles dorsolateral on head. Five pairs of gill openings on ventral side of disc. Body usually with denticles, thorns, and tubercles on the dorsal surface of disc and tail. In most species, tail with 1–4 stinging spines (stings). **Color:** grayish brown or brownish green dorsally, paler ventrally; a few species with bluish, whitish, or blackish spots, rings, or reticulations.

Remarks: occur in marine, estuarine, and fresh-water habitat in temperate and tropical areas worldwide.

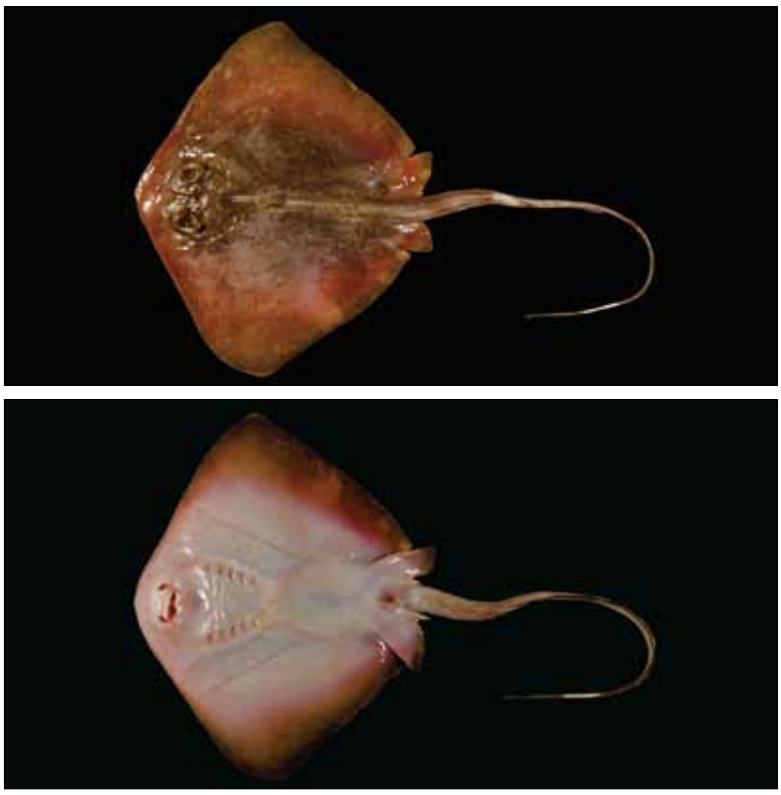


Similar families occurring in the area: Plesiobatidae – tail stout, with a long leaf-like caudal fin. Rajidae – tail not whip-like, with small posterior dorsal fins, and/or caudal fins; pelvic fins subdivided. Narcinidae – stout tail with dorsal and caudal fins. Gymnuridae – disc extremely broad (more than 1.5 times as broad as long), tail very short (shorter than ½ disc width). Myliobatidae – head distinct from disc; pectoral apices angular, acute.

Dasyatis parvonigra Last & White, 2008

Dwarf Black Stingray

Disc rhomboidal with somewhat angular apices; tail moderately long, becoming much more slender beyond sting; short, low dorsal skin fold on tail beyond sting; long, low ventral skin fold on tail; thorns confined to central disc (single row on midline with shorter row either side) dorsally (in adults); no thorns on tail before sting. **Color:** adults with disc dark brown to olivaceous dorsally, young disc brownish; disc dark edged (not yellowish) ventrally in young and adult; tail beyond sting paler than anterior tail in adults, a broad white segment near tail tip, dorsally and ventrally in young. **Size:** maximum size 51 cm disc width. **Distribution:** known only from northwestern Australia, Indonesia and Malaysia. **Remarks:** demersal on insular and continental shelves in 60–125 m; marketed fresh.

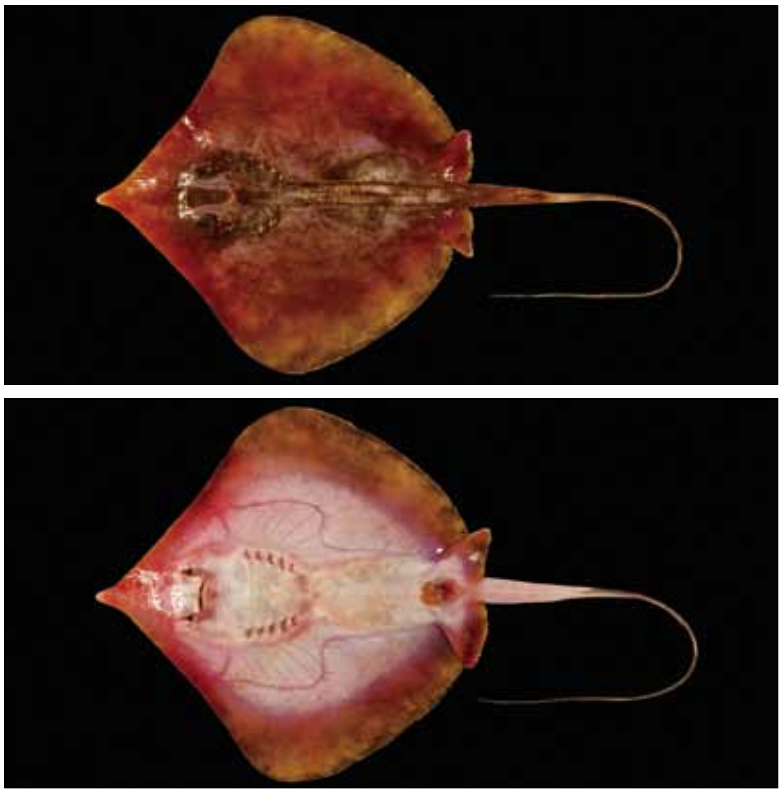


Dasyatis parvonigra, KAUM–I. 16871, 19.5 cm DW
off Terengganu (KT), 5 Dec. 2008

Dasyatis zugei (Müller & Henle, 1841)

Sharpnose Stingray

Disc with broadly rounded apices; tail relatively short, tapering in thickness beyond sting; weak dorsal skin fold on tail beyond sting; long, low ventral skin fold on tail; a few small thorns along midline of disc dorsally; row of small thorns on tail before sting in adults; snout very elongate; no oral papillae in mouth. **Color:** disc brownish dorsally; disc pale or dark edged ventrally. **Size:** maximum size 290 cm disc width. **Distribution:** Indo-West Pacific, from India to eastern Indonesia (Bali) and northwards to southern Japan. **Remarks:** demersal on insular and continental shelves, to depths of at least 40 m. viviparous, gives birth to litters of 1–10 pups; feeds on bottom crustaceans; marketed fresh.

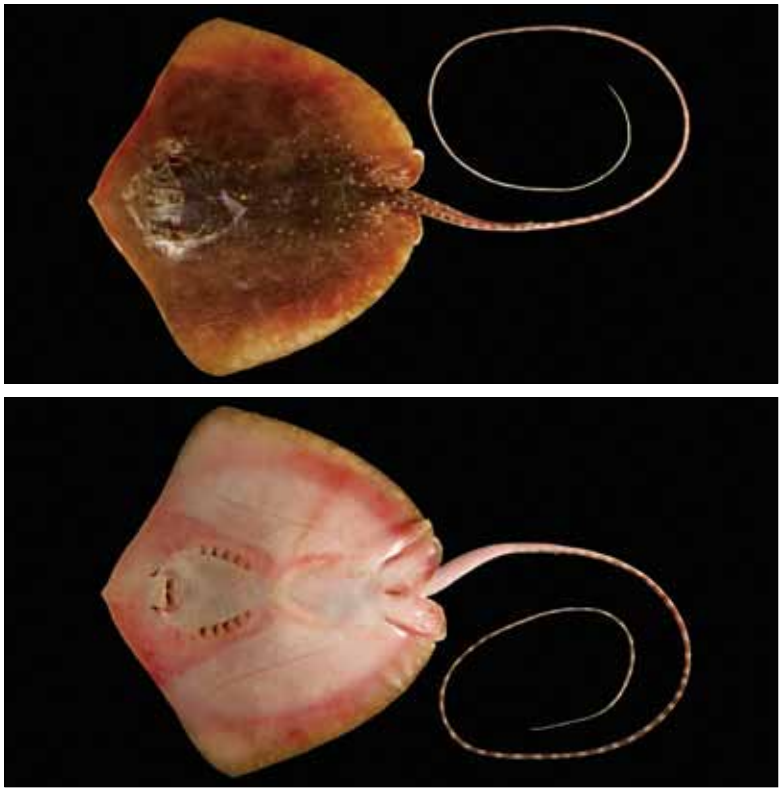


Dasyatis zugei, KAUM–I. 16872, 15.7 cm DW
off Terengganu (KT), 5 Dec. 2008

Himantura gerrardi (Gray, 1851)

Whitespotted Whipray

Disc quadrangular; tail long, whip-like, no skin folds on tail; widely spaced, granular denticles on central disc (absent in small juveniles); central disc usually with 1–5 small thorns; tail lacking thorns; sting situated anteriorly on tail. **Color:** disc with numerous white spots (rarely plain grayish brown) dorsally; white ventrally; tail with alternating light and dark bands (rarely faint). **Size:** maximum size 85 cm disc width. **Distribution:** widespread in the Indo-West Pacific, from India to eastern Indonesia, north to Taiwan. **Remarks:** demersal on soft bottoms, from inshore to depths of at least 60 m; feeds primarily on small bottom crustaceans, but also small fishes; marketed fresh, the skin is valuable as leather.

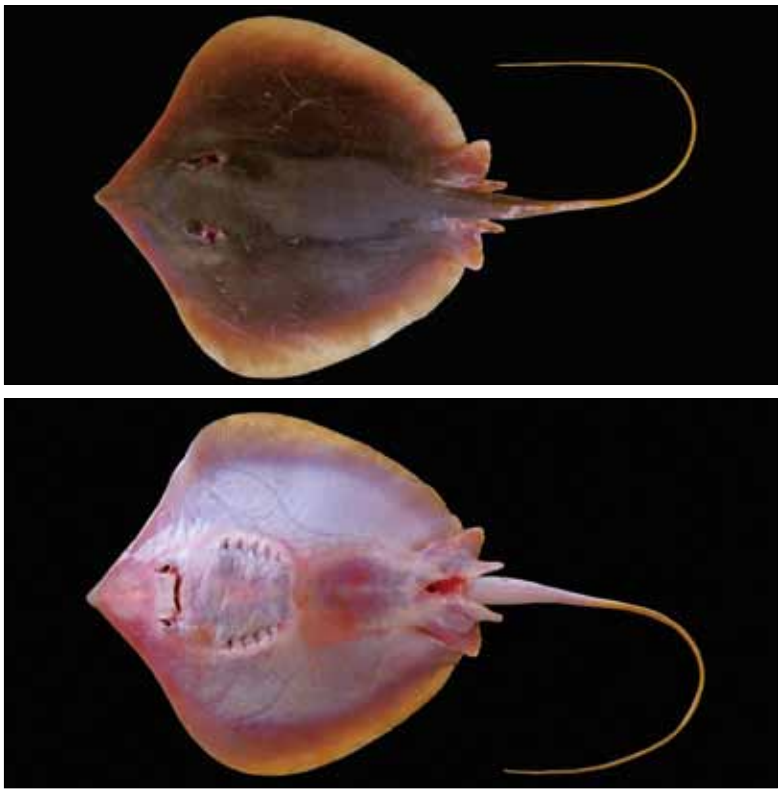


Himantura gerrardi, KAUM–I. 16982, 23.8 cm DW
off Terengganu (KT), 12 Dec. 2008

Himantura walga (Müller & Henle, 1841)

Dwarf Whipray

Disc almost oval; tail short, not whip-like (end bulbous in adult females); no skin folds on tail; narrow band of flat denticles on central disc in adults; mid-disc thorns absent or rudimentary; tail thorns very elongate, bases nearly half eye diameter in length; sting situated anteriorly on tail; snout broadly triangular. **Color:** grayish or brownish dorsally (without a pattern); whitish ventrally, sometimes with a yellowish gray posterior margin. **Size:** maximum size 240 cm disc width. **Distribution:** off Thailand, Malaysia and Indonesia. **Remarks:** demersal on insular and continental shelves, and occasionally in coastal embayments. Used for its meat, fresh and dried, and is in demand locally.

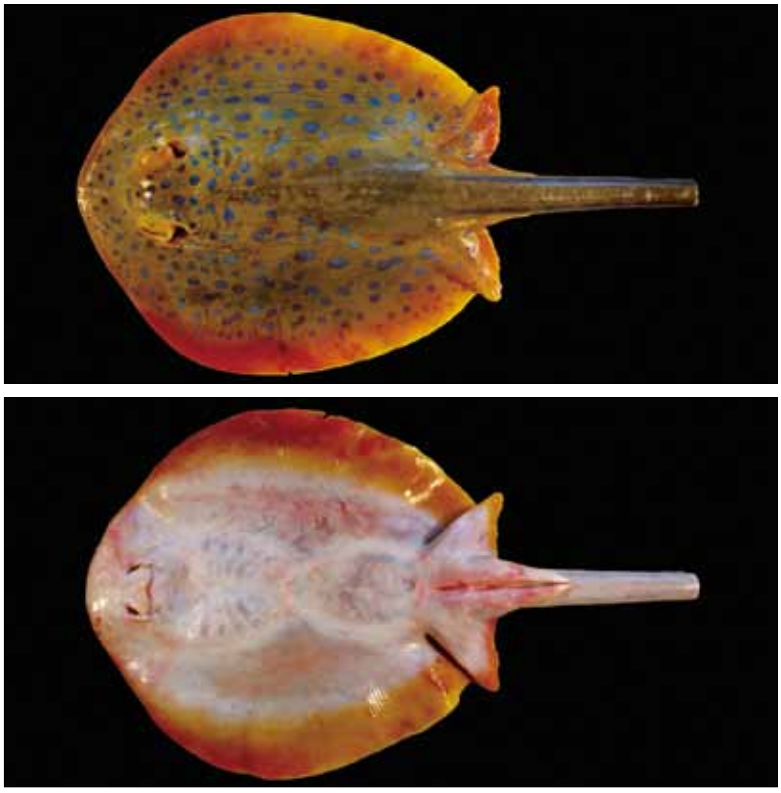


Himantura walga, KAUM–I. 16922, 17.7 cm DW
off Terengganu (KT), 10 Dec. 2008

Taeniura lymma (Forsskål, 1775)

Bluespotted Fantail Ray

Disc oval; tail base broad, tapering beyond sting; ventral skin fold on tail relatively deep, extending to tail tip; dorsal surface almost smooth to granular (denticles very small); 2 stings, located posteriorly on tail. **Color:** disc and tail brownish or orangish dorsally, disc with numerous bright blue spots, tail with blue stripe on each side before sting. **Size:** maximum size 350 cm disc width. **Distribution:** widespread in Indo-West Pacific, from southern Africa to the Solomon Islands, south to tropical Australia, and north to the Philippines and Viet Nam. **Remarks:** dominant ray in coral reef habitats; occurs in inshore to depths of at least 20 m; feeds on molluscs, polychaetes and crustaceans; marketed fresh.



Taeniura lymma, KAUM–I. 17283, 22.9 cm DW (tail cut off)
Redang Island, 18 Jan. 2009

Taeniurops meyeni (Müller & Henle, 1841)

Blotched Fantail Stingray

Disc circular; tail relatively short, becoming much more slender beyond sting; long, deep ventral skin fold on tail, extending to tail tip; dorsal surface almost smooth (denticles very small); a large sting, located posteriorly on tail. **Color:** disc dark with white blotches and mottling (often faint); tail uniform black posterior to sting. **Size:** maximum size 180 cm disc width. **Distribution:** widespread in Indo-West Pacific, from South Africa to Japan, south to Micronesia, including northern Australia. **Remarks:** demersal on soft bottoms near coral reefs, to offshore depths exceeding 400 m; feeds on bottom bivalves, crustaceans and small fishes.

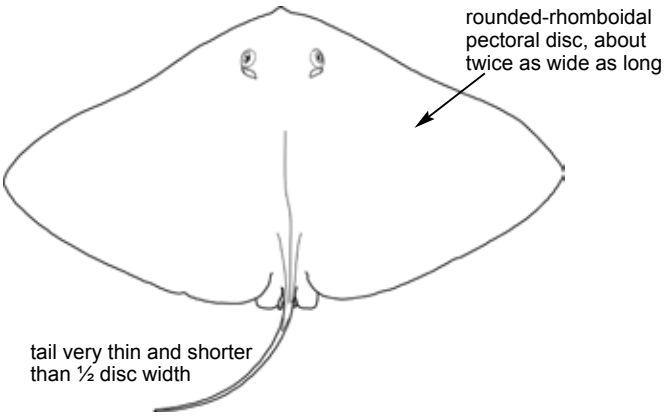
Taeniurops meyeni, KAUM–II. 41, ca. 130 cm DW
off Terengganu (KT), 17 Dec. 2008

GYMNURIDAE

Butterfly Rays

By B. Mabel Manjaji-Matsumoto

Small to moderately large batoids; maximum size 2.6 m in total length, 4 m disc width. Head, trunk, and greatly enlarged pectoral fins fully fused to form a laterally expanded, rounded rhomboidal or diamond shaped disc; precaudal tail moderately depressed or cylindrical; tail short, whip-like. Five pairs of gill openings on ventral side of disc. Body entirely naked, except a few large species with fine denticles dorsally. In some species, tail with 1 stinging spine (sting), located just behind pelvic fins, absent in others. **Color:** dorsal surface of disc and pelvic fins brown, gray or greenish, whitish ventrally; dorsal surface either unspotted or variegated with light or dark spots and reticulations, with a pair of large white spots in some species; tail with black and white stripes.



Remarks: occurring in all tropical and subtropical continental seas. Range from the intertidal to the offshore shelf on soft bottom, to depths of 110 m. Feed on crustaceans and small fishes. Ovoviviparous.

Similar families occurring in the area: no other batoids in the area combine large rounded-rhomboidal pectoral discs nearly or quite twice as wide as long and short slender whip-like tails without caudal fins.

Gymnura poecilura (Shaw, 1804)

Longtail Butterfly Ray

Tail length about equal to snout-cloaca length; no dorsal fin; no sting on tail. **Color:** disc with faint whitish spots (sometimes plain) dorsally; disc pale ventrally. **Size:** maximum size 99 cm disc width. **Distribution:** tropical Indo-West Pacific, from the Red Sea eastward to southern Japan and eastern Indonesia. **Remarks:** demersal on the continental shelf, to depths of at least 30 m; appears to prefer sandy habitats, often in shallow inshore waters and on sand banks; marketed fresh.

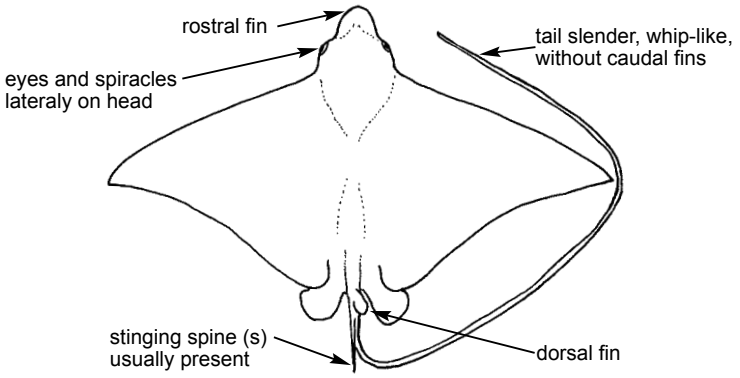
Gymnura poecilura, KAUM–I. 17014, 26.3 cm DW
off Terengganu (KT), 15 Dec. 2008

MYLIOBATIDAE

Eagle Rays

By B. Mabel Manjaji-Matsumoto

Medium to large sized batoids; maximum size 330 cm disc width. Head with rostral or cephalic fins; eyes and spiracles present laterally on head. Five pairs of gill openings on ventral side of disc. Trunk fused with broad, wing-like pectoral fins, forming a large flattened rhomboidal disc. Body naked or with small denticles covering the dorsal surface. Tail slender, long, whip-like, without caudal fin. A single, small dorsal fin on tail base; one or more stings in most species. **Color:** plain green, brown, gray or yellowish to blackish dorsally, most species white ventrally; dorsal surface either unspotted or variegated with light spots, light transverse stripes, dark stripes and reticulations, or small ocelli, no paired ocelli on pectoral bases.



Remarks: circumglobal in temperate to tropical marine, coastal and offshore areas in Atlantic, Indian and Pacific Oceans. Viviparous.

Similar families occurring in the area: Rhinopteridae – snout notched medially, formed as 2 rounded lobes; 3 rows of laterally expanded medial plate-like teeth on jaws. Mobulidae – snout formed into paired elongated cephalic fins; teeth very small, not plate-like; internal gill arches with large and complex filter plates.

Aetobatus ocellatus (Kuhl, 1823)

Whitespotted Eagle Ray

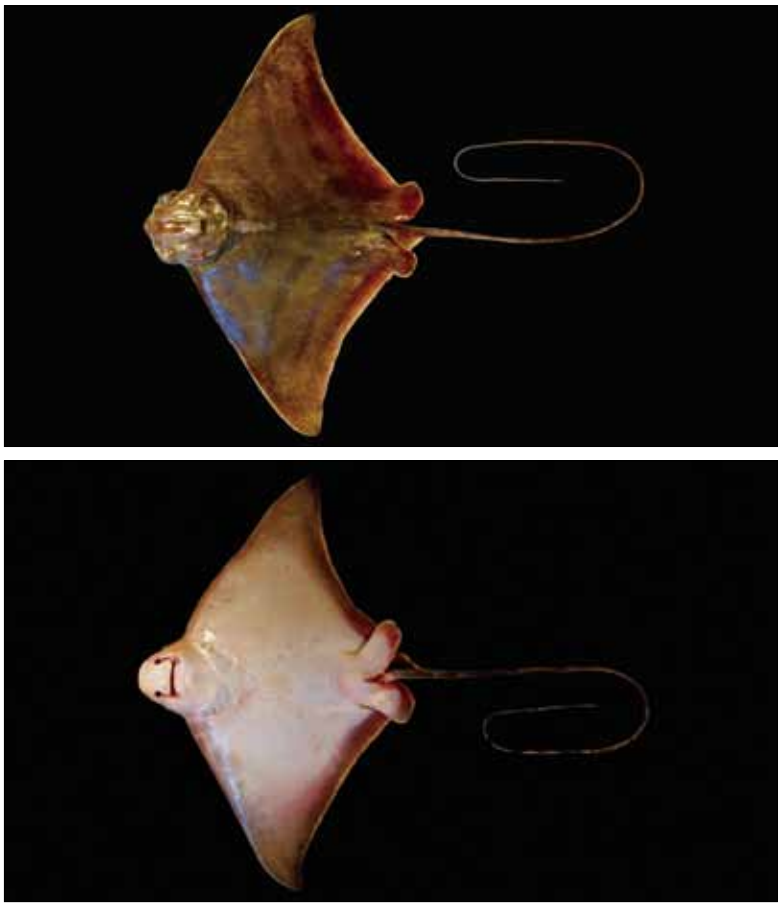
Snout moderately long, broadly rounded; spiracles dorsolateral on head; nasal curtain V-shaped; teeth in a single row in both jaws, chevron-shaped. **Color:** disc dark brown dorsally, with numerous white spots; pale ventrally. **Size:** maximum size 330 cm disc width. **Distribution:** tropical and warm temperate seas of the Indo-West Pacific, from the Red Sea and South Africa to Hawaii, north to Japan, and south to Australia. **Remarks:** inshore and benthopelagic on continental shelves, in estuaries, near atolls and offshore in open water. Viviparous.

Aetobatus ocellatus, KAUM–I. 17339, 43.6 cm DW
off Terengganu (KT), 21 Jan. 2009

Aetomylaeus nichofii (Bloch & Schneider, 1801)

Banded Eagle Ray

Fleshy ridge on side of head not connected to edge of disc; spiracles lateral on head; posterior margin of dorsal fin strongly angled, its origin slightly anterior to or opposite pelvic-fin insertions; edge of nasal curtain near mouth almost straight. **Color:** disc yellowish dorsally, with 5 bluish bands (often faint); disc pale ventrally, posterior margin of pectoral fins and pelvic fins dark. **Size:** maximum size 72 cm disc width. **Distribution:** Indo-West Pacific, from India through Indonesia and northward to Japan. **Remarks:** bottom intertidal, and offshore to depths of at least 70 m; viviparous.



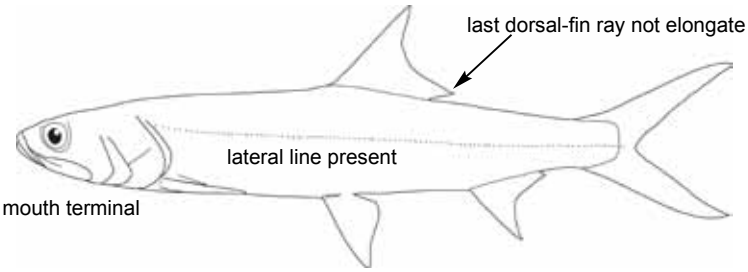
Aetomylaeus nichofii, KAUM–I. 17338, 28.6 cm DW
off Terengganu (KT), 21 Jan. 2009

ELOPIDAE

Ladyfishes

By Mizuki Matsunuma

Medium to large sized (maximum 100 cm, commonly 50 cm) fishes, slender and moderately compressed. Mouth large, terminal; jaws subequal; posterior tip of upper jaw extending posterior margin of eye; a gular plate present between arms of lower jaw. Teeth small and granular. Branchiostegal rays numerous, approximately 27–35. Fins without spines; a dorsal fin begins slightly behind midbody, with 20–25 rays, the last ray not elongate; anal fin short with 13–18 rays, situated well behind base of dorsal fin; pectoral fins with 17–18 rays, set on side of body, near ventral outline; pelvic fins abdominal with 12–16 rays, below origin of dorsal fin; caudal fin deeply forked. Scales very small; usually 95–120 in lateral line. Vertebrae 63–79. **Color:** body silver, blue or greenish gray dorsally; fins sometimes with a faint yellow tinge.



Remarks: one genus (*Elops*) with about six species, two of which distributed in the Pacific Ocean. Coastal fishes found in lagoons, bays, and estuaries; commonly travelling in schools in open water; feeds on various fishes and crustaceans. Leptocephalus larva having developed caudal fin. Food fishes used as fresh, dried or salted one; also known as sport fishes.

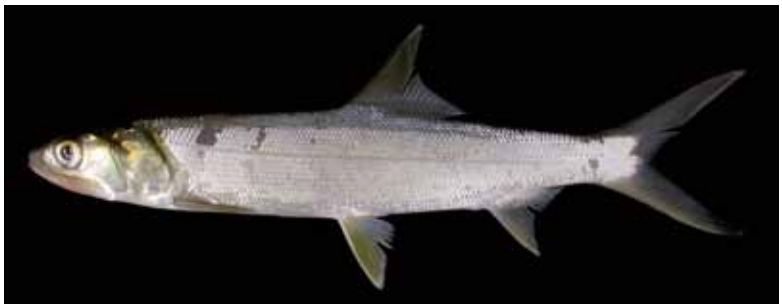
Similar families occurring in the area: Elopidae differs from other similar families in having gular plate, no scutes along midline of ventral, large number of lateral line scales, much number of branchiostegal rays. Clupeidae – lateral line absent; gular plate absent; most species have scutes along midline of ventral. Megalopidae (*Megalops cyprinoides*) – scales much larger, about 30 to 40 in lateral line; last ray of dorsal fin elongate and filamentous. Albulidae (*Albula* spp.) – mouth inferior. Chanidae (*Chanos chanos*) – mouth smaller, gape not extending behind eye; gular plate absent; branchiostegal rays few (4 or 5).

Elops hawaiiensis Regan, 1909

Hawaiian Ladyfish

D 23–27; A 15–17; P_1 17–18; P_2 14–15; LL 93–100; BR 27–35; GR 7–8 + 13–15 = 20–23; V 68–70. Body elongate and slender. Mouth large and terminal; upper jaw extending beyond a vertical through posterior margin of eye; a gular plate present between arms of lower jaw. Scales very small. Dorsal fin large; without elongated lobe. Caudal fin deeply forked. **Color:** silvery sides, darker dorsally; fins yellowish. **Size:** commonly 50 cm. **Distribution:** widely distributed in the Indo-Pacific including the Hawaiian Islands. **Remarks:** found mainly in coastal waters; larvae to juveniles occurs estuaries, and mouth of river. Marketed fresh, dried, or salted.

Elops hawaiiensis, UMTF 1046 (KAUM–I. 16452), 12.8 cm SL
estuary near UMT, 28 Sept. 2008

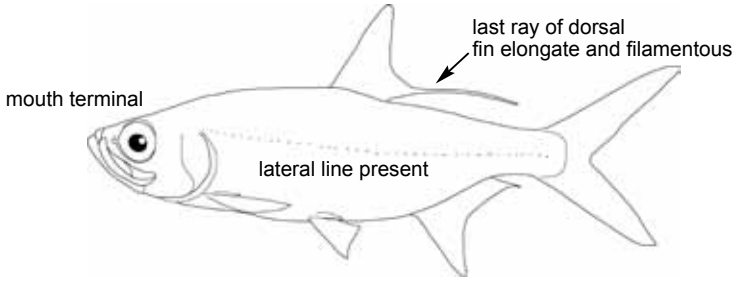


Elops hawaiiensis, KAUM–I. 16460, 26.9 cm SL
estuary near UMT, 28 Sept. 2008

MEGALOPIDAE

Tarpons

By Mizuki Matsunuma



Medium to large sized (up to 2.4 m) fishes. Body moderately deep, compressed, deepest in middle, tapering toward both ends. Eye large. Mouth large, gape ending at level of posterior margin of eye; lower jaw projects beyond snout; a gular plate present between arms of lower jaw. Teeth small, granular. Branchiostegal rays numerous, 23–27. Gill rakers long and slender. Fins without spines; a dorsal fin at midbody with 13–21 rays, last ray elongate and filamentous; anal fin relatively long with 22–29 rays; pectoral fins set low on side of body near ventral margin; pelvic fins abdominal with 10 or 11 rays; caudal fin deeply forked. Scales large, about 40–50 in lateral line. **Color:** body silvery, bluish green dorsally.

Remarks: one genus (*Megalops*), with two species are known from worldwide, one of which (*M. cyprinoides*) distributed in the Indo-Pacific. Coastal fishes found in lagoons, bays, and estuaries; commonly travelling in schools in open water; feeds on various fishes and crustaceans. Leptocephalus larva having forked caudal fin. Food fishes used as fresh, dried or salted one; also known as sport fishes.

Similar families occurring in the area: Megalopidae differs from other similar families by having a gular plate, no scutes on ventral, fewer number of lateral line scales, much number of branchiostegal rays, last dorsal-fin ray elongate and filamentous. Elopidae (*Elops* spp.) – scales much smaller, about 100 on lateral line; last dorsal-fin ray not elongate and filamentous. Albulidae (*Albula* spp.) – mouth inferior; last dorsal-fin ray not elongate and filamentous; scales smaller. Clupeidae – lateral line absent; gular plate absent; most species have scutes on midline of belly. Chanidae (*Chanos chanos*) – mouth smaller, gape not reaching beyond anterior part of eye; scales smaller; last dorsal-fin ray not elongate and filamentous; gular plate absent; fewer branchiostegal rays (4).

Megalops cyprinoides (Broussonet, 1782)

Indo-Pacific Tarpon

D 16–20; A 23–31; P_1 10–11; P_2 14–15; LL 30–40; BR 23–27; GR 7–8 + 13–15 = 20–23; V 66–70. Body moderately deep and compressed. Mouth large and terminal; lower jaw projects beyond snout; a gular plate present between arms of lower jaw. Scales large. Dorsal fin large; with elongated lobe. Caudal fin deeply forked. **Color:** body silvery, darker dorsally; dorsal and caudal fins dark yellowish. **Size:** 80 cm SL. **Distribution:** Indo-Pacific, including the Red Sea, from the east coast of Africa to the Society Islands, north to southern Japan. **Remarks:** marketed fresh.

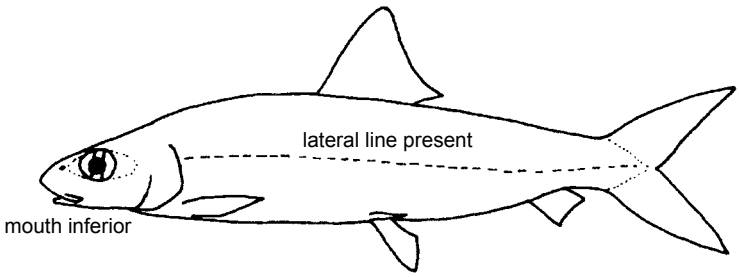
Megalops cyprinoides, KAUM–I. 16463, 10.5 cm SL
estuary near UMT, 29 Sept. 2008

Megalops cyprinoides, KAUM–I. 17054, 26.4 cm SL
off Terengganu (KT), 18 Dec. 2008

ALBULIDAE

Bonefishes

By Mizuki Matsunuma



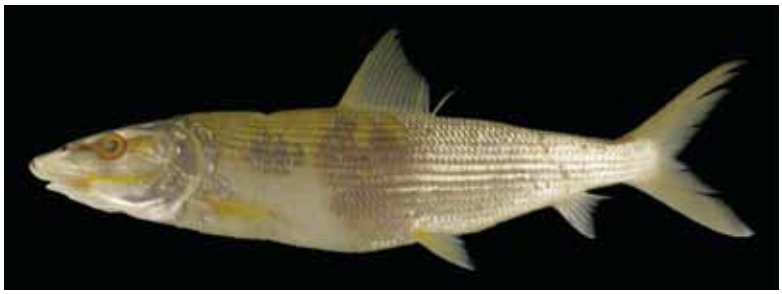
Medium to large sized fishes (up to 80 cm) with body slender, moderately elongate, slightly compressed. Eye large. Snout conical, projecting well beyond lower jaw. Mouth small, inferior, gape not reaching anterior margin of eye; a small gular plate present between arms of lower jaw, but small and inconspicuous. Teeth small, granular, in patches on jaws and on roof and floor of mouth. Branchiostegal rays about 10–15. Gill rakers rudimentary, consisting of small patches of minute, villiform teeth. All fins without spines; a dorsal fin situated at midbody, with 16–21 rays, last ray filamentous in *Albula nemoptera*; anal fin short with 7–9 rays, located well behind dorsal fin; pectoral fins set low on side of body, near ventral outline; pelvic fins abdominal, located under posterior part of dorsal fin; caudal fin deeply forked. Scales small, 66–84 in lateral line. **Color:** bluish green dorsally, often with several faint saddles of slightly darker color; silvery on sides, with several faint, narrow, longitudinal lines; belly white.

Remarks: occurring usually in shallow coastal waters on sandy or muddy bottoms, rarely found in brackish and freshwater. One genus, *Albula*, with about six species including several undescribed species. Food fish marketed fresh; also known as sport fishes.

Similar families occurring in the area: Elopidae – mouth terminal; gular plate well developed; branchiostegal rays 27–35; upper jaw extending beyond mid-eye. Megalopidae – mouth supraterminal; gular plate well developed; branchiostegal rays 23–27; upper jaw extending beyond mid-eye; scales larger. Sillaginidae – two dorsal fins, first with IX–XII spines; anal fin base long with II spines and 15–27 soft rays.

Albula argentea (Forster, 1801)

Pacific Bonefish



Albula argentea, KAUM–I. 16854, 30.0 cm SL off Terengganu (KT), 5 Dec. 2008

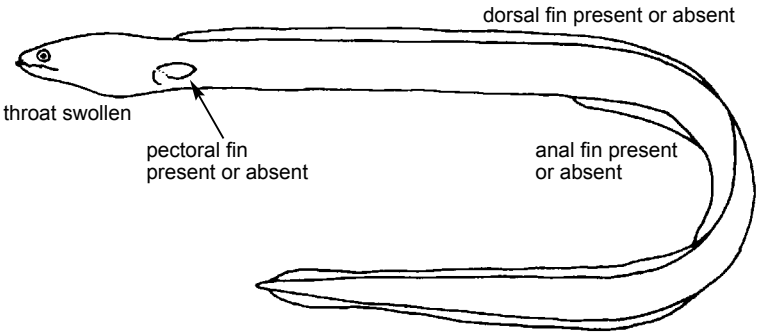
D 16–17; A 7–8; P_1 16–18; P_2 9–10; LL 62–72; BR 12–15; GR 7–11 + 10–12 = 17–22; V 65–73. Body slender. Snout long, conical; mouth inferior, lower jaw in ventral view pointed; posterior tip of upper jaw not reaching to front margin of eye. Tip of pelvic fin reaching anterior edge of anus. Villiform teeth in small patches on premaxilla and dentary; molariform teeth in broad bands on parasphenoid, basibranchials and mesopterygoid; anterior end of tooth bands on mesopterygoids almost corresponds to that of tooth band on parasphenoid. Scales cycloid. **Color:** head and body bright silver; posterior margin of caudal fin black; posterior tip of lower caudal lobe white; first pelvic-fin ray white; anal fin white; base of pectoral and pelvic fins slightly yellow; a vivid yellow line on preopercle from end of maxilla; anterior margin of snout black. **Size:** 80 cm. **Distribution:** west and south Pacific, from the Indo-Malayan region east to the Society Islands and Marquesas. **Remarks:** according to Hidaka et al. (2008), *Albula forsteri* Valenciennes, 1847 is junior synonym of *A. argentea*. Found in coastal waters, bay, and mouth of river. Marketed fresh, dried, or salted.

OPHICHTHIDAE

Snake Eels and Worm Eels

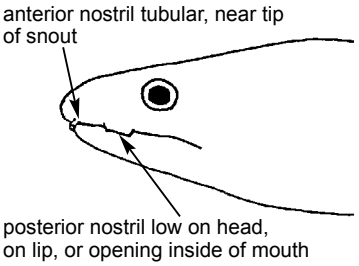
By Mizuki Matsunuma and Hisashi Imamura

Marine fishes, some species in or occasionally entering freshwater. Body snake-like or worm-like, more or less rounded in cross section. Throat swollen. Eye usually small and just above mouth. Snout pointed. Anterior nostril tubular, near tip of snout. Posterior nostril low on head, on lip, or opening inside of mouth. Mouth moderate to large, terminal or inferior. Teeth variable in form, from fang-like to conical to molariform to villiform. Gill opening midlateral to completely ventral, round or slit-like. Dorsal, anal, pectoral and caudal fins present or absent; when caudal fin present, confluent with dorsal and anal fins, when absent, tip of tail often hard and pointed. Lateral line complete, usually with well developed pores on head and body. Scales absent. **Color:** highly variable, from uniform light or dark to various patterns of spots, stripes, or bars; usually darker dorsally than ventrally.



Remarks: ophichthyids occur in a wide variety of habitats from muddy estuaries to coral reefs to the midwater realm, from the shore to depths of 700–800 m or more, but most occur in less than 200 m.

Similar families occurring in the area: Muraenidae – Posterior nostril high on head, above or before eye, a simple pore or in a tube. Muraenesocidae – throat not swollen.



Ophichthus lithinus (Jordan & Richardson, 1908)

Evermann's Snake Eel

P_1 14; PLp 68–74; V 151. Body extremely elongate; tip tail finless, pointed. Mouth moderately large; teeth of upper and lower jaws small and sharp, those on maxilla arranged in 1–2 rows; vomer teeth present. Dorsal fin begins just behind tip of pectoral fin; pectoral fin well developed. **Color:** head and body cream; white ventrally; about 30 poorly defined brown saddles along head and body; sensory pores on head spotted brown. **Size:** maximum length about 90 cm. **Distribution:** West Pacific, from Australia north to southern Japan. **Remarks:** according to McCosker et al. (2006), *Ophichthus evermanni* Jordan & Richardson, 1909 is junior synonym of *O. lithinus*. Inhabits muddy bottom of coastal waters and mouth of river. (M. Matsunuma)

Ophichthus lithinus, KAUM–I. 17256, 79.0 cm TL
off Terengganu (KT), 17 Jan. 2009

Pisodonophis cancrivorus (Richardson, 1848)

Longfin Snake Eel

P_1 13–14; PLp 55–60; V 153–162. Body extremely elongate. Mouth moderately large; teeth of upper and lower jaws, and vomer villiform, forming wide bands. Dorsal fin begins above pectoral fin; tip tail finless, pointed; pectoral fin well developed. **Color:** head and body yellowish brown, darker dorsally; dorsal and anal fins dark brown. **Size:** maximum length about 100 cm. **Distribution:** Indo-West Pacific, including the Red Sea, from the east coast of Africa east to French Polynesia, Australia north to southern Japan. **Remarks:** inhabits coastal waters of muddy bottom.

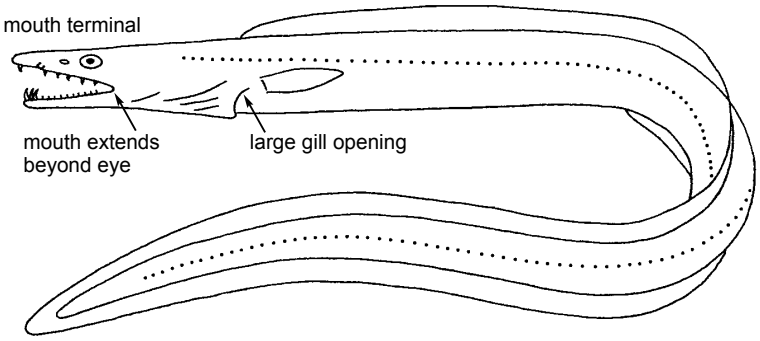
(M. Matsunuma)

Pisodonophis cancrivorus, KAUM–I. 17126, 51.8 cm TL
off Terengganu (KT), 31 Dec. 2008

MURAENESOCIDAE

Pike Congers

By Mizuki Matsunuma



Median to large sized (up to more than 1 m) marine fishes. Body moderately elongate, compressed along tail. Head moderate to moderately elongate. Eye well developed. Snout moderate to acute, projects somewhat beyond tip of lower jaw. Mouth large, gape ends behind posterior margin of eye; lips without fleshy flanges; tips of lower jaw with enlarged teeth that fit into a notch in underside of snout when mouth closed. Teeth large, prominent, sharp; multiserial on jaws; typically in 3 rows on vomer, with a median row of canines flanked on each side by a row of much smaller teeth. Anterior nostril tubular, on side of snout just behind tip; posterior nostril a simple opening in front of eye at approximately mid-eye level. Gill opening a large, oblique slit in front of and below pectoral fins; gill openings of the 2 sides nearly meet on ventral midline, interspace much smaller than length of gill opening. Dorsal and anal fins well developed. Lateral line complete, but usually opening through a complex or branching system of multiple pores rather than a single pore per segment. Scales absent. **Color:** brown or silver gray to black, lighter ventrally; vertical fins usually edged in black; no distinct patterns or markings.

Remarks: muraenesocids are found in tropical and subtropical coastal waters of worldwide, inhabit primarily on sand or mud bottoms. Commonly collected with bottom trawls.

Similar families occurring in the area: Congridae – underside of snout without a conspicuous notch; teeth on vomer typically inconspicuous; gill openings not meeting across midline. Anguillidae – body covered with embedded scales; lower jaw projecting slightly. Ophichthidae – no caudal fin but tail tip pointed in most genera; throat swollen; a median frontal pore on head. Muraenidae – no pectoral fin; gill opening a small hole. Chlopsidae – gill opening a small hole; vomer teeth in 2 divergent rows; lateral line reduced; pectoral fins present or absent.

Muraenesox cinereus (Forsskål 1775)

Daggertooth Pike Conger

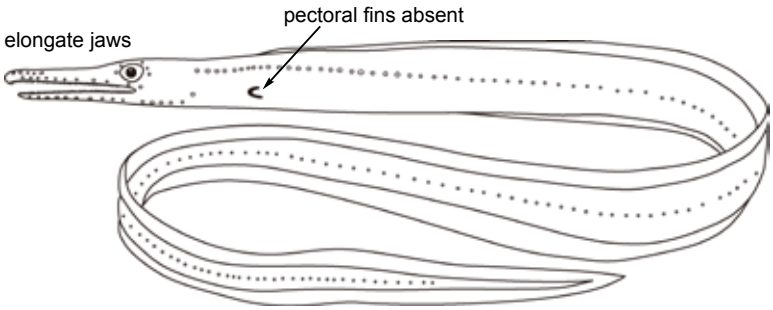
Muraenesox cinereus, KAUM–I. 16898, 49.2 cm TL off Terengganu (KT), 6 Dec. 2008

D before anus 66–78; PLp 40–47; V 145–159. Body moderately elongate; head broader, interorbital width about 8 times in head length; anus before mid-body. Snout relatively blunt, not well pointed; mouth large, end of mouth slit behind posterior margin of eye; teeth almost canine like; vomer with a median series of compressed, strong canine teeth with 1 or 2 basal cusps. Pectoral and caudal fins developed. **Color:** head and body uniformly brown; lighter ventrally; median fins blackish marginally; pectoral fin black; pores in lateral line and on head white. **Size:** maximum length about 80 cm. **Distribution:** Indo-West Pacific, from the Red Sea to Indonesia, northern Australia north to Japan. **Remarks:** inhabits coastal waters to depths of about 100 m. Feeds on benthic fishes and crustaceans.

NETTASTOMATIDAE

Duckbill Eels

By Mizuki Matsunuma



Medium to large sized (up to 1 m) snake-like marine fishes. Body very elongate; anus before mid-body; tail slender, attenuate. Head slender. Eye well developed. Snout and jaws elongate, snout projects a variable distance beyond tip of lower jaw. Mouth large, gape extends to about rear margin of eye; no fleshy flange on upper or lower lip; some teeth visible when mouth closed; tip of lower jaw fits into depression behind intermaxillary tooth patch. Teeth generally small, conical, multiserial on jaws and vomer, some vomerine teeth enlarged but no species in the area has large fangs. Anterior nostril tubular, near tip of snout; posterior nostril variable in position, either in front of eye, on lip, on top of head, or on top of body behind head. Dorsal and anal fins present, confluent with caudal fin; dorsal fin begins over or slightly behind gill opening. Pectoral fins absent in all species occurring in the area. Lateral line complete. Scales absent. **Color:** brown, lighter ventrally, without markings; dorsal and anal fins often edged in black, especially posteriorly.

Remarks: six genera with about 38 species. Found in moderate to deep water. Collected with bottom trawls, but no commercial importance.

Similar families occurring in the area: Congridae – posterior nostril located far forward on snout, closer to anterior nostril than to eye; inner row of teeth on upper jaw separated from outer rows by a longitudinal toothless groove. Muraenesocidae – pectoral fins well developed. Ophichthidae – pectoral fins well developed; caudal fin absent with pointed tail tip, or present. Serrivomeridae – pectoral fins present. Nemichthyidae – pectoral fins present; anus located under or shortly behind pectoral fins.

Saurenchelys cancrivora Peters, 1864

Slender Sorcerer

PLp 29–39; V 211. Body extremely elongated; head slender; tail very long. Posterior nostril front of eye at mid-eye level. Mouth large, end of maxilla extending beyond posterior margin of eye. Teeth small conical on both jaw, premaxilloethmoid, vomer and pterygoid. Dorsal fin behind gill opening. **Color:** body semi-translucent; a narrow silver band on head from snout to opercle; tail brackish. **Size:** maximum length about 70 cm. **Distribution:** West Pacific. **Remarks:** according to Klausewitz and Zajoz (2000), *Chlopsis fierasfer* Jordan & Snyder, 1901 is junior synonym of *S. cancrivora*. Collected with bottom trawls.

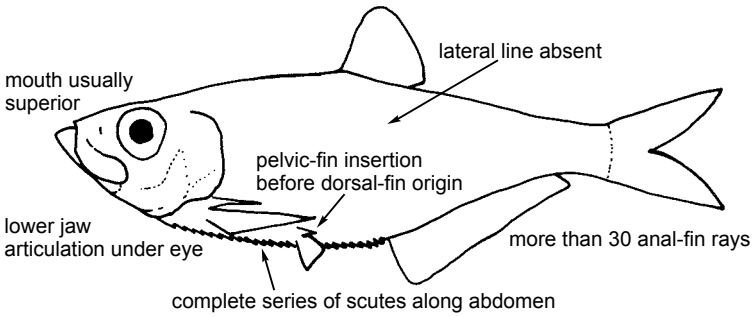
Saurenchelys cancrivora, KAUM–I. 17036, 24.5 cm TL off Terengganu (KT), 17 Dec. 2008

PRISTIGASTERIDAE

Longfin Herrings

By Seishi Kimura and Mizuki Matsunuma

Moderate to large fishes (maximum length 55 cm SL, usually 20–25 cm SL), with compressed, elongated or deep body. Mouth usually superior or terminal in some species; upper jaw with 2 supramaxillae; lower jaw articulation under eye; teeth on jaws small or minute, canines only in a western Atlantic species, *Chirocentrodon bleekerianus*. Eyelids with broad vertical opening in middle. Branchiostegals 6. Fins without spines; dorsal fin single, short (absent in Indo-West Pacific species, *Raconda russeliana*), situated near midpoint of body; anal fin long, 30–92 rays; pectoral fins moderate or large; pelvic fins with 6 or 7 rays, situated before dorsal fin origin, but absent in some genera; caudal fin forked. Body covered with cycloid scales; a complete series of scutes along abdomen; lateral line absent. **Color:** bluish green dorsally, blight silver laterally and ventrally.



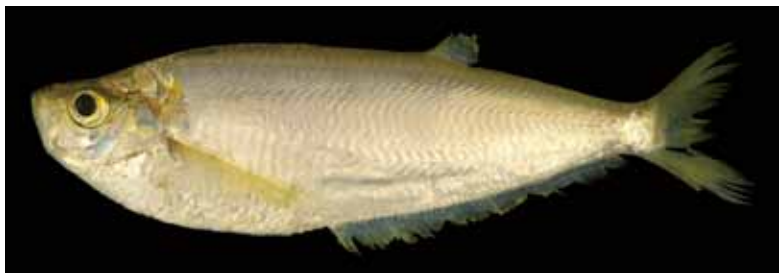
Remarks: schooling fishes found in coastal areas of tropical and subtropical seas; some species entering estuaries, and a few species restricted to freshwater. Food fishes used as fresh, dried, or salted ones.

Similar families occurring in the area: Pristigasteridae differs from other similar families in having lower jaw articulation under eye, pelvic fins inserting before dorsal-fin origin, long anal fin with more than 30 rays, a complete series of scutes along abdomen, and no lateral line. Elopidae – lateral line present; no abdominal scutes; gular plate present; numerous branchiostegal rays (more than 20). Megalopidae – lateral line present, no abdominal scutes; gular plate present; numerous branchiostegal rays (more than 20). Albulidae – lateral line present; no abdominal scutes; gular plate present. Chirocentridae – body highly compressed and elongate; no abdominal scutes; jaws with developed fanglike canine teeth. Clupeidae – pelvic fins inserting just below dorsal fin origin; anal fin short with less than 28 rays. Engraulidae – snout pig-like and projecting; jaw articulation well behind eye. Chanidae – lateral line present; no abdominal scutes; branchiostegal rays few (4 or 5).

Opisthopterus tardoore (Cuvier, 1829)

Tardoore

A 51–60; P_1 12–14; LGR 22–28. Body elongate and strongly compressed, moderately deep (body depth 27–33% SL); abdomen concave in front, with 29 to 35 sharply-keeled scutes. Mouth directed obliquely upward; upper jaw short, not reaching posteriorly to vertical through mid-eye; no toothed hypomaxilla between posterior tip of premaxilla and blade of maxilla. Pectoral fins relatively long (length 21–26% SL; usually about equal with or greater than head length); dorsal fin very small; anal fin long; pelvic fin absent. **Color:** body silver, yellowish brown dorsally; dorsal and anal fins translucent, with yellow margin; caudal fin pale yellow. **Size:** maximum length 18 cm. **Distribution:** tropical Indo-West Pacific, from the Gulf of Oman to Indonesia. **Remarks:** found in coastal waters and estuaries. Marketed fresh, dried, or boiled. (M. Matsunuma)



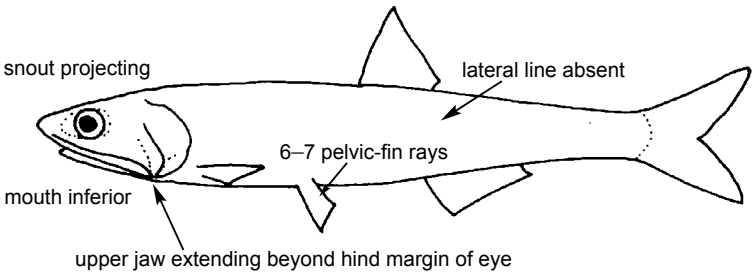
Opisthopterus tardoore, KAUM–I. 16996, 12.4 cm SL
off Terengganu (KT), 14 Dec. 2008

ENGRAULIDAE

Anchovies

By Mizuki Matsunuma and Seishi Kimura

Small to medium-sized fishes (mostly less than 20 cm, some larger) with silver-colored, fusiform or slender body. Mouth inferior; snout projecting beyond tip of lower jaw; jaw articulation well behind eye; upper jaw with 2 supra-maxillae; teeth on jaws absent or minute, rarely with canines. Fins without spines; dorsal fin short and single, situated near midpoint of body, far forward in *Coilia*; anal fin mostly short, less than 25 rays, but long in some (to over 100 rays); pectoral fins set low on body; pelvic fins abdominal usually with 7 rays; caudal fin deeply forked, but small and pointed in some. Body covered with cycloid scales; scutes often present along abdomen; lateral line absent.



Remarks: schooling fishes found in marine coastal areas, mostly feeding on small planktonic animals and plants. Small but important food fishes used as fresh, dried, or salted ones, taken by beach seine and other variety of nets. Regionally some species have great contribution to local catches.

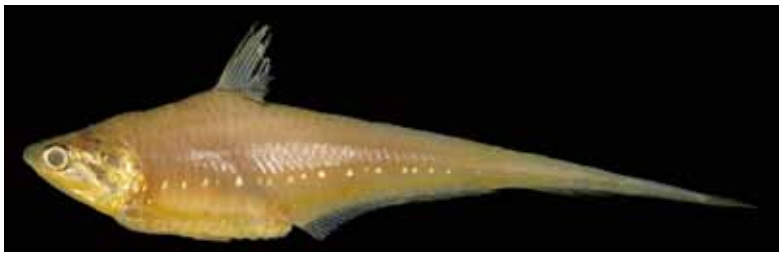
Similar families occurring in the area: Engraulidae differs from other clupeoid families in having projecting and pig-like snout, slender lower jaw, and jaw articulation well behind eye. Chirocentridae – body highly compressed and elongate; no abdominal scutes; jaw articulation below eye; jaws with developed fang-like canine teeth. Clupeidae – snout not pig-like and projecting; jaw articulation anterior to below eye. Pristigasteridae – snout not pig-like and projecting; lower jaw projecting; jaw articulation anterior to vertical below eye.

Coilia dussumieri Valenciennes, 1848

Gold-spotted Grenadier Anchovy

A 80 or more; P_1 9–11; P_2 7; LGR 23–26. Body tapering, abdomen rounded anterior to pelvic fins; abdomen with 5 or 6 prepelvic and 7–9 postpelvic keeled scutes, 12–15 in total number; a small predorsal spine-like scute present. Maxilla short; two supramaxillae present. Teeth in jaws small. Dorsal fin far forward, beginning in first third of body length; anal fin long; posteriormost fin ray joined to caudal fin; caudal fin very small, extremely pointed; pectoral fins long and filamentous, reaching posteriorly at least to anal-fin origin. Light organs present along flanks and abdomen. **Color:** body yellowish silver, brownish dorsally; flanks and abdomen with longitudinal rows of golden or pearly spots (light organs) **Size:** commonly 13–17 cm, maximum 20 cm. **Distribution:** eastern Indian Ocean and western Pacific, from India to the Gulf of Thailand and Indonesia. **Remarks:** occurs inshore waters and estuaries.

Coilia dussumieri, KAUM–I. 16993, 14.1 cm SL
off Terengganu (KT), 14 Dec. 2008



Coilia dussumieri, UMTF 1870, 13.3 cm SL
off Terengganu (KT), 24 Dec. 2008

Marketed fresh, dried, dried-salted or made into fish sauce or fish balls.

(M. Matsunuma)

Encrasicholina devisi (Whitley, 1940)

Devis' anchovy

D 15; A 18–20; P_1 15; P_2 7; LGR 20–27. Body elongate; abdomen slightly rounded, with 3–6 (usually 5) needle-like prepelvic scutes; no postpelvic scutes and no predorsal scutes; posterior tip of maxilla pointed, reaching to subopercle; isthmus muscle short, preceded by a small bony plate on urohyal between gill membrane; initial 3 dorsal and anal fin rays unbranched; anal-fin origin slightly posterior to a vertical through end of dorsal-fin base. **Color:** in life, body with golden hue; a broad bright silvery to brassy stripe on side, with a thin blue line above; dorsal part of body blue-gray. **Size:** maximum length 9.5 cm. **Distribution:** Indo-West Pacific from Gulf of Aden east to Samoa; northern Australia north to Taiwan. **Remarks:** schooling fish found in coastal waters. Marketed fresh or dried; also used as a baitfish for tuna.

(M. Matsunuma)

Encrasicholina devisi, KAUM–I. 16932, 7.8 cm SL
off Terengganu (KT), 11 Dec. 2008

Setipinna taty, KAUM–I. 16994, 12.5 cm SL
off Terengganu (KT), 14 Dec. 2008

Setipinna taty (Valenciennes, 1848)

Scaly Hairfin Anchovy

A 48–60; P_2 7; LGR 17–21 (usually 18–20). Body deep and strongly compressed; abdomen with complete series of keeled scutes from isthmus to anus; 20–29 (usually 22–27) prepelvic and 9–14 (usually 11 or 12) postpelvic scutes, 32–40 (usually 33–39) in total number; a predorsal spine-like scute present. Mouth nearly horizontal, jaws slender; first supramaxilla absent; second supramaxilla relatively small, rounded. Dorsal-fin origin anterior to mid-body midpoint, slightly anterior to vertical through anal-fin origin; anal fin long; pectoral fin with first fin ray filamentous, its tip reaching posteriorly to base of 23rd to posteriormost anal-fin ray; caudal fin well forked, upper lobe truncated. Scales cycloid, present on dorsal and anal fins; longitudinal scale rows about 40–48. **Color:** body yellowish silver, brown dorsally; fins pale to deep yellow, caudal fin with black margin. **Size:** commonly 10 cm, maximum length 14 cm. **Distribution:** Western Central Pacific, from Gulf of Thailand south to Indonesia. **Remarks:** schooling fish found in coastal waters, often entering estuaries. Marketed fresh or dried.

(M. Matsunuma)

Stolephorus andhraensis, KAUM–I. 17284, 8.0 cm SL
off Terengganu (KT), 19 Jan. 2009

Stolephorus andhraensis Babu Rao, 1966

Andhra Anchovy

D 13–14; A 19–20; LGR 20–21. Body slender, somewhat compressed; abdomen with 6–7 (usually 6) small needlelike prepelvic scutes, but no postpelvic scutes; pelvic scute without spine; no predorsal spine-like scute; pelvic scute without spine. Posterior tip of maxilla pointed, extending to or beyond posterior border of preopercle; posterior border of preopercle concave. Isthmus muscle reaching to and beyond gill membrane. Anal fin short, its origin situated below middle of dorsal fin base; caudal fin large and forked. Scales cycloid; longitudinal scale rows about 37–39. **Color:** body semi-translucent, with a broad silver stripe midlaterally; caudal fin dusky. **Size:** maximum ca. 5 cm SL. **Distribution:** eastern coast of India, Andaman Sea coast of Thailand, Singapore, Gulf of Papua, and northern and northeastern Australia. **Remarks:** schooling fish found in coastal waters.

(S. Kimura)

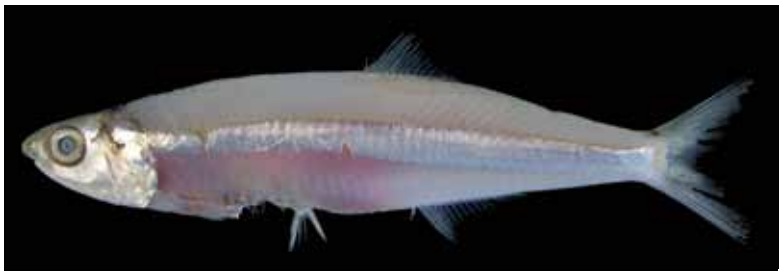
Stolephorus baganensis Hardenberg, 1933

Bagan Anchovy

A 21–22; LGR 20–23. Body slender, somewhat compressed; abdomen with 6–7 (usually 6) small needle-like prepelvic scutes, but no postpelvic scutes; pelvic scute with spine; a small predorsal spine-like scute present. Posterior tip of maxilla pointed, extending to or beyond posterior border of preopercle; posterior border of preopercle rounded, indented near maxilla tip. Isthmus muscle reaching to and beyond gill membrane. A few small teeth somewhat present on upper edge of hyoid bones. Anal fin short, its origin situated below middle of dorsal fin base; caudal fin large and forked. Scales cycloid; longitudinal scale rows about 34–36. **Color:** body semitranslucent, with a broad silver stripe midlaterally; a double pigment line on dorsum posterior to dorsal fin. **Size:** maximum length about 9 cm. **Distribution**: eastern Indian Ocean and western Pacific. **Remarks:** schooling fish found in coastal waters.

(M. Matsunuma)

Stolephorus baganensis, KAUM–I. 17116, 9.3 cm SL
off Terengganu (KT), 31 Dec. 2008



Stolephorus indicus, KAUM–I. 16822, 14.0 cm SL
off Terengganu (KT), 5 Dec. 2008

Stolephorus indicus (van Hasselt, 1823)

Indian Anchovy

D 15–17; A 19–21; P_1 15–17; P_2 7; LGR 20–28. Body slender, round in cross-section; abdomen with 3–5 small needle-like prepelvic scutes, but no postpelvic scutes; pelvic scute without spine; no predorsal spine-like scute; posterior tip of maxilla pointed, extending to or slightly beyond anterior border of preopercle; posterior border of preopercle convex and rounded. Isthmus muscle tapering and reaching to gill membrane. Pelvic fins inserting well before vertical through dorsal fin origin; anal fin short, its origin situated at vertical through middle of dorsal fin base; caudal fin large and forked. Scales cycloid; longitudinal scale rows about 40. **Color:** body translucent, yellowish dorsally, with a broad silver stripe midlaterally; head silver. **Size:** commonly 12 cm, maximum length 15 cm. **Distribution:** widely distributed in the Indo-Pacific, including the Red Sea, from the east coast of Africa to Samoa and Tahiti. **Remarks:** schooling fish found in coastal waters, often entering estuaries.

(M. Matsunuma)

Thryssa dussumieri, KAUM–I. 17020, 8.8 cm SL
off Terengganu (KT), 16 Dec. 2008

Thryssa dussumieri (Valenciennes, 1848)

Dussumier's Thryssa

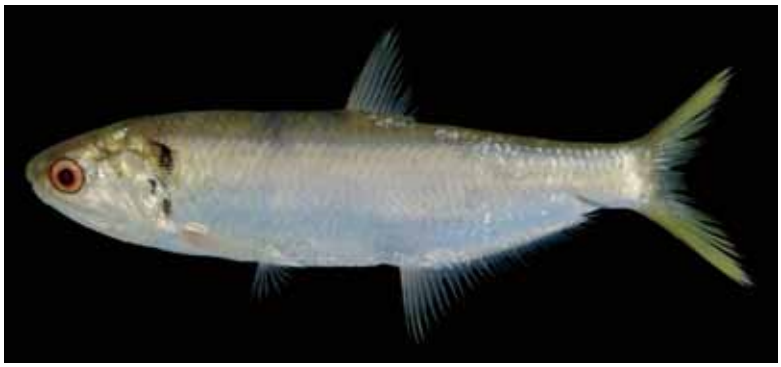
A 32–40 (usually 34–39); P_2 7; LGR 17–19. Body somewhat deep, compressed; abdomen with 15–16 prepelvic and 6–9 (usually 7–8) postpelvic keeled scutes, 21–24 (usually 22–23) in total number; a small predorsal spine-like scute present. Teeth in jaws small or minute, not canine-like. Maxilla very long, reaching posteriorly to a point at least halfway along length of pectoral fin and nearly to pelvic-fin base in adults. Anal fin long, its origin situated posterior to dorsal-fin base; upper pectoral-fin ray not extended as a filament. Scales cycloid; longitudinal scale rows 36–40. **Color:** body silvery white, grayish brown dorsally; a dark blotch posterior to upper part of gill opening, usually joined to a dark saddle on nape; dorsal and caudal fins yellowish; caudal fin with broad black margin. **Size:** maximum length 11 cm. **Distribution:** Indo-West Pacific, from the coast of Pakistan to Indonesia, north to Taiwan. **Remarks:** schooling fish found in inshore waters and estuaries. Marketed fresh, dried and dried-salted.

(M. Matsunuma)

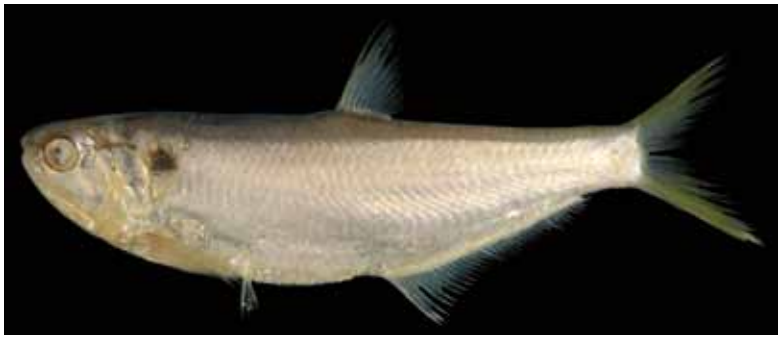
Thryssa mystax (Bloch & Schneider, 1801)

Moustached Thryssa

A 32–40 (usually 35–38); P_2 7; LGR 14–16. Body somewhat deep, compressed; abdomen with 17–19 prepelvic and 8–13 (usually 11) postpelvic keeled scutes, 24–32 (usually 28–30) in total number; a small predorsal spine-like scute present. Teeth in jaws small or minute, not canine-like. Maxilla long, reaching or almost reaching posteriorly to base of first pectoral-fin ray. Anal fin long, its origin posterior to vertical through end of dorsal-fin base; upper pectoral-fin ray not extended as a filament. Scales cycloid; longitudinal scale rows 41–46. **Color:** body silvery white, brownish dorsally; a dark blotch of wavy lines posterior to upper part of gill opening; dorsal-fin tip black; upper, lower, and posterior margins of caudal fin black. **Size:** maximum length 16 cm. **Distribution:** Indo-West Pacific, from the west coast of India to Indonesia, north to Gulf of Thailand. **Remarks:** schooling fish found in inshore waters and estuaries. Marketed fresh, dried and dried-salted. (M. Matsunuma)



Thryssa mystax, KAUM–I. 16988, 13.0 cm SL
off Terengganu (KT), 14 Dec. 2008



Thryssa mystax, UMTF 1865, 11.9 cm SL
off Terengganu (KT), 24 Dec. 2008

Thryssa setirostris (Broussonet, 1782)

Longjaw Thryssa

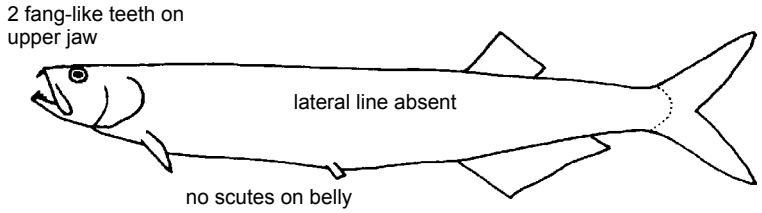
D 12; A 32–39 (usually 35–38); P_2 7; LGR 10–12. Body somewhat deep, compressed; abdomen with 16–18 prepelvic and 9–10 postpelvic keeled scutes, 25–28 in total number; a small predorsal spine-like scute present. Teeth in jaws small or minute, not canine-like. Maxilla very long, reaching posteriorly at least to tip of pectoral fins, usually to pelvic-fin base, or even to anal-fin origin. Anal fin long, its origin at or posterior to vertical through end of dorsal-fin base; upper pectoral-fin ray not extended as a filament. Scales cycloid; longitudinal scale rows 41–46 (usually 41–44). **Color:** body silvery white, brownish dorsally; a diffuse patch of horizontal wavy gray or charcoal lines on shoulder posterior to upper part of gill opening; dorsal and caudal fins dusky to deep yellow, margins charcoal; anal fin deep yellow or white; pectoral and pelvic fins pale yellow. **Size:** maximum length 18 cm. **Distribution:** Indo-West Pacific, from the Gulf of Oman east to Vanuatu, northern Australia north to Taiwan. **Remarks:** schooling fish mostly found in close inshore, entering bays and estuaries. Marketed fresh, dried and dried-salted. (M. Matsunuma)

Thryssa setirostris, KAUM–I. 17021, 10.6 cm SL
off Terengganu (KT), 16 Dec. 2008

CHIROCENTRIDAE

Wolf Herrings

By Seishi Kimura



Medium to large-sized silvery fishes; maximum size about 1 m SL. Body elongate and strongly compressed; no pelvic scutes. Two fang-like teeth on upper jaw; a series of canine teeth on lower jaw. Eyes relatively small, with eyelids completely covering eyes. Gill rakers 17–22; branchiostegal rays 8. No spinous fin rays; dorsal-fin with 16–19 rays, its origin just above anal-fin origin, its base shorter than anal-fin base; anal fin with 30–35 rays; caudal fin deeply forked; pelvic fins small, abdominal, with 6–7 rays. Scales small cycloid; lateral line absent. No pyloric caeca; spiral valve present in intestine. Total vertebrae 69–75. **Color:** dark bluish green dorsally, blight silver laterally and ventrally.

Remarks: occurring in coastal area of Indo-West Pacific, from South Africa to Japan and Australia. Feeds on fishes. A single genus, *Chirocentrus*, with two species.

Similar families occurring in the area: Elopidae and Chanidae – no fanglike teeth; lateral line present. Engraulidae, Pristigasteridae, and Clupeidae – no fang-like teeth; scutes usually present on belly.

Chirocentrus dorab (Forsskål, 1775)

Dorab Wolf-herring

D 16–18; A 29–36; P_1 13–16; P2 6; GR 1–4 + 10–16. Body elongate, strongly compressed, belly sharp; pectoral fin short, 11–13% SL. Mouth large, directed upward; both jaws with large canine teeth anterioly. Scales cycloid, very small. **Color:** dark blue-green dorsally, silvery ventrally; black marking on the upper part of dorsal fin; caudal fin blackish. **Size:** maximum 1 m SL, commonly 30–50 cm SL. **Distribution:** widely distributed in Indo-West Pacific from Red Sea and South Africa to Solomon Is., north to southern Japan. **Remarks:** occurring in inshore waters. Feeds on small fishes, crustaceans, squids, etc. Marketed fresh.

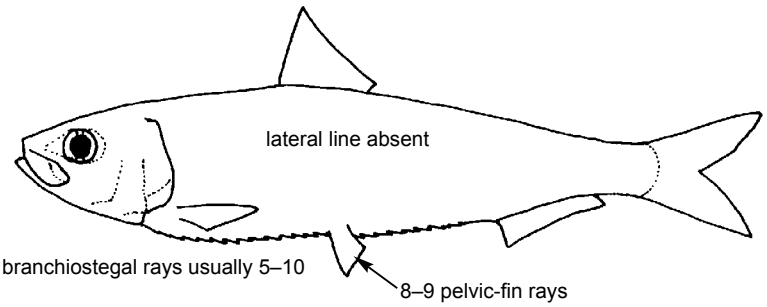
Chirocentrus dorab, KAUM–I. 17023, 25.0 cm SL
off Terengganu (KT), 16 Dec. 2008

CLUPEIDAE

Herrings (Sardines)

By Seishi Kimura and Mizuki Matsunuma

Small to medium-sized fishes (mostly 10 to 20 cm, some exceeding 50 cm) with silver-colored fusiform body, compressed or oval in cross-section. Mouth terminal or somewhat superior except for members of Dorosomatinae with mouth fully inferior; upper jaw mostly with 2 supramaxillae; jaw articulation always anterior to vertical below eye; teeth on jaws mostly absent or minute, sometimes with canines. Fins without spines; dorsal fin single, situated near midpoint of body; anal fin short less than 28 rays; pectoral fins set low on body; pelvic fins abdominal with 8 or 9 rays; caudal fin deeply forked. Body covered with cycloid scales; a series of scutes along abdomen; lateral line absent. **Color:** typically blue-green dorsally, silvery on flanks; with variable darker markings including spot behind gill cover, spots along flanks, spot at dorsal-fin origin, and dark pigmentation on part of dorsal, pectoral, anal, and caudal fins.



Remarks: schooling fishes found in marine coastal areas, mostly feeding on small planktonic animals and plants. Small but important food fishes used as fresh, dried, or salted ones, taken by beach seine and other variety of nets. Regionally some species have great contribution to local catches.

Similar families occurring in the area: Clupeidae differs from other similar families in having jaw articulation before vertical through eye, mostly 2 supramaxillae, pelvic fins inserting below short dorsal fin, short anal fin less than 28 rays, a series of scutes along abdomen, and no lateral line. Elopidae – lateral line present; no abdominal scutes; gular plate present; numerous branchiostegal rays (more than 20). Megalopidae – lateral line present, no abdominal scutes; gular plate present; numerous branchiostegal rays (more than 20). Albulidae – lateral line present; no abdominal scutes; gular plate present. Chirocentridae – body highly compressed and elongate; no abdominal scutes; jaws with developed fang-like canine teeth. Pristigasteridae – pelvic fins inserting anterior to vertical through dorsal fin origin; anal fin long more than 30 rays. Engraulidae – snout pig-like and projecting; jaw articulation well behind eye. Chanidae – lateral line present; no abdominal scutes; branchiostegal rays few (4 or 5).

Amblygaster clupeoides Bleeker, 1849

Bleeker's Smoothbelly Sardinella

D 18; A 18; P_1 17; P_2 8; LGR 26–31. Body moderately slender, somewhat cylindrical; belly rounded with 16–19 (usually 17) prepelvic and 11–14 (usually 13) postpelvic somewhat weak scutes. Upper jaw rounded without distinct median notch or cleft; 2 supramaxillae present; second (posterior) supramaxilla symmetrical; posterior tip of maxilla not reaching posteriorly to vertical through anterior margin of eye. Opercle smooth, without bony radiating striae. Shoulder girdle (cleithrum) margin with 2 outgrowths. Scales cycloid; a median series of predorsal scales present. **Color:** dark blue-green dorsally, silvery ventrally; no blackish spots laterally on trunk; a black blotch behind gill opening; dorsal fin blackish. **Size:** commonly to 15 cm, maximum length 18 cm. **Distribution:** Indo-West Pacific, from southern coasts of India to Indonesia, and also Fiji. **Remarks:** schooling fish found in coastal waters. Marketed fresh, dried, or dried-salted.

Amblygaster clupeoides, KAUM–I. 17040, 17.6 cm SL
off Terengganu (KT), 17 Dec. 2008

(M. Matsunuma)

Amblygaster sirm (Walbaum, 1792)

Spotted Sardinella

D 17–19; A 15–19; P_1 16–17; P_2 8; LGR 33–43; V 41–43. Body slender, somewhat cylindrical; belly rounded with 16–17 prepelvic and 13–15 postpelvic somewhat weak scutes (29–32 in total). Upper jaw with 2 supramaxillae; the second (posterior) supramaxillae symmetrical. Opercle smooth, without bony radiating striae. Shoulder girdle (cleithrum) margin with 2 outgrowths. Scales cycloid; a median series of predorsal scales present. **Color:** dark blue-green dorsally, silvery ventrally; a series of 10–20 blackish spots laterally on trunk. **Size:** commonly to 20 cm, maximum 23 cm SL. **Distribution:** widely distributed in Indo-West Pacific from the Red Sea and Madagascar to Kiribati and Fiji, north to Japan. **Remarks:** schooling fish found in coastal waters, feeds on copepods and other zoo- and phytoplanktons. Marketed fresh, dried, or dried-salted. (S. Kimura)

Amblygaster sirm, KAUM–I. 17041, 16.5 cm SL
off Terengganu (KT), 17 Dec. 2008

Anodontostoma chacunda, KAUM–I. 17057, 11.8 cm SL
off Terengganu (KT), 24 Dec. 2008

Anodontostoma chacunda (Hamilton, 1822)

Chacunda Gizzard Shad

D 17–19; A 19–20; P_1 15–16; P_2 8; LGR 54–96; V 41–43. Body very deep, almost oval, strongly compressed (40–50% SL in specimens > 10 cm SL); belly keeled with scutes (ca. 28). Mouth inferior; upper jaw with a distinct median notch. Opercle smooth, without bony striae. Longest lower gill rakers shorter than corresponding gill filaments. Shoulder girdle (cleithrum) margin without fleshy outgrowths. Last dorsal-fin ray not filamentous. Scales cycloid with denticulation along posterior margin; a median series of predorsal scales present. **Color:** body silvery, darker dorsally; occiput to nape yellowish or gold; a large black spot behind gill opening. **Size:** maximum ca. 18 cm SL. **Distribution:** widely distributed in Indo-West Pacific from the Persian Gulf to New Caledonia. **Remarks:** found in inshore waters and estuaries, feeds on zoo- and phytoplanktons. Marketed fresh, dried, or dried-salted. (S. Kimura)

Dussumieria elopsoides, KAUM–I. 17130, 15.0 cm SL
off Terengganu (KT), 1 Jan. 2009

Dussumieria elopsoides, KAUM–I. 17201, 13.8 cm SL
off Terengganu (KT), 10 Jan. 2009

Dussumieria elopsoides Bleeker, 1849

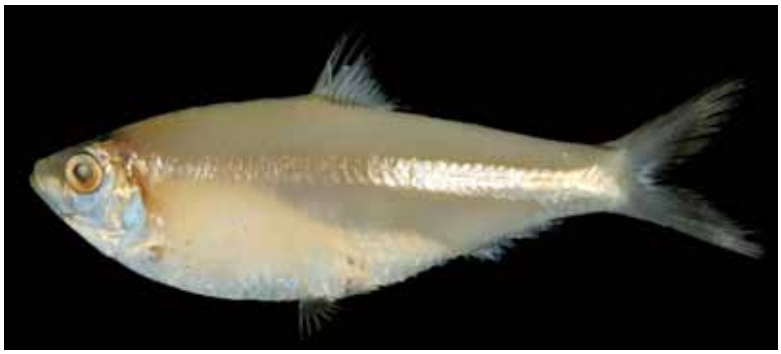
Slender Rainbow Sardine

D 18–21; A 15–17; P_1 14–15; P_2 8; LGR 21–32. Body elongated, cylindrical, slender (16–22% SL); belly rounded without prepelvic or postpelvic scutes. Premaxillae rectangular; branchiostegal rays numerous (13–18). Scales cycloid with numerous tiny radiating striae posteriorly. **Color:** dark blue-green dorsally, silvery ventrally, with a narrow lateral band of silvery gray and gold extending from upper operculum to caudal-fin base. **Size:** maximum ca. 20 cm SL. **Distribution**: Indo-West Pacific. **Remarks:** pelagic, inshore fish. Feeds on planktonic crustaceans and small fishes. Marketed fresh, dried, or dried-salted. (S. Kimura)

Escualosa thoracata (Valenciennes, 1847)

White Sardine

D 16; A 18–19; P_1 12–13; P_2 7; LGR 27–40. Body somewhat deep (27–37% SL), compressed; belly strongly keeled with 17–19 (mostly 18) prepelvic and 10–12 (mostly 11) postpelvic scutes (28–30, mostly 29, in total). Upper jaw rounded, without distinct median notch or cleft; 2 supramaxilla present. Opercle smooth, without bony radiating striae. Shoulder girdle (cleithrum) margin without fleshy outgrowths. **Color:** body semi-translucent with broad silvery midlateral stripe; inner edges of caudal fin broadly darkish. **Size:** maximum ca. 10 cm SL. **Distribution:** widely distributed in Indo-West Pacific from the Persian Gulf to northeastern Australia, north to Vietnam and Philippines. **Remarks:** schooling fish found in coastal, inshore waters. (S. Kimura)



Escualosa thoracata, KAUM–I. 17291, 7.3 cm SL
off Terengganu (KT), 20 Jan. 2009

Hilsa kelee (Cuvier, 1829)

Kelee Shad

D 18; A 20–22; P_2 8; LGR 100–175. Body very deep and strongly compressed; abdomen with sharply-keeled 15–17 prepelvic and 12–14 postpelvic scutes, 27–31 (usually 28–30) in total number. Mouth terminal; upper jaw with a distinct median notch. Opercle smooth, without bony striae. Gill rakers fine and numerous, those on inner arches curled outward; Shoulder girdle (cleithrum) margin without fleshy outgrowths. Frontoparietal striae (on top of head) numerous, 8–14. Last dorsal-fin ray not filamentous. Scales cycloid with denticulation along posterior margin; vertical striae overlapping at center of scale present. **Color:** body silvery, blue-green dorsally; occiput to nape yellowish or gold; a black spot behind gill opening. **Size:** commonly 15–18 cm, maximum 25 cm SL. **Distribution:** Indo-West Pacific. **Remarks:** found in inshore waters and estuaries, feeds on zoo- and phytoplanktons. Marketed fresh, dried, or dried-salted. (M. Matsunuma)

Hilsa kelee, KAUM–I. 17297, 15.0 cm SL
off Terengganu (KT), 20 Jan. 2009

Sardinella albella, KAUM–I. 16995, 11.6 cm SL
off Terengganu (KT), 14 Dec. 2008

Sardinella albella (Valenciennes, 1847)

White Sardinella

D 17–19; A 18–19; P_1 14–15; P_2 8; LGR 41–68. Body somewhat compressed, but variable from slender to moderately deep (body depth 25–40 %SL); abdomen keeled with prepelvic and postpelvic scutes; total number of scutes 29–33 (usually 30–32); pelvic scute with ascending arms. Second supramaxilla symmetrical and paddle-shaped; opercle smooth without radiating bony striae; posterior border of gill opening with 2 fleshy outgrowths. Anal fin short with 2 posteriormost rays enlarged. Scales cycloid; vertical striae discontinuous, not meeting at center; posterior part with a few perforations and somewhat produced posteriorly; longitudinal scale rows usually 41–43. **Color:** body silvery, blue-green dorsally; a dark spot at dorsal-fin origin; dorsal fin pale yellow; tips of dorsal and caudal fins blackish. **Size:** commonly 10 cm, maximum 14 cm SL. **Distribution:** Indo-West Pacific. **Remarks:** schooling fish found in reef-associated coastal waters. Marketed fresh, dried and dried-salted.

(M. Matsunuma)

Sardinella gibbosa (Bleeker, 1849)

Goldstripe Sardinella

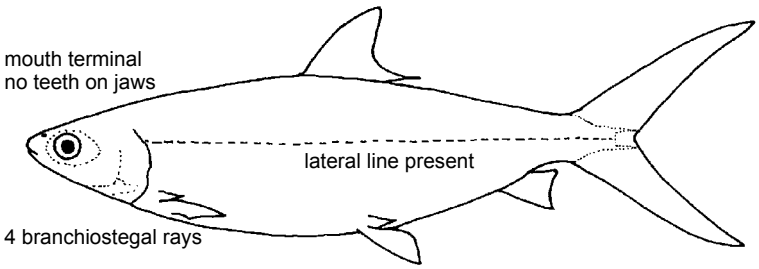
Sardinella gibbosa, KAUM–I. 17174, 13.2 cm SL
off Terengganu (KR), 5 Jan. 2009

D 17–20; A 17–21; P_1 14–17; P_2 8; LGR 45–60. Body moderately slender (body depth 25–40% SL); abdomen keeled with prepelvic and postpelvic scutes; total number of scutes 32–34; pelvic scute with ascending arms. Second supramaxilla symmetrical and paddle-shaped; opercle smooth without radiating bony striae; posterior border of gill opening with 2 fleshy outgrowths. Anal fin short with 2 posteriormost rays enlarged. Scales cycloid; vertical striae discontinuous, not meeting at center; posterior part with numerous small perforations; longitudinal scale rows 43–47. **Color:** body silvery, blue-green dorsally, with a thin golden midlateral line; a dark spot at dorsal-fin origin; margins of dorsal and caudal fins blackish. **Size:** commonly 15 cm, maximum 17 cm SL. **Distribution:** widely distributed in Indo-West Pacific from East African coasts to eastern Australia, north to Taiwan. **Remarks:** schooling fish found in coastal waters. Marketed fresh, dried, dried-salted and/or boiled. (M. Matsunuma)

CHANIDAE

Milkfish

By Mizuki Matsunuma

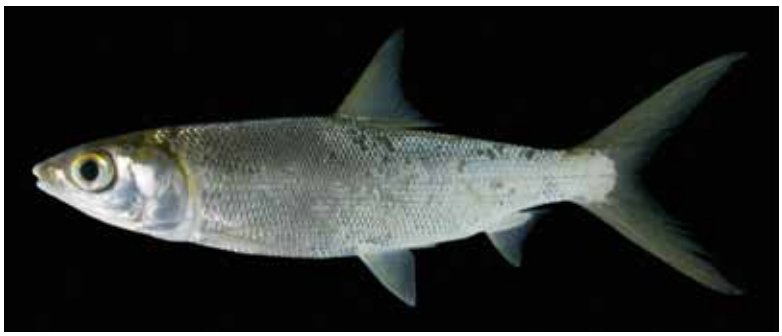


This family represented by a single species; see the following species account.

Similar families occurring in the area: Megalopidae – a bony gular plate present between arms of lower jaw; last dorsal-fin ray filamentous; scales large, 30–40 in lateral line. Elopidae – mouth much larger; a bony gular plate present between arms of lower jaw. Mugilidae – 2 dorsal fins; pectoral fins set high on body; no lateral line. Clupeidae – size much smaller; usually 6 or 7 branchiostegal rays (only 4 in *Chanos*); no lateral line; scutes usually present along belly. Polynemidae – mouth large, subterminal; 2 dorsal fins; pectoral fins in 2 parts, lower part with long unattached rays.

Chanos chanos (Forsskål, 1775)

Milkfish



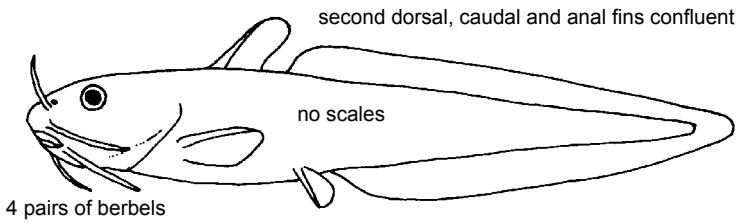
Chanos chanos, KAUM–I. 16451, 13.5 cm SL
estuary near UMT, 28 Sept. 2008

D 13–17; A 9–11; P_2 9–11; LL 75–91; GR 147–160 + 107–165. Body elongate, moderately compressed; no scutes along velly. Eye covered by adipose tissue. Mouth small, terminal, without teeth; lower jaw with small tubercle at tip, fitting into a notch in upper jaw; no bony gular plate between arms of lower jaw. Branchiostegal rays 4. Dorsal situated on about midpoint of body; anal fin short, close to caudal fin; caudal fin large and deeply forked, with scale flaps at base in adults; pectoral and pelvic fins with axillary scales. Scales small and smooth. **Color:** silver laterally and ventrally, olive-green or blue dorsally; dorsal, anal, and caudal fins with dark margin. **Size:** commonly 70–100 cm SL, maximum 1.5 m SL. **Distribution:** widely distributed in tropical and subtropical Indo-Pacific. **Remarks:** occurring in marine and brackish waters. Important food fish; marketed fresh, dried, canned, and smoked.

PLOTOSIDAE

Eeltail Catfishes (Eel Catfishes)

By Mizuki Matsunuma



Small to medium-sized (commonly less than 40cm, some up to 100 cm) catfishes. Body elongate, tapering posteriorly; without scales or bony plates. Lateral line complete, running along middle of body and extending nearly to caudal-fin base. A dendritic organ, located along ventral midline of body just anterior to anal-fin origin and posterior to anus, found in all marine, and some freshwater species. Mouth surrounded with barbels in 4 pairs; 1 pair between widely separated anterior and posterior nostrils; 1 pair at corner of mouth and 2 pairs on lower jaw. Teeth present on jaws, except on upper jaw of some fresh-water species. Palate with teeth, often molariform; molariform teeth sometimes found in lower jaw. Dorsal and pectoral fins located just posterior of head, each with a pungent serrated spine at leading edge; fin spines venomous and capable of producing painful sting; anal fin long and continuous with rounded or pointed caudal fin; dorsal series of procurrent caudal-fin rays consists of elongate rays which, in marine species, extend the fin anteriorly to at least vertical line at anal-fin origin, thus forming a second dorsal fin that is continuous with caudal fin; dorsal adipose fin absent. **Color:** body tan, brown, or black; lighter ventrally; sometimes with light stripes along side of body, extending onto head.

Remarks: found in fresh, brackish, and marine waters of tropical and subtropical regions of the Indo-Pacific; freshwater species restricted to Australia and New Guinea. Venomous, but marketed mostly fresh and locally may be important.

Similar families occurring in the area: Plotosidae differs from all other catfish families in having a dendritic organ (marine species), and caudal fin confluent with dorsal procurrent caudal, and anal fins. Ariidae – caudal fin forked; adipose fin present; anal fin short and not confluent with caudal fin; nasal barbel absent. Other freshwater catfish families (Siluridae, Clariidae and Heteropneustidae) – dorsal and pectoral fins with no pungent serrated spine at anterior edge; anal fin not confluent with caudal fin.

Plotosus lineatus (Thunberg, 1787)

Striped Eel Catfish

D I, 4; DPC 89–111; A 68–80; P_1 I, 10–12; P_2 10–13; GR 6–8 + 20–23 = 27–31. Body somewhat elongate; body depth more than 15% SL; anterior nostril situated dorsal to upper lip, opening directed anteriorly; gill membranes narrowly attached across isthmus; nasal and maxillary barbels short, reaching to or slightly beyond posterior margin of eye; origin of dorsal procurrent caudal fin inserting vertical above pelvic-fin base. **Color:** head and body dark brown, whitish ventrally; 2 or 3narrow pale-yellow longitudinal stripes on body, of which 2 extending onto head; barbels dark brown; dendritic organ yellowish brown. **Size:** commonly 20 cm, maximum 30 cm. **Distribution:** widely distributed in the Indo-West Pacific, from the Red Sea and east coast of Africa to Samoa, northern Australia north to southern Japan. **Remarks:** found in coastal waters, often entering estuaries. Juveniles forming dense ballshaped schools, adults solitary or occurring in small schools. Each serrate spine of dorsal and pectoral fins venomous and highly dangerous.

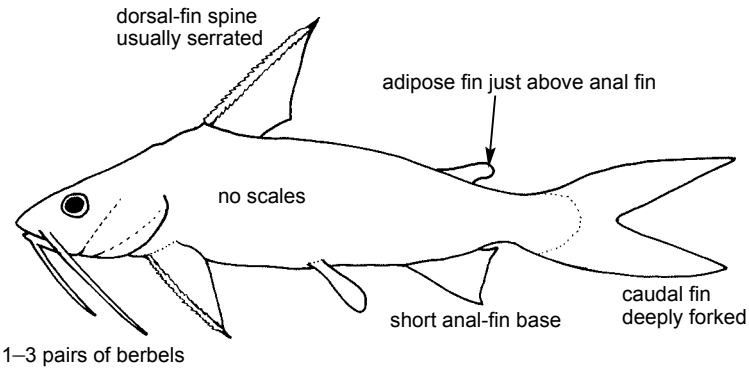
Plotosus lineatus, UMTF 1355 (KAUM–I. 16658), 26.5 cm SL
Bidong Island, 13 Oct. 2008

Plotosus lineatus, KAUM–I. 17010, 20.4 cm SL
off Terengganu (KT), 15 Dec. 2008

ARIIDAE

Sea Catfishes

By Seishi Kimura



Medium to large sized marine and freshwater catfishes; maximum size about 1.8 m. Body elongated, robust; head depressed but tail compressed. Bony shield dorsally on head usually visible, with a dorsomedian grove, extending posteriorly to nuchal bone; snout pointed or rounded anterior and posterior nostrils close together; mouth terminal or inferior; one, two, or three pairs of barbells present around the mouth, no nasal barbels; jaw teeth small, arranged into narrow or broad bands; palatal teeth on small or large patches; gill membranes joined together and attached isthmus anteriorly; branchiostegal rays 5–7. Dorsal fin with a long, robust, usually serrated spine followed by 7 branched rays; a very small spinelet or buckler present prior to dorsal spine; anal fin with 14–36 soft rays; caudal fin deeply forked with 15 (7 + 8) principal rays; pectoral fins low on the sides of body with a usually long and serrated spine and 7–13 branched rays; pelvic fins abdominal with 6 branched rays; adipose fin present just above anal fin. Body naked; lateral line well developed. **Color:** body dark, brownish dorsally, silvery ventrally; adipose fin with a black spots in some species.

Remarks: occurring in tropical to temperate marine, estuarine, and freshwater areas of the world, usually found in coastal and estuarine habitats, abundant in mangrove areas and large river estuaries. Omnivorous, usually feed on crustaceans, mollusks, and fishes. Males incubating the fertilized eggs in its mouth cavity. Food fish.

Similar families occurring in the area: Ariidae is distinguished from other Indo-Pacific catfish families in having a long, usually serrated dorsal fin spine, deeply forked caudal fin, short-based anal fin, adipose fin just above anal fin, naked body, and no nasal barbells. Plotosidae – caudal fin confluent with long-based anal fin; no adipose fin; nasal barbells present. Bagridae (freshwater) – nasal barbells present. Siluridae and Clariidae (both freshwater) – nasal barbells present; no dorsal fin spine; long-based anal fin. Pangasidae (freshwater) – long-based anal fin.

Arius maculatus (Thunberg, 1792)

Spotted Catfish

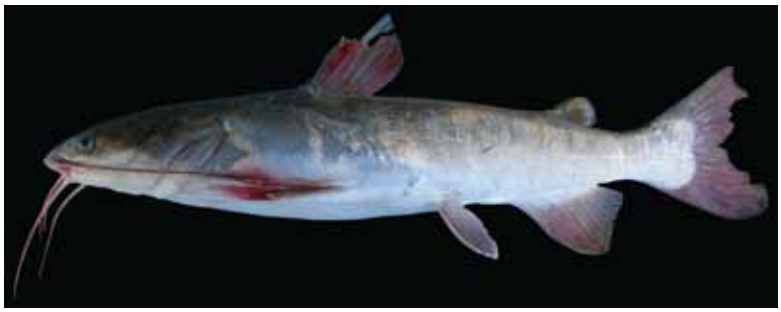
D I, 7; A 19–23; P_1 I, 9–10; P_2 6; GR 5–7 + 11–14; free vertebrae 41–44. Body elongated, compressed; head depressed; head shield and supraoccipital process weakly striated and granulated; dorsomedian head groove narrower and deeper posteriorly; snout rounded; palatal teeth small conical with blunt tip or molariform, on a single pair of oval patches, located well posterior to upper oral valve; inner gill rakers present on all gill arches; lateral line bifurcates behind caudal fin base. **Color:** body silvery, brownish green dorsally; all fins somewhat brownish; adipose fin pale with a prominent dark marking. **Size:** maximum length 50 cm. **Distribution:** Vietnam, Gulf of Thailand, Pacific coasts of Peninsular Thailand and Malaysia, Borneo, Sumatra, and Java. **Remarks:** inhabits coastal waters and estuaries.

Arius maculatus, KAUM–I. 16925, 15.3 cm SL
off Terengganu (KT), 10 Dec. 2008

Hexanematichthys sagor (Hamilton, 1822)

Sagor Sea Catfish

D I, 7; A 16–19; P_1 I, 11; P_2 6; GR 12–18; V 53–55. Body elongated, compressed; head broad, depressed; head shield striated; supraoccipital hemispherical in adults, its apex convex; dorsomedian head groove short; palatal teeth conical, tips sharp, on 2 pairs of patches; inner patches smaller than outer; barbels flattened, strap-like; inner gill rakers absent on the anterior 2 gill arches; pectoral-fin spine longer than dorsal-fin spine. **Color:** body silvery, blue-brownish dorsally; several golden green vertical stripes on body; adipose fin pale. **Size:** maximum length 45 cm SL. **Distribution:** Indo-West Pacific, from Pakistan to Borneo and Java. **Remarks:** inhabits coastal waters and estuaries.



Hexanematichthys sagor, KAUM–I. 17013, 40.0 cm SL
off Terengganu (KT), 15 Dec. 2008

Hexanematichtys sagor, UMTF 1071 (KAUM–I. 16679), 10.7 cm SL
Kemaman, 21 Oct. 2008

Netuma thalassina (Rüppell, 1837)

Giant Sea Catfish

D I, 7–8; A 14–19; P_1 I, 11–13; P_2 6; GR 4–5 + 8–10; free vertebrae 38–45. Body elongated, compressed; head depressed; head shield and supraoccipital process finely granulated; dorsomedian head groove short and shallow, V-shaped posteriorly; palatal teeth minute, tips sharp, on 3 pairs of patches, located just posterior to upper oral valve; inner patches on both sides separated; inner gill rakers absent on the anterior 2 gill arches; caudal fin lobes somewhat long, slender; adipose fin small; lateral line bifurcates behind caudal fin base. **Color:** body silvery, brownish dorsally; adipose fin with a black marking. **Size:** maximum length 130 cm SL. **Distribution:** widely in Indo-West Pacific, from East Africa to eastern Australia, north to Philippines and southern China. **Remarks:** inhabits coastal waters.

Netuma thalassina, KAUM–I. 16969, 19.0 cm SL
off Terengganu (KT), 11 Dec. 2008

Plicofollis dussumieri, KAUM–I. 17072, 14.9 cm SL
off Terengganu (KT), 27 Dec. 2008

Plicofollis dussumieri (Valenciennes, 1840)

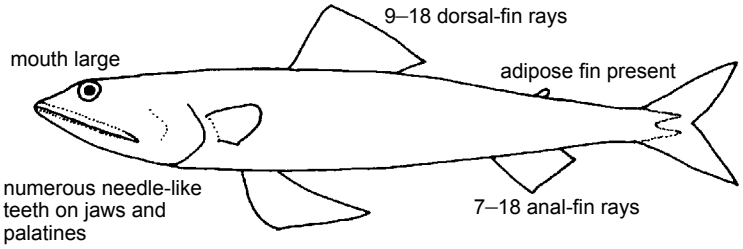
Blacktip Sea Catfish

D I, 7; A 14–18; P_1 I, 10; P_2 6; GR 14–16. Body elongated, compressed. Head depressed; head shield and supraoccipital process weakly granulated posteriorly; dorsomedian groove distinctly deeper anterior to supraoccipital process; supraoccipital process triangular with sharp median keel; palatal teeth granular or conical with blunt tips, on 2 pairs of patches longitudinally arranged; anterior patch small and oval; posterior patch elongate, slender; inner gill rakers absent on the anterior 2 gill arches. **Color:** body silvery, brownish dorsally; all fins dusky; adipose fin distally blackish or with a black marking. **Size:** maximum length 75 cm. **Distribution:** Indian Ocean, Pacific coast of Peninsular Thailand and Malaysia, Borneo, and Sumatra. **Remarks:** inhabits coastal waters and estuaries.

SYNODONTIDAE

Lizardfishes

By Mizuki Matsunuma and Seishi Kimura



Small to medium-sized marine fishes; maximum size about 70 cm, commonly 20–40 cm. Body slender, cylindrical, and moderately elongated. Mouth large; hind tip of upper jaw extending well beyond hind margin of eye; a single supramaxilla small or absent; numerous needle-like teeth on jaws and palatines; branchiostegal rays 12–18. No spinous fin rays; dorsal fin located about midpoint of body, 9–15 rays; anal fin posterior to dorsal fin base, 8–17 rays; caudal fin forked, 19 principal rays; pelvic fins close together, 8–9 rays; adipose fin present above anal fin. Cycloid scales present at least on the posterior half of body and along lateral line. **Color:** body usually brown or reddish with variable markings. Peritoneum either pale with several black spots, or black.

Remarks: occurring in tropical to temperate marine and estuarine areas, usually found on rocky, coral, sandy, or muddy bottoms in shallow waters. Feed on small fishes and crustaceans.

Similar families occurring in the area: Aulopidae – two supramaxillae present; hind tip of upper jaw not or slightly extending beyond hind margin of eye. Bathysauridae – head depressed conspicuously; branchiostegal rays 8–13; adipose fin present or absent; pelvic fin rays 8. Chlorophthalmidae – a single elongate supramaxilla present; hind tip of upper jaw not extending beyond center of eye.

Harpadon nehereus (Hamilton, 1822)

Bombay Duck

D 10–13; A 13–15; P_1 10–12; P_2 9. Body elongate, well compressed; mouth large; lower jaw longer than upper jaw. Scales restricted to posterior half of body; lateral line extending as a median lobe of caudal fin. Pectoral fin very long, its posterior tip extending beyond origin of dorsal fin; dorsal and pelvic fins large. **Color:** body cream, with black pigments dorsally; fins blackish. **Size:** maximum 40 cm SL. **Distribution:** widely distributed in Indo-West Pacific from India to Solomon Islands, north to southern Japan. **Remarks:** found in coastal waters of sandy mud bottom. Marketed extensively as a relish with curry. (M. Matsunuma)

Harpadon nehereus, KAUM–I. 17293, 7.9 cm SL
off Terengganu (KT), 20 Jan. 2009

Saurida tumbil (Bloch, 1795)

Greater Lizardfish

D 11–13; A 10–11; P_1 13–16; P_2 9; LL 59–65; PDS 16–19; V 56–61. Body subcylindrical, elongate. Head and caudal peduncle somewhat depressed; mouth large; numerous small teeth exposed on side of jaws when mouth closed; palatine teeth arranged in two bands on each side of roof of mouth; palatine teeth on the outer bands in 3 or 4 rows anteriorly. Outermost ray of pelvic fin subequal to innermost ray. Pectoral fin short, its posterior tip not or only just reaching to insertion of pelvic fin. **Color:** body light brown dorsally, silvery white ventrally; pectoral fin and lower lobe of caudal fin dusky; upper margin of caudal fin without any marking; adipose fin with a black marking. **Size:** maximum length about 25 cm SL. **Distribution:** widely distributed in the Indo-West Pacific from east coast of Africa, Red Sea to eastern Australia. **Remarks:** found in shallow coastal sandy or muddy bottoms. Feeds on fishes, crustaceans, and squids. Marketed fresh. (S. Kimura)

Saurida tumbil, KAUM–I. 17241, 27.8 cm SL
off Terengganu (KT), 15 Jan. 2009

Saurida undosquamis (Richardson, 1848)

Brushtooth Lizardfish

D 10–13; A 10–11; P_1 13–14; P_2 9; LL 49–55; PDS 18–21; V 50–53. Body subcylindrical, elongate. Head and caudal peduncle somewhat depressed; mouth large; numerous small teeth exposed on side of jaws when mouth closed; palatine teeth arranged in two bands on each side of roof of mouth; palatine teeth on the outer bands in only 2 rows anteriorly. Outermost ray of pelvic fin subequal to innermost ray. Pectoral fin short, its posterior tip not reaching a line between origins of pelvic and dorsal fins. **Color:** body light brown dorsally, silvery white ventrally; pectoral fin and lower lobe of caudal fin dusky; upper margin of caudal fin with 6–16 black dots; adipose fin with a black marking. **Size:** maximum length about 28 cm SL. **Distribution:** eastern Indian Ocean and West Pacific from Arabian Gulf to northern and southwestern Australia, north to Gulf of Thailand. **Remarks:** found in shallow coastal sandy or muddy bottoms.

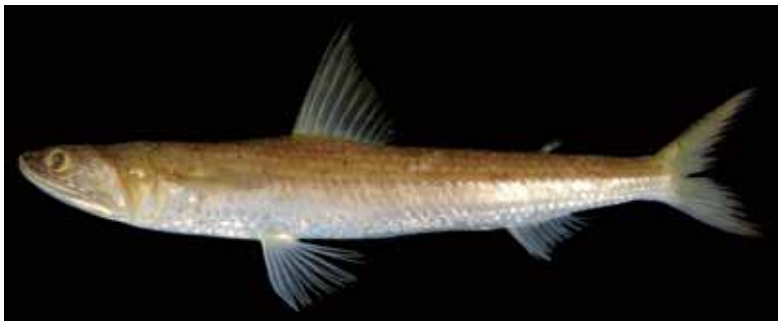
(M. Matsunuma)

Synodus tectus (Cressey, 1981)

Tectus Lizardfish

D 13–14; A 9–10; P_1 12–13; P_2 8; PLS 55–57; PDS 13–15; V 54–56. Body fusiform, elongate, caudal peduncle slightly compressed. Head somewhat depressed; mouth large; anteriormost palatine teeth longer than more posterior teeth. Outermost ray of pelvic fin distinctly shorter than innermost ray; anal fin base shorter than dorsal fin base; pectoral fin short, its posterior tip not reaching a line between origins of pelvic and dorsal fins. **Color:** body light brown dorsally, silvery white ventrally; with about 8 brown saddle-like patches extending laterally, forming diamond-shaped patches at level of the lateral line; a black spot on upper edge of opercle, divided dorsally into 3 or 4 separate finger-like branches; 9–11 peritoneal spots. **Size:** maximum length 17 cm SL. **Distribution:** West Pacific from northern Australia to Taiwan. **Remarks:** found in shallow coastal sandy or muddy bottoms.

(M. Matsunuma)



Saurida undosquamis, KAUM–I. 17242, 24.7 cm SL
off Terengganu (KT), 15 Jan. 2009

Synodus tectus, KAUM–I. 17094, 14.4 cm SL
off Terengganu (KT), 28 Dec. 2008

Synodus tectus, UMTF 1891, 16.7 cm SL
off Terengganu (KT), 11 Jan. 2009

Trachinocephalus myops, UMTF 1360 (KAUM–I. 16572), 16.6 cm SL
Bidong Island, 13 Oct. 2008

Trachinocephalus myops (Forster, 1801)

Bluntnose Lizardfish

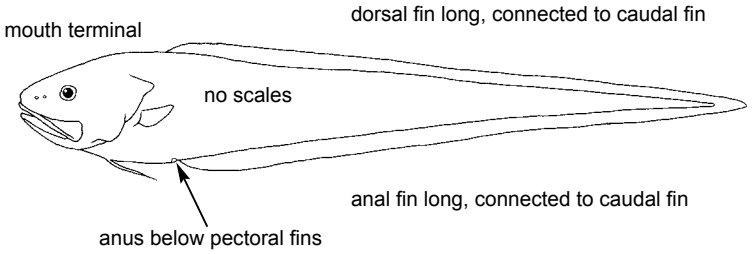
D 11–14; A 13–18; P_1 11–13; P_2 8; LL 51–61; V 54–55. Body fusiform, elongate; snout very short; mouth large; palatine with a row of teeth. Outermost ray of pelvic fin distinctly shorter than innermost ray; anal fin base longer than dorsal fin base; pectoral fin short. **Color:** body with alternating narrow dark-edged pale blue and yellow stripes; a large black spot at upper end of gill opening; about 5 yellow stripe on dorsal fin; adipose and anal fins with yellow margin; pelvic fin with a yellow stripe basally; caudal fin yellow. **Size:** maximum length 25 cm SL. **Distribution:** circumglobal in tropical and subtropical seas except for Eastern Pacific. **Remarks:** found in shallows to 400 m on sandy bottom. (M. Matsunuma)

CARAPIDAE

Pearlfishes

By Hiroyuki Motomura and Mizuki Matsunuma

Small to medium-sized fishes, rarely reaching 50 cm TL. Body elongate and compressed or subcylindrical. Eye diameter subequal to snout length in adults. Supramaxilla absent. Mouth terminal, often with strong teeth. No spines on opercle. Scapula and coracoid fused; upper distal radial of pectoral fins enlarged; hyomandibula with large foramen. Dorsal and anal fins long, connected to caudal fin; dorsal fin rays shorter than opposing anal fin rays; highly modified first dorsal fin ray in larvae. Pelvic fin with a soft ray, or without ray. Scales absent. Anus located below pectoral fins. **Color:** semitransparent to brownish.



Remarks: occurs in shallow to moderately deep waters. Usually pelagic in larvae and benthic in adults; free-living adults in some species; commensals in body cavity of invertebrates, primarily holothurians (sea cucumbers), in most species when adults. A bycatch in some sea cucumber fisheries, but no importance to fisheries.

Similar families occurring in the area: Ophidiidae – body scales present; anus located behind posterior tip of pectoral fin.

Encheliophis homei (Richardson, 1846)

Silver Pearlfish

P_1 17–21; P_2 0; V 116–128; Body elongate, compressed; head depth slightly greater than body depth. Mouth moderate; maxilla free from cheek, movable; villiform teeth on jaws, without fangs. Dorsal fin origin posterior to anal fin origin; pectoral fin relatively long, its length subequal to upper jaw length. Anus located anterior to vertical through at pectoral fin base. Swimbladder without ridges an intrinsic constriction. **Color:** body translucent; cheek and abdomen silvery; side of jaws with some blackish pigment. **Size:** maximum length 19 cm. **Distribution:** widely distributed in the Indo-Pacific, from Madagascar east to Society Islands, and northern Australia north to southern Japan. **Remarks:** commensal in sea cucumbers. (M. Matsunuma)

Encheliophis homei, KAUM–I. 17186, 10.5 cm SL
off Terengganu (KR), 5 Jan. 2009

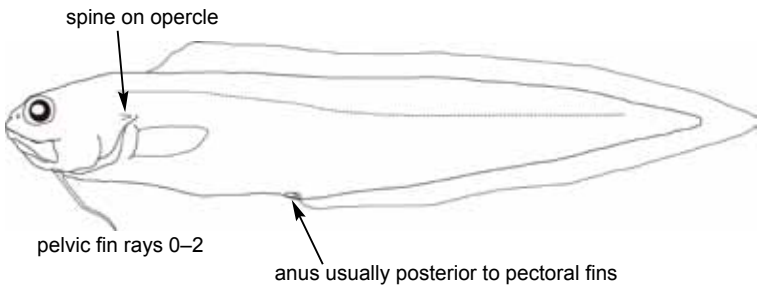
Encheliophis homei, KAUM–I. 17187, 10.6 cm SL
off Terengganu (KR), 5 Jan. 2009

OPHIDIIDAE

Cusk Eels

By Mizuki Matsunuma

Median to large-sized marine fishes, reaching 200 cm. Body moderately elongate. Anterior nostril placed midway between upper lip and posterior nostril. Teeth usually small, densely distributed, and blunt-tipped. Supramaxilla present. Very seldom less than 7 long gill rakers on anterior gill arch. A well developed spine on opercle usually present. Dorsal and anal fins long, joined to caudal fin. Dorsal fin rays normally longer than opposing anal fin rays. Pelvic fin rays 0–2. Scales present; lateral line present or absent. Anus placed posterior to pectoral fins except in species with prolonged pectoral fins. **Color:** very variable, some with horizontal or vertical bars and eye-spots.



Remarks: most of species occurs pelagically at great depths; the few shallow water species are cryptic. Usually no commercial importance.

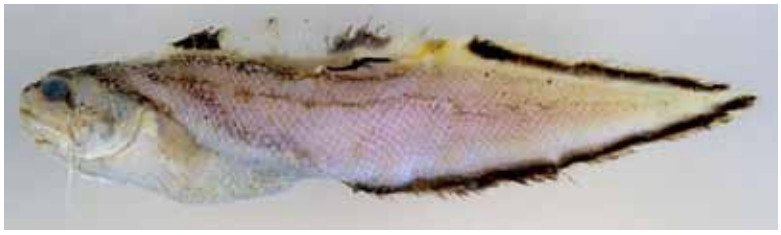
Similar families occurring in the area: Carapidae – scales absent; anal-fin rays longer than opposing dorsal-fin rays; anus placed below pectoral fins. Bythitidae – anterior nostril placed immediately above upper lip; very seldom more than 7 long gill rakers on anterior gill arch. Macrouridae – pelvic fins well separated from each other, with more than 2 rays. Gadidae and Moridae – pelvic fins well separated from each other; dorsal and anal fins not joined to caudal fin.

Sirembo jerdoni (Day, 1888)

Brownbanded Cuskeel

D 89–95; A 64–68; P_1 22–24; P_2 1. Body relatively elongate, compressed, but not attenuate; snout bluntly rounded; eyes well developed. Dorsal and anal fins long, joined to caudal fin; pelvic fins closed to each other, located below level of posterior margin of eye. No spines on preopercle; spine on opercle short, not reaching posterior margin of opercle. Scale cycloid. **Color:** body silvery white, with 3–4 broad, oblique bands on head and anterior body, connecting over the predorsal and head to the other side; several brown blotch on dorsal and caudal fins; anal fin with a brown stripe basally, blackish marginally. **Size:** commonly 10 cm SL. **Distribution:** Indo-West Pacific, including the Red Sea, Bay of Bengal,Western Australia, Gulf of Thailand, Philippines, and South and East China Sea. **Remarks:** found in moderate to deep waters at depths of 57–99 m.

Sirembo jerdoni, KAUM–I. 17170, 14.2 cm SL
off Terengganu (KR), 5 Jan. 2009

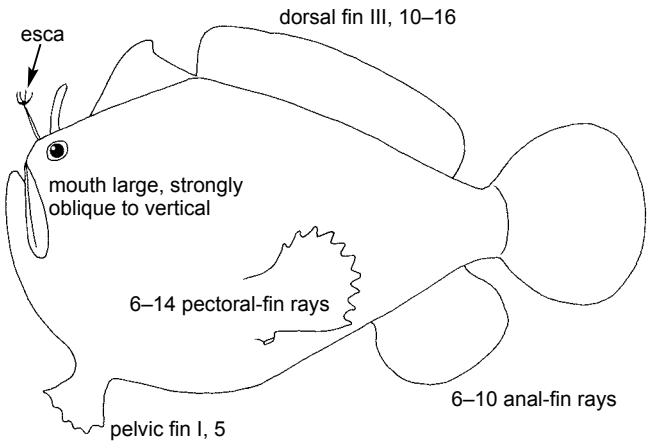


Sirembo jerdoni, KAUM–I. 17028, 10.8 cm SL
off Terengganu (KT), 17 Dec. 2008

ANTENNARIIDAE

Frogfishes

By Hiroyuki Motomura



Small to moderate fishes, largest species attaining to over 50 cm; most species less than 20 cm. Body short, deep, globose, slightly compressed. Mouth large, strongly oblique to vertical; villiform teeth on jaws and palatines. Gill opening, below or behind pectoral-fin base, with a small pore. Dorsal fin with III spines and 10–16 soft rays; spinous portion of fin widely separated from soft-rayed portion; first spine free from rest of fin, nearly always with a well-developed terminal bait (esca); second and third spines covered by thick skin. Anal fin with 6–10 soft rays. Caudal fin rounded. Pectoral fin with 6–14 rays, elongate, leg-like. Pelvic fin with I spine and 5 soft rays. Body covered with loose skin, naked or with denticles. **Color:** extremely variable, often closely matching that of surroundings; changing color within a few weeks in some species.

Remarks: most species inhabiting on bottom in shallow waters; one species pelagic, clinging in floating algae. Feeds on fishes, sometimes large fishes longer than themselves; also cannibalistic. Released eggs embedded in a single, large, buoyant gelatinous mass; floating on water surface.

Similar families occurring in the area: families with an esca not occurring in shore waters in the area.

Antennarius nummifer (Cuvier, 1817)

Spotfin Frogfish

D I + I + I, 12–13; A 7–8; P_1 10–11; P_2 I, 5; C 9. Body globose, compressed. Gill opening below pectoral-fin base. First dorsal-fin spine with a fleshy tentacle; base of the spine behind upper jaw symphysis; second spine without membrane posteriorly; illicium short, subequal in length to second dorsalfin spine. Posterior end of dorsal fin not broadly connected by membrane to caudal peduncle. Pectoral-fin rays unbranched. **Color:** body red, pink, orange, yellow, tan, or brown, with a large black spot at dorsal-fin base. **Size:** maximum length 13 cm. **Distribution:** widely distributed in the Indo-Pacific, from east coast of Africa east to the Hawaiian and Marquesas Islands, and also from islands of the eastern Atlantic. **Remarks:** usually found on reefs in shallow waters to a depth of 293 m.

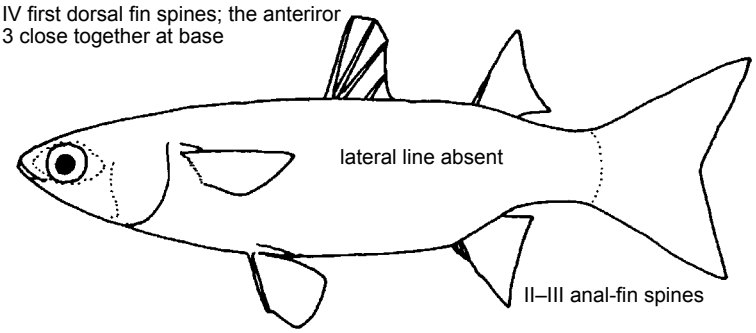
Antennarius nummifer, KAUM–I. 16629, 1.4 cm SL
Bidong Island, 13 Oct. 2008

MUGILIDAE

Mullets

By Koichi Shibukawa, Siti Tafzilmeriam S. A. K. and Seishi Kimura

Medium to large sized (up to 100 cm) moderately slender fishes. Body subcylindrical, compressed posteriorly; lateral line absent. Head subcylindrical, flattened dorsally in many species; eyes often partly covered by well-developed adipose eyelid; mouth moderately small, terminal or inferior; teeth minute or absent. Two dorsal fins well separated from one another; first dorsal fin with IV pungent spines, the anterior three close together at base; second dorsal fin with I spine and usually 9–10 soft rays; anal fins with II–III spines and 7–12 soft rays; pectoral fins high on side of body; pelvic fins subabdominal, with I spine and 5 rays; caudal fin lunate, emarginate or nearly truncate. Scales cycloid or ctenoid, moderately large; enlarged axillary scales usually present at base of pectoral and pelvic fins. **Color:** head and body more or less silvery, darkened dorsally; fins transparent, dusky or yellowish.



Remarks: fast swimming fishes; inhabits coastal waters (usually to depths of 20 m) including estuaries; often enter freshwater areas and lagoons. Frequently schooling. Feed on detritus or small organisms. Many species are important to fisheries, caught by various nets (e.g., seines, cast nets, and gill nets) and usually marketed fresh, frozen, salted or boiled; roe may be also marketed; often used as live bait in tuna fishing. Generic assignment follows Senou (2002) and Ghasemzadeh et al. (2004).

Similar families occurring in the area: Atherinidae – first dorsal fin with III–VIII flexible spines, anterior three spines separate at base; a single anal-fin spine.

Chelon subviridis (Valenciennes, 1836)

Greenback Mullet

D IV + 8–10; A III, 8–9; P_1 14–17; LR 27–33. Body moderately robust (depth usually 22–26% of SL), compressed posteriorly; no elongate scale (axillary scale) above pectoral-fin base. Head width subequal to depth, flattened dorsally; adipose eyelid weakly developed posteriorly, not covering iris; hind tip of maxilla exposed when mouth closed. Second dorsal and anal fins pointed but not falcate; caudal fin emarginate. Scales ctenoid. Pyloric caeca 4–6. **Color:** head and body silvery, darkened dorsally; 3–6 indistinct, dusky longitudinal stripes on body; caudal fin bluish with dusky narrow margin. **Size:** 40 cm SL, commonly to 25 cm TL. **Distribution:** Indo-Pacific. **Remarks:** found in shallow coastal waters; frequently enters lower reaches of streams, estuaries, and mangrove swamps. Marketed fresh and salted.

(K. Shibukawa & S. Tafzilmeriam)

Chelon subviridis, KAUM–I. 17064, 19.0 cm SL
off Terengganu (KT), 26 Dec. 2008

Chelon subviridis, UMTF 1025 (KAUM–I. 16788), 11.9 cm SL
Merang, 2 Nov. 2008

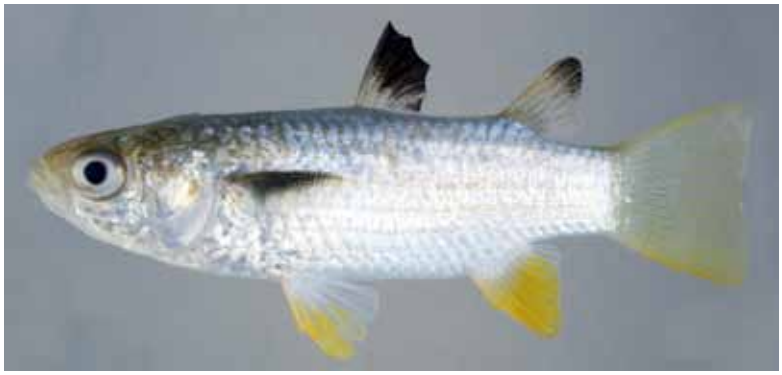
Ellochelon vaigiensis (Quoy & Gaimard, 1825)

Squaretail Mullet

D IV + 7–9; A III, 8; P_1 15–18; LR 25–29. Body moderately robust (depth usually 20–27% of SL), compressed posteriorly; no elongate scale (axillary scale) above pectoral-fin base. Head wider than deep, flattened dorsally; adipose eyelid poorly developed; hind tip of maxilla exposed when mouth closed. Second dorsal and anal fins pointed but not falcate; caudal fin truncate. Scales ctenoid. Pyloric caeca much divided, up to 23 in about 2 bunches. **Color:** head and body silvery, darkened dorsally; 5–6 indistinct, dusky longitudinal stripes on body; pectoral fin entirely black; anal and caudal fins yellowish. **Size:** 60 cm SL, commonly to 35 cm TL. **Distribution:** Indo-Pacific. **Remarks:** found in shallow coastal waters, and enters estuaries. Marketed fresh and salted.

(K. Shibukawa & S. Tafzilmeriam)

Ellochelon vaigiensis, KAUM–I. 17314, 24.8 cm SL
off Terengganu (KT), 20 Jan. 2009



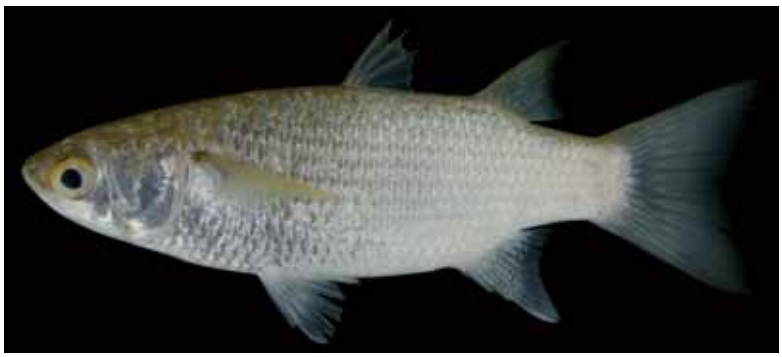
Ellochelon vaigiensis, UMTF 1314 (KAUM–I. 16684), 4.1 cm SL
Kemaman, 21 Oct. 2008

Moolgarda delicata (Alleyne & Macleay, 1877)

Delicate Mullet

D IV + 8; A III, 9; P_1 15–17; LR 34–36. Body elongate; mouth small and terminal; snout rounded; posterior end of maxilla concealed when mouth closed; adipose eyelid covering none of iris; scales cycloid with crenulated membranous edge; pyloric caeca not branching; caudal fin forked. **Color:** greenish or brownish gray dorsally, shading silvery on side and ventrally; posterior margin of caudal fin black; a dark blue spot at origin of pectoral fin. **Size:** about 13 cm SL. **Distribution:** western Pacific. **Remarks:** occurring in beaches and estuaries. Although Thomson (1997) treated this nominal name as a synonym of *Valamugil seheli* (Forsskål, 1775), the former is considered as valid species (H. Senou pers. com.).

(S. Kimura)



Moolgarda delicata, UMTF 1293 (KAUM–I. 16454), 8.6 cm SL
estuary near UMT, 28 Sept. 2008

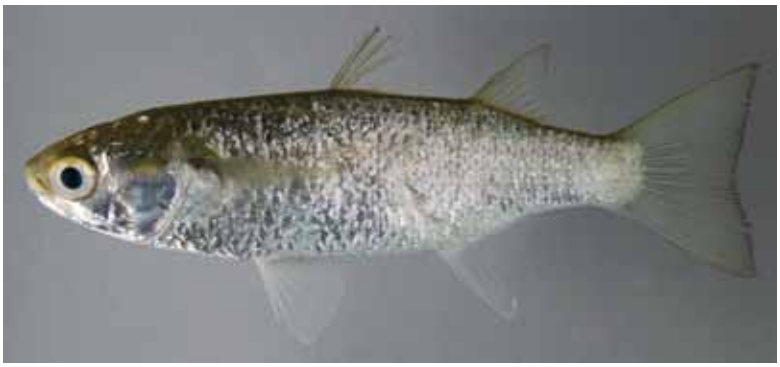
Moolgarda delicata, UMTF 1229 (KAUM–I. 16789), 7.1 cm SL
Merang, 2 Nov. 2008

Moolgarda perusii (Valenciennes, 1836)

Longfinned Mullet

D IV + 8–10; A III, 9; P_1 15–17; LR 31–34. Body moderately robust (depth 24–35 % SL), compressed posteriorly. Head deeper than wide and dorsally flattened; adipose eyefold developed, extending over iris; hind tip of maxilla concealed when mouth closed. Second dorsal and anal fins long, but not falcate; caudal fin emarginate. Scales with a digitated membranous posterior margin; thoracic and abdominal scales more distinctly ctenoid. Pyloric caeca 5–7. **Color:** greenish dorsally, flanks and abdomen silvery; a small gold spot on opercle; pectoral fins with dark spot dorsally at origin. **Size:** maximum 25 cm TL, commonly to 15 cm TL. **Distribution:** Indo-West Pacific. **Remarks:** found in coastal waters and estuaries. (S. Tafzilmeriam)

Moolgarda perusii, KAUM–I. 17106, 15.0 cm SL
off Terengganu, 28 Dec. 2008



Moolgarda perusii, UMTF 1217 (KAUM–I. 16669), 7.7 cm SL
Kemaman, 20 Oct. 2008

Oedalechilus labiosus (Valenciennes, 1836)

Hornlip Mullet

D IV + 8–9; A III, 9; P_1 15–18; LR 33–37. Body moderately deep. Head relatively flattened dorsally; adipose eyefold absent; upper lip with deep longitudinal fold near its ventral edge, splitting it into upper and lower lobes; these lobes fringed with ridges of horny epidermis; ridges small and appear as papillae on upper lobe; ridges on lower lobe better developed; upper and lower lips form folds tucked under preorbital at corners of mouth. Caudal fin emarginate. Scales cycloid or weakly ctenoid. Pyloric caeca 3–4. **Color:** body olive dorsally, silvery ventrally; fins greenish or yellowish. **Size:** maximum 40 cm SL, commonly to 20 cm TL. **Distribution:** Indo-Pacific. **Remarks:** found in shallow coastal waters, coral reefs and in harbors. Caught with gill nets, lift nets, and seines. (S. Tafzilmeriam)

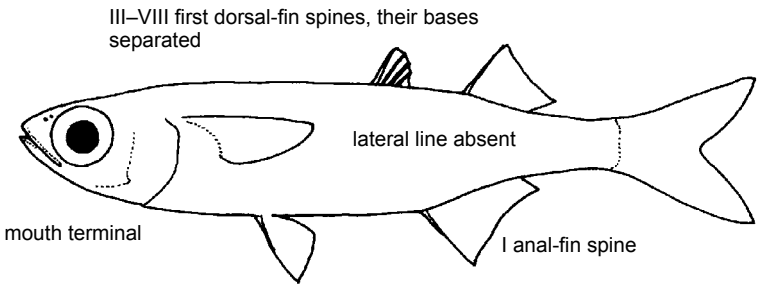
Oedalechilus labiosus, UMTF 1230 (KAUM–I. 16623), 4.0 cm SL
Bidong Island, 12 Oct. 2008

ATHERINIDAE

Silversides

By Seishi Kimura

Small to medium sized marine and freshwater fishes; maximum size about 20 cm in the area, commonly 5–10 cm. Body slender cylindrical or somewhat compressed with round belly. Eyes large; interorbital area flat; mouth small and terminal; hind tip of upper jaw not extending to posterior margin of eye. Two dorsal fins well separated, the first with III to VIII flexible spines separated each other at base; the second dorsal and anal fins with a single spine followed by soft rays (D_2 I, 7–13; A I, 8–21); caudal fin forked; pectoral fins high on the sides of body with 10–19 rays; pelvic fins abdominal to subabdominal with I, 5. Scales cycloid, relatively large; lateral line absent. **Color:** body greenish or greenish brown dorsally, silvery ventrally; a broad silvery (black in preserved specimens) stripe on the side of body.



Remarks: occurring in tropical to temperate marine, estuarine, and freshwater areas; usually found in beaches and seagrass areas. Eggs with entangling filaments on chorion.

Similar families occurring in the area: Atherinidae is distinguished from the following similar families in having round belly, anus located behind pelvic fin base, 2 dorsal fins, first dorsal-fin spines separated each other at base, and a single anal fin spine. Engraulidae – hind tip of upper jaw extending beyond posterior margin of eye; a single dorsal fin; no spines in fins. Isonidae – body compressed with keeled belly. Mugilidae – first dorsal fin with IV spines, anterior 3 spines close together at base; II or III anal fin spines. Phallostethidae – anus anterior, located under head.

Atherinomorus lacunosus (Forster, 1801)

Wide-banded Hardyhead Silverside

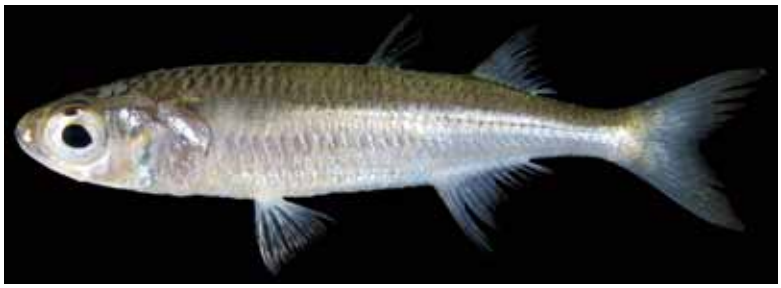
D IV–VII + I, 9–11; A I, 12–16; P_1 15–18; LR 40–44; LGR 18–24; V 20–25 + 18–22 = 41–45. Body rather stout, deep; anus near or usually beyond pelvic-fin tips; mouth large, upper jaw reaching to or slightly beyond a vertical through front margin of pupil; ascending process of premaxilla short and broad; upper margin of the dentary almost flat distally, without a distinct tubercle at the posterior end; posterior margin of lateral scales usually entire, but sometime crenulated. **Color:** body greenish tan dorsally; a broad (ca. 1.5 scale width) silvery longitudinal band on side. **Size:** maximum length about 14 cm SL. **Distribution:** almost entire Indo-Pacific, from East Africa to Tonga. **Remarks:** occurring in beaches, sometimes entering estuaries. The genus *Atherinomorus* is characterized by having a short and blunt ascending process and a low and wide lateral process of the premaxilla. Seven species of *Atherinomorus* (*A. aetholpis*, *A. crenolepis*, *A. duodecimalis*, *A. endrachtensis*, *A. lacunosus*, *A. pinguis*, and *A. regina*) are distributed in the West Pacific coasts of Southeast Asian countries. Of these, *A. endrachtensis*, *A. lacunosus*, and *A. pinguis* differ from the remaining four species by lacking a tubercle at the posterior end of dentary. Although *A. lacunosus* closely resembles *A. pinguis* in general morphology, the former is distinguished from the later in having a wider midlateral band (the lower margin reaching to almost the center of the fourth scale row at level of the anal fin origin vs. the lower margin reaching to the ventral end of the third scale row in the later) and more numerous midlateral scales (40–44 vs. 38–41). *Atherinomorus endrachtensis* has 33–35 midlateral scales.

Atherinomorus lacunosus, KAUM–I. 16376, 7.3 cm SL
Dungun, 23 Sept. 2008

Atherinomorus pinguis (Lacepède, 1803)

Narrow-banded Hardyhead Silverside

D IV–VI + I, 9–11; A I, 12–16; P_1 14–17; LR 38–41; LGR 19–23 V 20–23 + 19–20 = 39–43. Body rather stout, deep; anus usually just anterior to pelvic-fin tips; mouth large, upper jaw reaching to or slightly beyond a vertical through front margin of pupil; ascending process of premaxilla short and broad; upper margin of dentary almost flat, without a distinct tubercle at the posterior end; preopercle notched; posterior margin of lateral scales usually entire, but sometime crenulated. **Color:** body greenish tan dorsally; a broad (1 scale width or less) silvery longitudinal band on side. **Size:** maximum length about 14 cm SL. **Distribution:** widely in Indo-West Pacific, from East Africa to northern Australia. **Remarks:** occurring in beaches, sometimes entering estuaries.



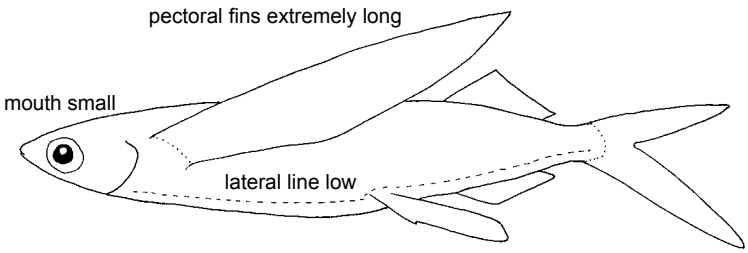
Atherinomorus pinguis, UMTF 1070 (KAUM–I. 16523), 9.9 cm SL
Cendering, 6 Oct. 2008

EXOCOETIDAE

Flyingfishes

By Mizuki Matsunuma

Medium sized (up to about 40 cm) marine fishes. Body elongate, cylindrical; flattened ventrally in some species. Head short; snout blunt, shorter than eye in all Western Central Pacific species. Mouth small; jaws of equal size; teeth on jaws absent or very small. Gill rakers well developed; upper pharyngeal bones of third gill arches close together, but not fused into a single plate. Fin spines absent; dorsal and anal fins set equally far back on body, their bases short and opposed; pectoral fins high on sides, strikingly long, always extending beyond dorsal-fin origin; pelvic fins abdominal in position, and greatly enlarged in many, but not all, species; caudal fin deeply forked, its lower lobe longer than the upper. Scale large, cycloid; lateral line present on lower body. Young stages (to about 10 cm) quite different in appearance from adults, with pectoral fins shorter, dorsal fin often higher than in adults, color patterns variable, and spots and bars often developed; single or paired chin barbels conspicuous in many species. **Color:** dark dorsally, pale laterally and ventrally; pectoral fins in some species with dark spots or pale stripes; dorsal fin in some species with black pigment.



Remarks: inhabits surface waters of open ocean as well as neritic and inshore areas. Important food fish.

Similar families occurring in the area: Hemiramphidae – pectoral fins short to medium length, never reaching dorsal-fin origin; lower jaw much longer than upper jaw, except in some genera; body more elongate; upper pharyngeals of third arch fused, forming a single plate.

Cheilopogon katoptron (Bleeker, 1866)

Indonesian Flyingfish

D 13–14; A 9–10; P_1 12–14; P_2 6; GR 6–8 + 19–21 = 25–28; PDS 16–20; LL 38–40. Body elongate, cylindrical. Mouth small and terminal; upper jaw protrusible. Lateral line with pectoral branch. Dorsal fin large, its origin just above anal fin origin; pectoral fin relatively short, its posterior tip extending beyond pelvic fin origin, but not reaching end of anal fin base; caudal fin well forked, length of lower lobe longer than upper lobe. **Color:** body silver, green to blue dorsally; dorsal fin entirely dark to black; pectoral fin with large black area; lower caudal fin lobe dusky. **Size:** maximum 18 cm SL. **Distribution:** western Pacific from northern Australia north to Viet Nam. **Remarks:** pelagic in nearshore surface waters; never spread to open sea.

Cheilopogon katoptron, KAUM–I. 17095, 16.1 cm SL
off Terengganu (KT), 28 Dec. 2008

Parexocoetus mento (Valenciennes, 1847)

African Sailfin Flyingfish

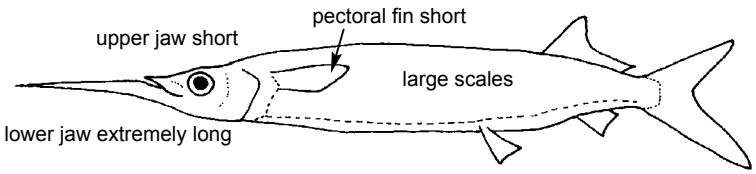
Parexocoetus mento, KAUM–I. 17080, 9.7 cm SL
off Terengganu (KT), 27 Dec. 2008

D 9–11; A 10–12; P_1 12–14; P_2 6; PDS 23–26. Body elongate, cylindrical. Mouth small and terminal; both jaws of equal length; teeth on jaws noticeable (conspicuous to the touch). Lateral line with pectoral branch. Dorsal fin large, its origin well before anal fin origin; pectoral fin long, its posterior tip reaching end of anal fin base, with an uppermost ray unbranched; caudal fin well forked, length of lower lobe much longer than upper lobe. **Color:** body silver, green to blue dorsally; dorsal fin uniformly pale; pectoral fins with pale oblique cross band, no dark spots; no black spot on pelvic fin **Size:** maximum 10 cm SL. **Distribution:** widely distributed in Indo-West Pacific, from Red Sea and East Africa to Marshall, Fiji, and Queensland, north to southern Japan. **Remarks:** pelagic in neritic surface waters, never spread to the open sea.

HEMIRAMPHIDAE

Halfbeaks

By Koichi Shibukawa and Mizuki Matsunuma



Small to medium sized (up to 45 cm) elongate fishes with long, javelin-like lower jaw, projecting far beyond upper jaw. Body elongate and compressed; lateral line running along ventral margin of body with a branch to origin of pectoral fin. Lower jaw usually long and javelin-like, whereas upper jaw short and triangular; eyes large; several rows of small teeth on jaws; gill rakers 0–78. Dorsal and anal fins positioned at posterior part of body; dorsal fin with 8–25 soft rays; anal fin with 8–19 soft rays; no isolated finlets behind dorsal and anal fins; pectoral fin usually short, with 7–14 soft rays; pelvic fins abdominal, with 6 rays; caudal fin rounded, truncate, emarginated or deeply forked. Scales moderately large, cycloid. **Color:** head and body silvery, darkened dorsally; tip of lower jaw tinged with red or orange in many species; fins hyaline, often with blackish markings.

Remarks: surface-swimming fishes, chiefly found in marine and brackish waters, whereas some in freshwaters. Omnivorous, feed on floating seagrass pieces, insects, crustaceans, and small fishes. Large species commonly esteemed as food fish, caught by seine and gill nets; some freshwater species often treated as aquarium fish.

Similar families occurring in the area: Belonidae – usually both jaws elongate; scale small. Exocoetidae – pectoral fin very large; jaws short.

Hemiramphus archipelagicus Collette & Parin, 1978

Jumping Halfbeak

Hemiramphus archipelagicus, KAUM–I. 16924, 16.1 cm SL (upper jaw broken)
off Terengganu (KT), 10 Dec. 2008

D 12–15; A 10–13; P_1 10–13; GR 6–8 + 19–24 = 25–32. Body elongate, subcyrindrical. Lower jaw greatly prolonged, beak-like (broken in photographed specimen); upper jaw short and triangular, without scale; preorbital ridge (bony ridge behind nostril) absent. Dorsal fin without developed anterior lobe; pectoral fins relatively short, not reaching posterior nasal pit when folded forward; caudal fin rounded forked, lower lobe longer than upper lobe. **Color:** body silvery white, dark bluish dorsally; a dark stripe with black upper margin on laterally; no vertical bars on body side; beak dark with a bright red fleshy tip; caudal fin dusky yellow, tip of dorsal-fin lobe with some yellow. **Size:** maximum about 23 cm SL. **Distribution:** western Indian Ocean and western Central Pacific. **Remarks:** found in coastal waters. Marketed fresh and dried salted. (M. Matsunuma)

Zenarchopterus dunckeri Mohr, 1926

Duncker's River Garfish

Zenarchopterus dunckeri, UMTF 1491 (KAUM–I. 16750), male, 6.7 cm SL
Setiu, 30 Oct. 2008

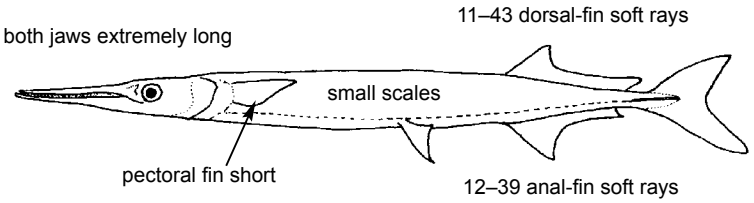
Zenarchopterus dunckeri, UMTF 1492 (KAUM–I. 16751), female, 4.9 cm SL
Setiu, 30 Oct. 2008

D 10–12; A 10–13; P_1 10; V 37–42. Body elongate, subcyrindrical. Lower jaw much prolonged, javelin-like; upper jaw wider than long; nasal papilla elongate and pointed. Base of dorsal fin longer than anal-fin base; 6th anal ray of males greatly thickened and elongated, reaching beyond caudal base; 4th and/or 5th dorsal ray(s) elongated; caudal fin nearly rounded. **Color:** light brown dorsally, becoming silvery white ventrally; no longitudinal black line on dorsal midline of upper jaw. **Size:** 12.5 cm SL. **Distribution:** Andaman Sea and West Pacific. **Remarks:** found in estuaries, especially mangrove area. Surface swimming fish, feeds on small terrestrial insects. (K. Shibukawa)

BELONIDAE

Needlefishes

By Mizuki Matsunuma



Medium to large sized (up to 2 m) elongate fishes. Body elongate, with both jaws extended into long beaks filled with sharp teeth; nostrils in a pit anterior to eyes. No spines in fins; dorsal fin single with 11–43 rays; anal fin with 12–39 rays; dorsal and anal fins posterior in position; pelvic fins located in abdominal position, with 6 rays; pectoral fins short with usually 10–20 rays; caudal fin variable, rounded to forked. Scales small, cycloid; lateral line running down from pectoral-fin origin and then along ventral margin of body. **Color:** these fishes live at the surface and are protectively colored for this mode of life by being green or blue on back and silvery white on lower sides and belly; usually, a dusky or dark blue stripe along sides; tip of lower jaw frequently red or orange.

Remarks: mostly found in marine, but some species occur in freshwater. Carnivorous, feeding largely on small fishes. Many species are important for fisheries; caught by casting or trolling surface or near-surface lures.

Similar families occurring in the area: Hemiramphidae – only the lower jaw prolonged or neither jaw prolonged and lacking the needle-sharp teeth that stud the upper and lower jaws of needlefishes. Sphyraenidae – jaws pointed but not prolonged into a beak; 2 dorsal fins, the first spiny; pelvic fins in thoracic position.

Ablennes hians (Valenciennes, 1846)

Flat Needlefish

Ablennes hians, KAUM–I. 16880, 43.6 cm SL
off Terengganu (KT), 5 Dec. 2008

D 23–26; A 24–28; P_1 13–15; PDS 340–430; V 87–93. Body elongate, greatly compressed laterally; no caudal peduncle keel; lateral line without pectoral branch; jaws greatly elongate, studded with small sharp teeth; gill rakers absent. Dorsal and anal fins with high falcate lobes anteriorly; origin of dorsal fin posterior to anal fin origin; pectoral fin falcate; caudal fin deeply forked, lower lobe much longer than upper lobe. **Color:** body silvery white, bluish green dorsally; an indistinct dark blue stripe along sides; about 12–14 prominent dark vertical bars on sides; tip of lower jaw red; scales and bones green. **Size:** maximum 120 cm TL. **Distribution:** widely distributed in tropical to warmtemperate waters in worldwide. **Remarks:** found in offshore surface waters. Marketed fresh.

Strongylura strongylura (van Hasselt, 1823)

Spottail Needlefish

D 12–15; A 15–18; P_1 10–12; PDS 100–130; V 59–65. Body elongate, belly rounded; no caudal peduncle keel; lateral line with pectoral branch; jaws greatly elongate, studded with sharp teeth; gill rakers absent. Dorsal and anal fins with moderate lobes anteriorly; origin of dorsal fin posterior to anal fin origin; pectoral fin not falcate; caudal fin rounded or truncate. **Color:** body silvery white, grayish to greenish dorsally; no markings on body sides; caudal fin with a prominent round black spot basally. **Size:** 40 cm SL. **Distribution:** Indo-West Pacific. **Remarks:** found in coastal areas and mangrove.

Strongylura strongylura, KAUM–I. 16792, 30.8 cm SL
Merang, 2 Nov. 2008

Tylosurus crocodilus crocodilus, KAUM–I. 17261, 71.0 cm SL
off Terengganu (KT), 17 Jan. 2009

Tylosurus crocodilus crocodilus (Péron & Lesueur, 1821)

Hound Needlefish

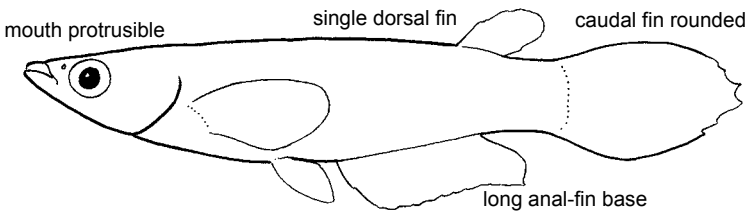
D 21–25; A 19–22; P_1 13–15; PDS 271–340; V 82–86. Body elongate, belly rounded; a distinct lateral keel on caudal peduncle; lateral line with pectoral branch; jaws greatly elongate, studded with sharp teeth; gill rakers absent. Dorsal and anal fins with relatively high lobes anteriorly; origin of dorsal fin posterior to anal fin origin; pectoral fin rounded; caudal fin well forked, lower lobe longer than upper lobe. **Color:** body silver, dark bluish green dorsally; a dark blue stripe along body sides; anterior lobes of dorsal and anal fins black; caudal fin black; scales and bones green. **Size:** 120 cm SL. **Distribution:** widely distributed in tropical to warm temperate waters worldwide, except for the eastern Pacific. **Remarks:** found in coastal and offshore waters areas. Marketed fresh.

APLOCHEILIDAE

Asian Rivulines

By Koichi Shibukawa

Small sized (up to 10 cm SL), slender and compressed fishes. Anus just before origin of anal fin; lateral line absent. Eyes large; mouth terminal, protrusible. Single dorsal fin, located at posterior part of body, with 7–20 soft rays; anal fins with 15–19 soft rays; length of anal-fin base longer than dorsal-fin base; pectoral fins rounded, with 14–21 soft rays; pelvic fins abdominal, with 6 soft rays; caudal fin rounded. Scales cycloid, small to moderately large. **Color:** highly variable, appearing characteristic pattern in each species.



Remarks: surface-swimming schooling fish, found in fresh- or brackish-waters. Oviparous.

Similar families occurring in the area: Adrianichthyidae – pectoral fin falcate (rather than rounded); mouth non-protrusible. Phallostethidae – small first dorsal fin present in many species; pelvic fins absent; caudal fin emarginate. Poeciliidae – anal-fin base rather short.

Aplocheilus panchax (Hamilton, 1822)

Blue Panchax

D 7–8; A 15–16; P_1 14; LR 30–34. Body moderately slender and compressed. Eyes large; mouth small, protrusible; lower jaw projecting beyond upper jaw. Base of anal fin much longer than dorsal-fin base. Caudal fin rounded. **Color:** light grayish brown dorsally, whitish ventrally; edge of scale pockets dusky; a distinct jet-black spot at base of dorsal fin. **Size:** 6 cm SL.

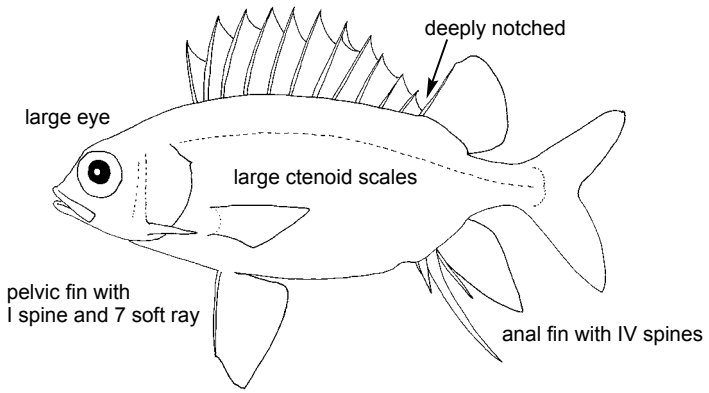
Aplocheilus panchax, UMTF 1106 (KAUM–I. 16383), 3.9 cm SL
estuary near UMT, 23 Sept. 2008

Distribution: South and Southeast Asia from Pakistan to the Indo-Malaysian Archipelago. **Remarks:** found in estuaries and around wetland, ponds, ditches and creeks with dense water plants.

HOLOCENTRIDAE

Soldierfishes

By Mizuki Matsunuma



Medium sized (up to 45 cm SL) marine fishes. Body ovate to moderately elongate, compressed. Head with ridges and mucous channels dorsally; edges of external bones of head serrate or with spines; eye very large; mouth moderately large, terminal or with lower jaw projecting; 2 supramaxillae; small villiform teeth in bands in jaws and on roof of mouth (on vomer, palatines, and for some species on ectopterygoids). Dorsal fin base long, with IX–XIII stout spines and 12–17 soft rays; deeply notched between spinous and soft portions or between last 2 dorsal fin spines; anal fin with IV spines, the third stoutest and often longest, and 7–16 soft rays; caudal fin forked with 18 or 19 principal caudal rays; pelvic fins with I spine and 7 soft rays. Large and very rough ctenoid scales; lateral line complete with 25–56 pored scales. **Color:** usually reddish or pink; scale on body sides often lighter or silvery white, thus forming longitudinal bands; black pigment somewhat present on opercular membrane or as markings in fins; fins with yellow or white markings.

Remarks: mostly found in shallow coastal waters. Feeds on large zooplankton, benthic invertebrates, and small fishes. Some species of *Sargocentron* having the preopercular spine with venomous.

Similar families occurring in the area: none. The serrate bony edges and spines on head, in combination with the large eyes, the very long base on spinous portion of dorsal fin, the presence of IV anal spines and 7 pelvic soft rays, readily distinguishes the squirrelfishes and soldierfishes from other fish families occurring in the area.

Sargocentron rubrum (Forsskål, 1775)

Redcoat

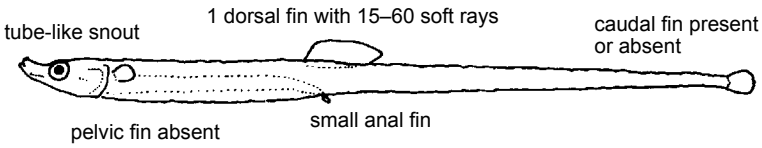
D XI, 12–14; A IV, 8–10; P_1 13–15; LL 34–38; GR 6–8 + 9–12. Body moderately deep; dorsal profile of head convex; snout short and blunt; corner of preopercle with a sharp spine; nasal fossa without spinules; first suborbital bone with 1 or 2 short lateral spines near upper margin. Last dorsal fin spine shortest; second anal fin spine very strong; caudal fin forked with slightly rounded tips. Scale rows above lateral line to middle of spinous portion of dorsal fin 2.5; cheek with 5 oblique rows of scales. **Color:** body with alternate stripes of silvery white and brownish red; a triangular streak of brownish red on cheek; often a concentration of pigment forming an elongate brown spot beneath soft portion of dorsal fin and a roundish blotch above base of soft portion of anal fin; pelvic fin spine white with red membrane; upper and lower edges of caudal fin brownish red; rest of caudal fin and soft portions of dorsal and anal fins yellowish; no dark spot on pectoral fin axil. **Size:** maximum length 32 cm SL. **Distribution:** Indo-West Pacific, from the Red Sea to New Caledonia and New South Wales of Australia, north to southern Japan. **Remarks:** found in protected habitats of shallow waters.

Sargocentron rubrum, UMTF 1362 (KAUM–I. 16575), 15.2 cm SL
Bidong Island, 14 Oct. 2008

SYNGNATHIDAE

Pipefishes (Seahorses)

By Mizuki Matsunuma



Usually small fishes (4–50 cm TL). Body typically slender and elongate, without scales, encased in a series of bony rings. Head either along same axis as rest of body (subfamily Syngnathinae), or bent in ventral direction from main body axis (subfamily Hippocampinae). Snout generally long and tubular; mouth small, toothless, located at tip of snout. Gill openings reduced to a pore in the opercular membrane. Branchiostegal rays 1–3. No spines in fins; pelvic fin absent, other fins variously present or absent; a single dorsal fin, usually with 15–60 soft rays; anal fin small, with 2–6 rays; caudal fin, if present, with 8–10 rays; pectoral fins usually with 10–23 rays. Some species develop dermal appendages along body, head, and snout. No lateral line. **Color:** variable with the species, generally adapted to the preferred habitat; species living on seagrass, sand, and coral rubble usually have gray, green, brown, or black ground color with various patterns; coral-reef species sometimes colorful with white, yellow, orange, blue, red, and black stripes and bands; fins usually transparent; caudal fin sometimes with colorful patterns.

Remarks: usually live in coastal marine waters; some are found in estuarine waters, and only a few in fresh water; marine species found in various habitats. Feed on minute benthic and planktonic fauna, preferably microcrustaceans, by sucking into a tubular snout. Males have a brood pouch in which the eggs are laid and where they are fertilized and incubated. Mostly no or minor importance as food, but some species are for the aquarium fishes or used as medicine in Asian markets.

Similar families occurring in the area: Aulostomidae – larger, reaching 80 cm TL; body compressed and scaly; distinct separate dorsal fin spines, followed by a normal second dorsal fin; caudal fin well developed; lateral line present. Fistulariidae – larger, over 100 cm TL; body depressed rather than compressed; with minute prickles and linear row of scutes; caudal fin forked with a distinct elongate filament. Solenostomidae – body short, compressed, with large stellate bony plates; 2 separate dorsal fins.

Halicampus brocki (Herald, 1953)

Brock's Pipefish

Halicampus brocki, UMTF 1456 (KAUM–I. 16630), 5.3 cm SL
Bidong Island, 13 Oct. 2008

Hippichthys (*Hippichthys*) *heptagonus*, KAUM–I. 16548, 12.3 cm SL
estuary near UMT, 30 Sept. 2008

D 21–23; A 4; P_1 11–14. Trunk rings 14; tail rings 33–37. Body slender and elongate; snot relatively long (2.4–3.0 in head length); superior trunk and tail ridges discontinuous; inferior trunk and tail ridges discontinuous, lateral trunk ridge confluent with inferior tail ridge; median dorsal snout ridge discontinuous, not essentially concave in lateral profile, with 2–3 short ridges; lateral snout ridge with 1–2 spines; with simple or branched dermal flaps on head. Caudal fin small, typically with 10 rays. **Color:** pale to tan, head blotched or mottled; snout and suborbital often with 3 brown bars; usually with 10–11 diffuse pale bars crossing dorsum and upper part of body; often with diffuse dark bars on lower part of side and ventral of trunk rings. **Size:** maximum ca. 12 cm. **Distribution:** eastern Indian Ocean and west Pacific, from Western Australia to the Mariana and Marshall Islands, north to southern Japan. **Remarks:** inhabits rock or coral habitats.

Hippichthys (*Hippichthys*) *heptagonus* Bleeker, 1849

Belly Pipefish

D 23–30; A 2–3; P_1 13–16. Trunk rings 14–15; tail rings 36–42. Body slender and elongate; superior trunk and tail ridges discontinuous, posterior end of lateral trunk ridge deflected downward; inferior trunk and tail ridges continuous; dorsal-fin origin on first tail ring; keels present on some or most scutella. Caudal fin small, typically with 10 rays. **Color**: variably tan to dark brown, often without distinctive markings; ventral of trunk usually dusky brown, shading to dark brown near median ridge, infrequently with faint transverse bars; dorsal fin usually hyaline. **Size:** maximum length about 15 cm SL. **Distribution:** Indo-West Pacific, from east coast of Africa east to Solomon Islands, eastern Australia north to southern Japan. **Remarks:** found in lower reach of river, estuary, and mangroves.

Trachyrhamphus bicoarctatus (Bleeker, 1857)

Double-ended Pipefish

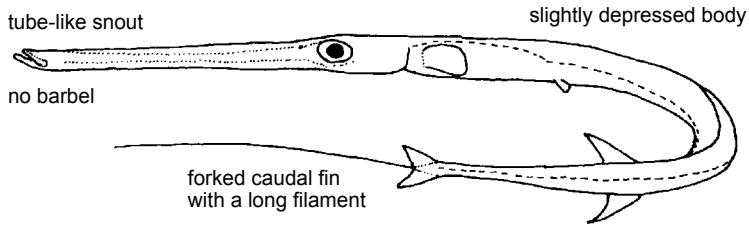
Trachyrhamphus bicoarctatus, UMTF 1178 (KAUM–I. 16577), ca. 27 cm SL (tail tip broken) Bidong Island, 30 Sept. 2008

D 24–32; A 4; P_1 15–19. Trunk rings 21–24; tail rings 55–63. Body slender and very elongate; snout relatively long (1.5–2.0 in head length), smooth dorsally; superior trunk and tail ridges discontinuous; inferior trunk and tail ridges discontinuous, lateral trunk ridge confluent with inferior tail ridge; dorsal-fin origin on trunk rings. Caudal fin small, typically with 9 rays. **Color:** body variably near white to almost black, spotted or mottled; somewhat with 12–13 pale bars crossing dorsum and side of tail. **Size:** maximum ca. 40 cm. **Distribution:** widely distributed in Indo-West Pacific, from the Red Sea and East Africa to New Caledonia, Australia to southern Japan. **Remarks:** found in shallow coastal of sandy, reef or grass bottoms in depths of 1.6–42 m.

FISTULARIIDAE

Cornetfishes

By Mizuki Matsunuma



Large elongate marine fishes, reaching 2 m TL. Body extremely elongate and slightly depressed. Mouth small, with a long tubular snout; teeth in jaws small. Dorsal and anal fins short based and opposite, with 14–17 soft rays; pectoral fins with 13–17 soft rays; pelvic fins small and abdominal, with 6 soft rays. Lateral line arched, running anteriorly along back, then bending downward on side and continuing posteriorly onto an elongate filament produced by the middle 2 caudal-fin rays; lateral line composed of tube-shaped ossifications that gradually take the form of long bony shields sometimes bearing sharp spines. Body covered with rows of small spinules in some species; a row of elongate bony plates may be present along dorsal and ventral midlines of body just anterior to dorsal and / or anal fin. **Color:** red to orange-brown above and silvery below or brownish olive above, lighter below, with a series of blue spots on back and snout.

Remarks: no importance in commercial fisheries, but usually caught with trawls.

Similar families occurring in the area: Aulostomidae – no caudal fin filament; barbel present on lower jaw; distinct separate spines anterior to soft dorsal fin. Syngnathidae – smaller; body covered with armor; anal fin reduced or absent.

Fistularia petimba Lacepède, 1803

Red Cornetfish

Fistularia petimba, KAUM–I. 16899, 39.0 cm SL off Terengganu (KT), 6 Dec. 2008

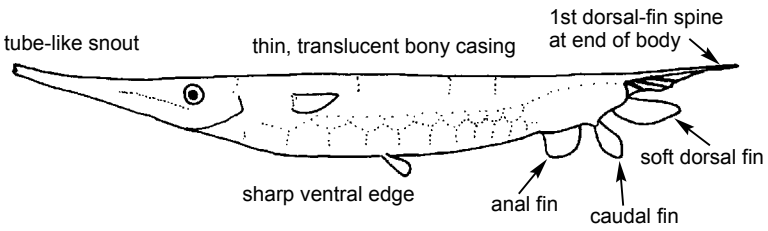
D 14–16; A 14–15; P_1 15–17. Body extremely elongate, slightly depressed; snout prolonged and tubular, posttemporal ridge with large well developed antrorse serrations. A row of elongate bony plates embedded in skin along midline of back anterior to dorsal fin; posterior lateral line ossifications ending in a sharp spine. Caudal fin forked with long whip-like tail filament. **Color:** head and body red to orange-brown dorsally, silver laterally and ventrally; median fins orangish. **Size:** commonly 100 cm, maximum 200 cm TL. **Distribution:** widely distributed in Atlantic, Indian, and western Pacific oceans, including Hawaii. **Remarks:** found in coastal waters over soft bottoms, usually at depths greater than 10 m. Marketed fresh, dried salted, or smoked; also reduced to fishmeal.

CENTRISCIDAE

Shrimpfishes (Snipefishes)

By Mazlan Abdul Ghaffar

Small fishes (14–30 cm TL); body elongate, strongly compressed, and blade-like. Head elongate; snout long, slender, and tubular; mouth small, toothless, located at tip of snout. Two dorsal fins; first dorsal-fin spine long and sharp, located at hindmost end of body; all other spinous and soft portions of dorsal fins on ventral surface of body; caudal fin small, on ventral surface; pelvic fins small, with 4 soft rays, originating at or behind midbody. Body enclosed in a flattened, transparent, bony casing with sharp ventral edge. Lateral line absent. **Color:** variable with the species; either silvery or yellowish brown to pale green on back, silvery on sides; dusky to conspicuous lateral streak running length of body and through eye.



Remarks: two genera with 4 species. Found in coastal waters; feed mainly on small animals of the demersal zooplankton, especially crustaceans. No importance in commercial fisheries, but usually caught with trawls.

Similar families occurring in the area: Aulostomidae – no caudal fin filament; barbel present on lower jaw; body compressed rather than depressed; distinct separate spines anterior to soft dorsal fin. Syngnathidae – smaller; body covered with armor; anal fin reduced or absent; no caudal fin filament. Belonidae – no caudal fin filament; mouth large, both jaws produced into slender beak, lower jaw longer, with single series of distinct canines.

Centriscus scutatus Linnaeus, 1758

Serrate Razorfish

D III–V-10–12; A 11–13; P_1 10–11; P_2 I, 3–5. Body encased in an armor of thin, translucent plates. First dorsal-fin spine fused with body armor plate, without a movable spinous ray at its end. Interorbital space with a groove continued to crown of head; sutures of lateral plates serrated; postorbital part of head 1 / 2 or more distance of operculum from base of pectoral fins. **Color:** body silvery, with a dusky lateral streak; 7 or 8 silvery crossbars on ventral plates. **Size:** maximum total length about 14 cm. **Distribution:** Indo-West Pacific. **Remarks:** found in seagrass beds and coral reefs; feed on minute crustaceans in the zooplankton. No commercial importance, but caught with trawls.

Centriscus scutatus, KAUM–I. 17308, 14.9 cm SL
off Terengganu (KT), 20 Jan. 2009

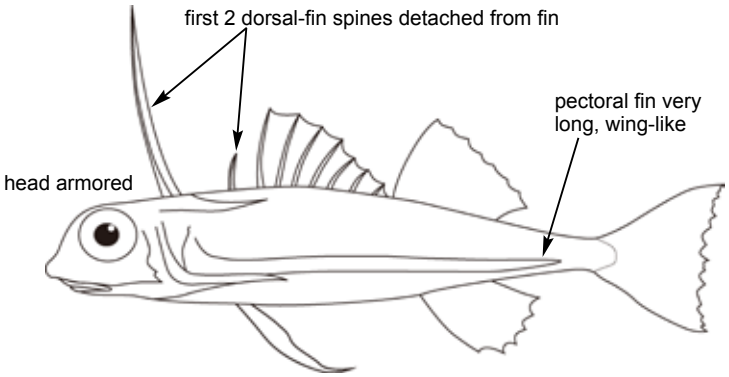
Centriscus scutatus, KAUM–I. 17272, 8.8 cm SL
off Terengganu (KT), 18 Jan. 2009

DACTYLOPTERIDAE

Flying Gurnards

By Hiroyuki Motomura

Moderate sized fishes. Body elongate, not strongly compressed; head large, heavily armored; eyes large; interorbital remarkably wide. Preopercle with a prominent elongate spine. Gill opening restricted, fused to isthmus. Spinous and soft-rayed portions of dorsal fin separated by a deep notch; first or anterior 2 spines separated from remainder of fin; dorsal fin with VII or VIII total spines and 8 or 9 soft rays. Anal fin without spines and with 6 or 7 soft rays. Caudal fin emarginate. Pectoral fins remarkably large, horizontal, divided into 2 portions; anterior portion with 5–7 short rays, posterior portion with 25–31 long rays, tip reaching to caudal fin base in adults. Pelvic fins with I spine and 4 soft rays. Body scales scute-like, forming prominent keels.



Swimbladder divided into 2 halves. **Color:** variable, from brownish to reddish, usually with spots or blotches. Upper surface of pectoral fin usually bluish, with some markings characterized for each species.

Remarks: found on sandy bottom in tropical and subtropical waters.

Similar families occurring in the area: Triglidae – lower pectoral fin rays free.

Dactyloptena gilberti Snyder, 1909

Flateared Helmet Gurnard

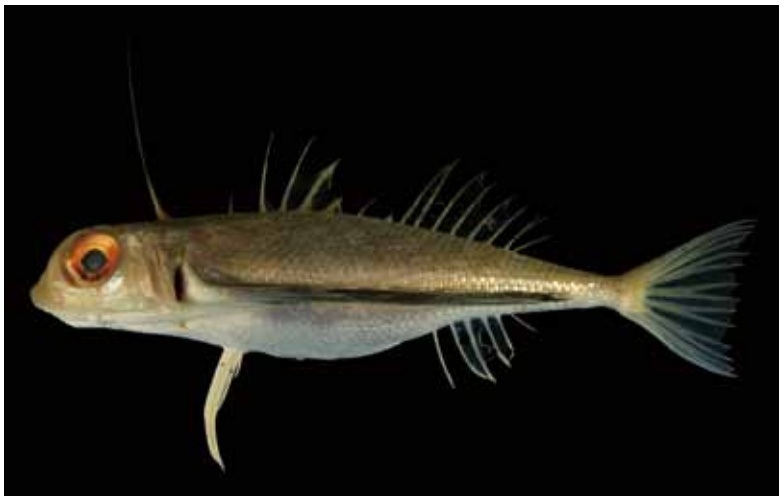
D I + I + V + I, 8; A 6–7; P_1 28–32; P_2 I, 4. Body moderately elongate. Second dorsal fin spine separated from third to seventh spines. Interorbital space extremely wide, its width 18–23% of standard length. Granular projections on snout arranged in a row; snout wide and rounded. Posttemporal spine well developed, but flat against body. **Color:** pectoral fin with numerous dark spots and a large black blotch on middle of ray; blue spots and lines inside the middle black blotch and posterior margin of fin. **Size:** maximum total length 22 cm. **Distribution:** distributed in the Indo-West Pacific, from the Arabian Peninsula to Japan, but not southern Southeast Asia or Australia. **Remarks:** generally found on mud-sand bottom at depths of 20–71 m.

Dactyloptena gilberti, KAUM–I. 17179, 11.1 cm SL
off Terengganu (KR), 5 Jan. 2009

Dactyloptena orientalis (Cuvier, 1829)

Oriental Helmet Gurnard

D I + I + V + I, 8; A 6–7; P_1 27–30; P_2 I, 4–5. Body moderately elongate. Second dorsal fin spine separated from third to seventh spines. Interorbital space wide, its width 13–15% of standard length. Snout wide and somewhat pointed. Preopercular spine not extending further posteriorly than posttemporal spine. **Color:** pectoral fin with numerous dark spots scattered on entire fin, except for white ray tips; margin of middle portion of ray black with numerous short blue lines in adults. A large dark ocellus on pectoral fin in juveniles. **Size:** maximum total length 40 cm. **Distribution:** widely distributed in the Indo-Pacific, from the east coast of Africa and the Red Sea to the Hawaii and Tuamotu Archipelago. **Remarks:** generally found on sand bottom in shallow coastal waters.

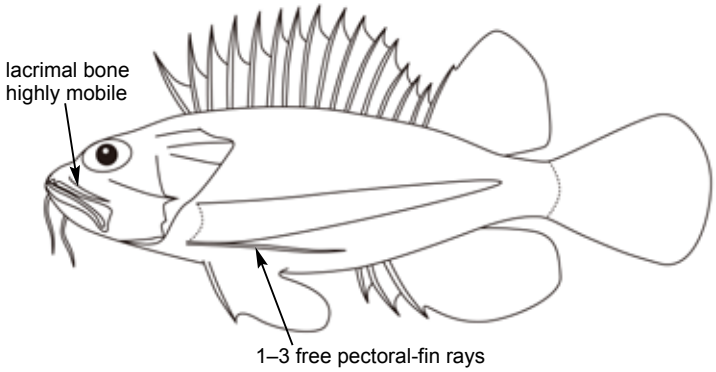


Dactyloptena orientalis, KAUM–I. 17140, 15.6 cm SL
off Terengganu (KT), 1 Jan. 2009

APISTIDAE

Bearded Waspfishes

By Hiroyuki Motomura



Moderate sized fishes. Body elongate, moderately compressed. Dorsal fin with VIII–XV spines and 7–10 soft rays; spines strong, venomous. Anal fin with III spines and 6–8 soft rays. Caudal fin rounded. Pectoral fins long, greater than head length; lower 1–3 rays detached or separated from upper part of fin. Pelvic fins with I spine and 5 soft rays. Lacrimal bone highly mobile. Depth of second suborbital bone subequal to length of the bone; second suborbital bone broadly connected to preopercle. Preopercular spines well developed. **Color:** head and body silver, yellowish, brownish or grayish, not strongly mottled with spots or blotches.

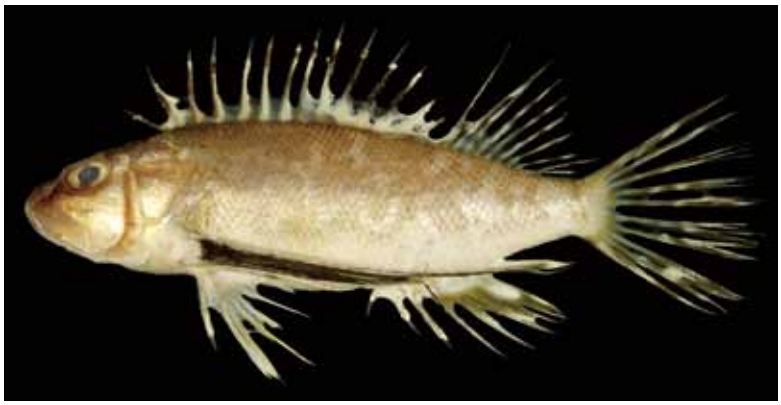
Remarks: found on sandy or muddy bottom in river mouth and inshore waters; body partially buried under the soft substrate. Dorsal, anal, and pelvic fin spines venomous.

Similar families occurring in the area: families with free pectoral fin rays and the mobile lacrimal bone not occurring in the area.

Apistus carinatus (Bloch & Schneider, 1801)

Ocellated Waspfish

D XIV–XV, 8–10; A III, 7–8; P_1 11–12; P_2 I, 5. Body moderately elongate, compressed. Lateral surface of head densely covered with numerous denticulations. Interorbital space 10.0–16.6 in head length. Ventralmost pectoral-fin ray separate from rest of fin. **Color:** body brownish dorsally, whitish ventrally. Spinous portion of dorsal fin with a large black blotch posteriorly; soft-rayed portion grayish, reticulated, with white margin. Inside and outside of pectoral fin yellowish and blackish respectively. Pelvic fin whitish to grayish. Anal fin grayish, with black band submarginally, white band marginally. Color pattern of caudal fin similar to that of soft-rayed portion of dorsal fin. **Size:** maximum standard length 12.5 cm. **Distribution:** widely distributed in the Indo-West Pacific, from South Africa to Japan and Australia. **Remarks:** taken over fine sandy bottom at depths of less than 60 m.



Apistus carinatus, KAUM–I. 17184, 8.9 cm SL
off Terengganu (KR), 5 Jan. 2009

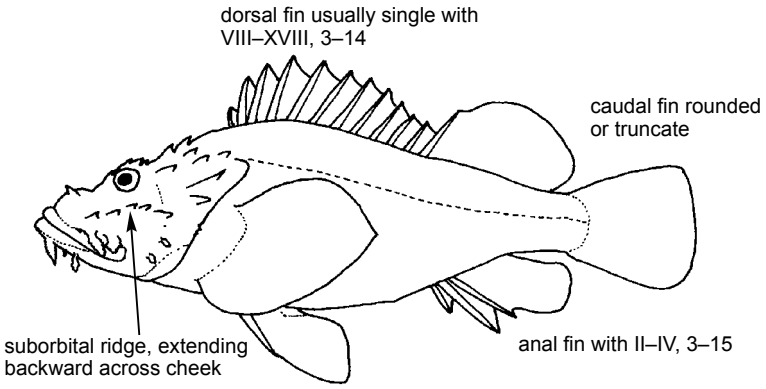
Apistus carinatus, KAUM–I. 17274, 4.3 cm SL
off Terengganu (KT), 18 Jan. 2009

SCORPAENIDAE

Scorpionfishes

By Hiroyuki Motomura and Mizuki Matsunuma

Small to relatively large fishes. Body usually weakly compressed; head moderate to large; eyes and mouth small to large. Numerous conical or villiform teeth on jaws. Branchiostegal rays 7, rarely 6. Gill rakers usually short to moderate, with spinous points on each raker. All species with a suborbital ridge, extending backward across cheek and usually firmly bound to preopercle; the ridge with spines in some species. Numerous spines on head in most species; numerous tentacles on head and body in some species. Dorsal fin with VIII–XVIII spines and 3–14 soft rays; spines strong, venomous in most species. Anal fin with II–IV spines and 3–15 soft rays. Caudal fin rounded or truncate. Pectoral fins usually large. Pelvic fins with I spine and 4 or 5 soft rays. Lateral line with 4–54 pored scales. **Color:** highly variable, from blackish to reddish, usually with spots or blotches; barred or mottled color patterns in most species.



Remarks: found on or near bottom from inshore shallow waters to depths of about 1200 m; entering into freshwater in some species; pelagic or semipelagic occurring offshore in depths of 200–800 m in some species. Well camouflaged and ambush predators, feeding mainly on arthropods and fishes. Dorsal, anal, and pelvic fin spines venomous in most species. Ovoviviparous or viviparous.

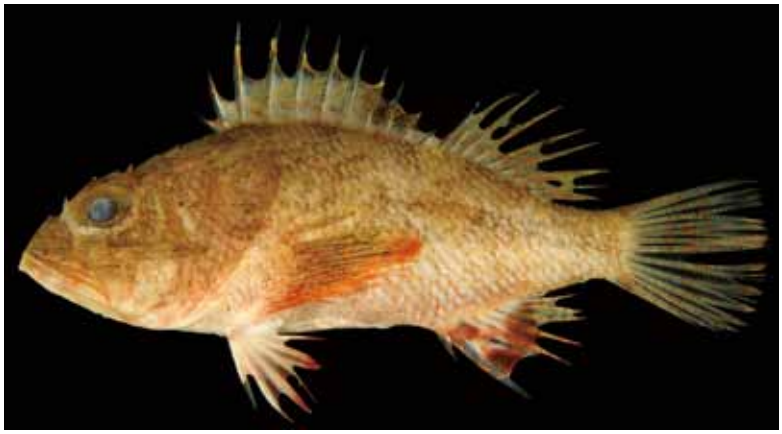
Similar families occurring in the area: Platycephalidae – head highly depressed; ventral margin of lacrimal smooth, without distinct spines; two dorsal fins well separated. Aploactinidae – fin rays usually unbranched; head with comparatively blunt spines. Serranidae – no suborbital ridge attaching to preopercle; large canine teeth in jaws in many species.

Neomerinthe procurva Chen, 1981

Curvedspine Scorpionfish

D XII, 10; A III, 5; P_1 19; P_2 I, 5. Body oblong, moderately compressed. Interorbital region scaled. Posterior lacrimal spine well developed, directed posteroventrally. Lateral lacrimal spine present. Three suborbital spines. No median ridge on lateral surface of maxilla. **Color:** body color variable, blackish to reddish, and variously blotched dorsally. **Size:** maximum standard length 14 cm. **Distribution:** distributed in the eastern Indian and western Pacific Oceans, from India to Japan. **Remarks:** usually taken by trawl; no depth data available.

(H. Motomura)



Neomerinthe procurva, KAUM–I. 17168, 6.5 cm SL off Terengganu (KR), 5 Jan. 2009

Parascorpaena picta (Cuvier, 1829)

Painted Scorpionfish

D XII, 9; A III, 5; P_1 16–19; P_2 I, 5; LR 43–49. Body oblong, moderately compressed. Posterior lacrimal spine directed anteriorly in adults, ventrally or anteroventraly in young. First and second suborbital ridges fused, forming a single ridge with two spines behind level of orbit, spines absent below eye. Interorbital ridges poorly developed, not encircling a depression. Occipital pit very weakly developed, nearly flat. **Color:** body usually brownish, mottled with poorly defined blackish blotches. **Size:** maximum standard length 12.3 cm. **Disribution:** distributed in Southeast Asia and northern Australia. **Remarks:** common in nearshore waters on reefs and over rocky bottoms. (H. Motomura)

Parascorpaena picta, KAUM–I. 16506, 8.1 cm SL
Cendering, 6 Oct. 2008

Pterois russelii Bennett, 1831

Plaintail Firefish

D XIII, 10–11; A III, 7–8; P_1 12–14; P_2 I, 5; LR 69–86. Body oblong, compressed; eye high set, broadly separated from suborbital ridge. Coronal and tympanic spines absent. Longest dorsal-fin spines subequal to body depth; membranes of spinous portion incised nearly to base of fin. All pectoral-fin rays unbranched; membranes of upper rays strongly incised nearly to base of ray; each membrane reaching ray tip. Scales cycloid. **Color:** body red with about 12 dark reddish bars; ventral surface of mandible and chest without markings; soft-rayed portion of dorsal and anal fins, and caudal fin pale red, without markings; pectoral fin rays with narrow black to reddish brown bands; numerous small white spots on inner surface of pectoral fin and pelvic fin membrane. **Size:** maximum length about 20 cm SL. **Distribution:** Indo-West Pacific. **Remarks:** found on sandy bottoms among corals in shallow waters. (M. Matsunuma)

Pterois russelii, KAUM–I. 17127, 13.2 cm SL
off Terengganu (KT), 1 Jan. 2009

Scorpaenopsis neglecta, KAUM–I. 16507, 4.0 cm SL
Cendering, 6 Oct. 2008

Scorpaenopsis neglecta Heckel, 1837

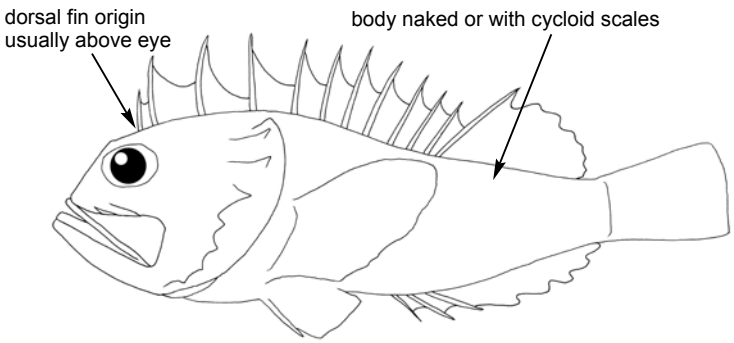
Yellowfin Scorpionfish

D XII, 9; A III, 5; P_1 16–18; P_2 I, 5; LLp 20–22; LR 42–45; GR 4–5 + 8–10. Nape and anterior body highly arched, giving a humpback appearance. Interorbital space broad, its width 3.8–4.4 in head length. Orbit diameter 1.7–2.0 in snout length. Supraorbital and suborbital ridges serrated. Upper posttemporal spine simple. Upper opercular spine divided into two or more spines. **Color:** body color highly variable, strongly mottled with yellowish to reddish and grayish blotches. Axil of pectoral fins with black spots. **Size:** maximum standard length 18.3 cm. **Distribution:** eastern Indian Ocean and the western Pacific Ocean, ranging from India east to Japan, Indonesia and Australia. **Remarks:** occurs in shallow rocky and coral reefs. (H. Motomura)

TETRAROGIDAE

Waspfishes

By Hiroyuki Motomura



Small to medium-sized fishes. Body usually strongly compressed; head moderate to large; eyes and mouth small to large. Numerous conical or villiform teeth on jaws. Ventralmost pectoral fin rays not detached or separated. Lacrimal bone highly mobile. Skinny sensory canal between pterotic and preopercle absent. Suborbital stay usually not forming wide connection to preopercle. Anterior dorsal proximal pterygiophores sutured to neurocranium and supracarinalis anterior absent. **Color:** highly variable, from blackish to reddish, usually with spots or blotches; barred or mottled color patterns in most species.

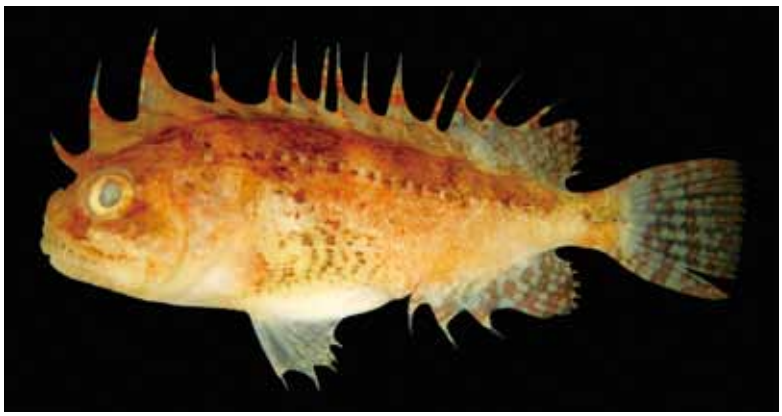
Remarks: found on bottom from inshore shallow waters to deep waters; one species lives in freshwater rivers. Dorsal, anal, and pelvic fin spines venomous in most species. This family was formerly included in the family Scorpaenidae.

Similar families occurring in the area: Aploactinidae – fin rays usually unbranched. Body covered with modified, prickly scales. Synanceiidae – skin at gill opening broadly connected to isthmus.

Cottapistus cottoides (Linnaeus, 1758)

Yellow Waspfish

D XIV–XV, 5–6; A III, 5–6; P_2 I, 4; LR 64–68; GR 18–21. Body oblong, strongly compressed; body depth 34–42% of standard length. Posterior margin of maxilla extending a vertical through middle of eye. No scales on anterior part of trunk above opercle. Interorbital space wide, exceeding orbit diameter. Caudal fin rounded. **Color:** usually brownish dorsally, whitish ventrally, with numerous dark spots on head, body and fins, except for pelvic fin. **Size:** maximum standard length 9.2 cm. **Distribution:** widely distributed in the western Pacific Ocean, from China to Australia. **Remarks:** occurs on sandy bottoms in shallow waters to 24 m depth.



Cottapistus cottoides, KAUM–I. 17161, 5.5 cm SL
off Terengganu (KR), 5 Jan. 2009

Richardsonichthys leucogaster (Richardson, 1848)

Whitebellied Rougefish

D XII–XIV, 5–9; A III, 6; P_1 14–16. Body oblong, not strongly compressed. Head profile rounded. Lacrimal with two spines. Uppermost preopercular spine strongly developed. Dorsal fin origin over posterior one-third of eye; first spine more than half length of second spine. Body entirely without scales, except for lateral line. Caudal fin rounded, without elongate outer rays. **Color:** highly variable, but ventral body, and pectoral, pelvic, anal and caudal fins usually reddish. **Size:** maximum standard length 6.6 cm. **Distribution:** widely distributed in the Indo-West Pacific, from Zanzibar and Seychelles east to New Caledonia. **Remarks:** occurs on sandy bottoms or among corals in shallow waters to 90 m depth.

Richardsonichthys leucogaster, KAUM–I. 16949, 3.8 cm SL
off Terengganu (KT), 11 Dec. 2008

Vespicula trachinoides (Cuvier, 1829)

Goblinfish

D XIII–XVI, 3–5; A III, 3–4. Body oblong, compressed. Head profile pointed. Lacrimal with two spines. Anterior three spines forming a nearly separate fin; dorsal fin origin well behind eye. Eye small, orbit diameter 6–9% of standard length. Caudal fin rounded. **Color:** body mottled with black and greenish yellow blotches. Caudal fin translucent with an indistinct vertical dark band. Soft-rayed portions of dorsal and anal fins with a broad black band. **Size:** maximum standard length 5.8 cm. **Distribution:** distributed in the eastern Indian and western Pacific Oceans, from Myanmar to China and Indonesia. **Remarks:** found on sandy and broken shell bottoms.

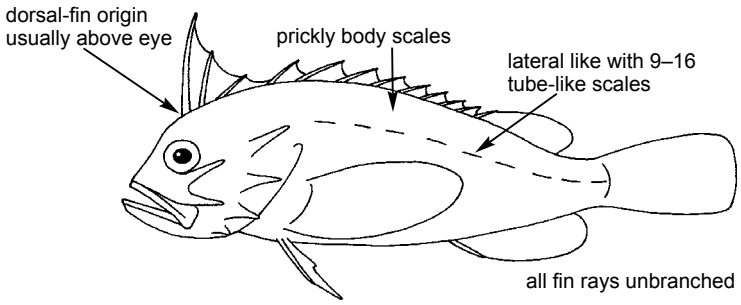
Vespicula trachinoides, KAUM–I. 16812, 2.0 cm SL
Merang, 2 Nov. 2008

Vespicula trachinoides, KAUM–I. 16767, 2.5 cm SL
Setiu, 31 Oct. 2008

APLOACTINIDAE

Velvetfishes

By Hisashi Imamura



Small marine fishes usually under 5 cm. Body usually compressed. Head usually with knoblike lumps. Eye small to relatively large. Snout often prominent. Mouth moderate to large. Upper and lower jaws with small conical teeth. Palatine always lacking tooth. Vomerine teeth present or absent. Gill rakers usually small or moderate; 0–6 on upper limb of first gill arch and 3–11 on lower. Anterior isthmus with fleshy extension in most species. All fin rays unbranched. Dorsal fin origin above eye or almost so, except in *Adventor* and *Peristrominous*. Dorsal fin with 9–16 spines and 7–16 soft rays; first 3–5 spines usually appear segregated, either elevated or largely without membrane connection with the rest of the spinous dorsal. Anal fin usually with 0–5 weak or blunt spines and 5–16 soft rays. Pelvic fin with 1 spine and usually 2 or 3 soft rays (rarely 1). Lateral line with 9–16 tube-like scales. Body scales modified to prickly scales (but some without scales). **Color:** body usually brown, reddish brown, or greenish.

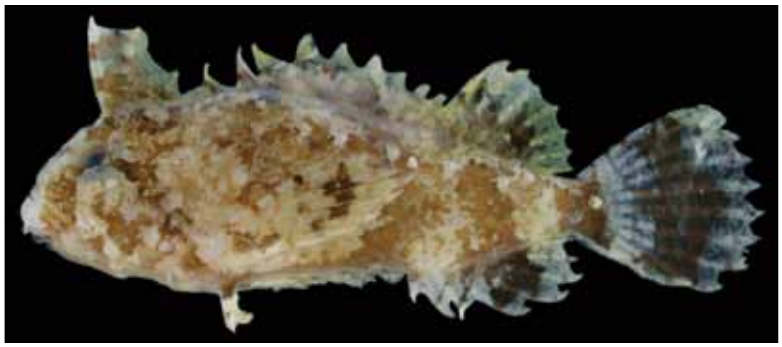
Remarks: aploactinids usually known from the shallow sea bottom, often found between or under vegetation or rocks. Most species well camouflaged. With no commercial importance.

Similar family occurring in the area: Scorpaenidae – pectoral fin with 1 spine and 5 soft rays. Tetrarogidae – anterior isthmus lacking fleshy extension.

Acanthosphex leurynnis (Jordan & Seale, 1905)

Wasp-spine Velvetfish

D III, IX–X, 7–9; A I–II, 6–8; P_1 9–10; P_2 I, 2; LLp 9 (10 in total, 1 on base of caudal fin). Body notably compressed. Lacrimal with 2 strong spines. Preopercle having 4 spines; lowermost small. Vomerine teeth present. Gill membrane broadly united to isthmus. Dorsal fin origin above near middle of eye. First dorsal spine stout and strong. Membrane between 3rd and 4th dorsal spines deeply concaved. Head and body lacking scales, except for tube-like lateral line scales. **Color:** body and head brownish or creamish, having or lacking brown spots; posterior margin of caudal fin clear; pectoral fin with dark band posteriorly. **Size:** maximum standard length about 2.1 cm. **Distribution:** Indo-West Pacific, including southeast India, South China Sea, Gulf of Thailand and Australia. **Remarks:** benthic species, inhabiting inshore, seagrass and soft bottom.



Acanthosphex leurynnis, KAUM–I. 16628, 1.2 cm SL
Bidong Island, 13 Oct. 2008

Aploactis aspera, KAUM–I. 17189, 4.2 cm SL
off Terengganu (KR), 5 Jan. 2009

Aploactis aspera (Richardson, 1845)

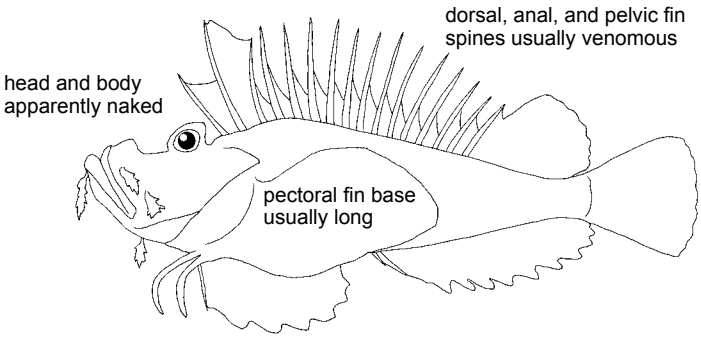
Dusky Velvetfish

D XIII, 13; A I, 13; P_1 13; P_2 I, 2; LLp 14. Body elongate and compressed. Lacrimal with 2 blunt spines. Preopercle having 5 spines; lowermost small. Vomerine teeth present. Gill membrane free from isthmus. Dorsal fin origin above posterior margin of eye. Head and body with prickles covered by skin. **Color:** body pale brown to dark brown, with small white and dark spots. **Size:** maximum length about 10 cm. **Distribution:** West Pacific, from southern Japan to South China Sea, New Caledonia and Australia. **Remarks:** occurring in shallow sandy bottoms.

SYNANCEIIDAE

Stonefishes

By Hiroyuki Motomura



Small to large-sized fishes. Body shape variable; head moderate to large; eyes and mouth small to large. Skin at gill openings broadly connected to isthmus. Suborbital stay becoming wider posteriorly. Lower pectoral fin rays free in some species. Head and body, except for lateral line, without exposed scales. **Color:** highly variable, from blackish to reddish, usually with spots or blotches; barred or mottled color patterns in most species. Inside of pectoral fin with various color markings.

Remarks: found on bottom from inshore shallow waters to relatively deep waters. Dorsal, anal, and pelvic fin spines highly venomous in most species.

Similar families occurring in the area: Scorpaenidae – skin at gill opening not broadly connected to isthmus. Aploactinidae – body covered with modified, prickly scales.

Choridactylus multibarbus Richardson, 1848

Threefinger Scorpionfish

D XII–XIV, 8–9; A II, 8–9; P_1 12; GR 9–11. Body oblong, moderately compressed. Head relatively small. Interorbital space wide, its width equal to 1.5 times orbit diameter. No teeth on vomer and palatines. Three lower pectoral fin rays free and detached from remainder of fin; uppermost pectoral fin ray not filamentous in adults. **Color:** body yellowish to brownish, with a yellow to reddish marking on shoulder. Inside of pectoral fin with about five oblong white areas, surrounded by black or brown pigment and usually with white specks in axil. **Size:** maximum standard length 10.3 cm. **Distribution:** widely distributed in the Indo-West Pacific, from the Red Sea east to China and the Philippines. **Remarks:** occurs in coastal waters. A highly venomous species.

Choridactylus multibarbus
KAUM–I. 17196, 8.6 cm SL
off Terengganu (KT), 5 Jan. 2009

Inimicus cuvieri (Gray, 1835)

Longsnout Stinger

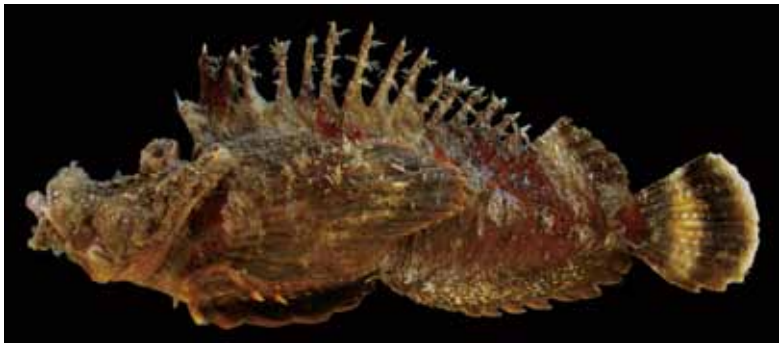
D XVII–XVIII, 8–9; A II, 11–13; GR 8–11. Body oblong, moderately compressed. Head relatively small. Orbit only slightly elevated. Snout length usually equal to or longer than postorbital length. Interspinous membrane from fourth rewards less than one fourth spine height. Lower pectoral fin rays free and detached from remainder of fin; no filamentous upper pectoral fin rays in adults. **Color:** body brown or grayish brown dorsally, paler ventrally. Head usually with minute black spots. Inner surface of pectoral fin without distinctive pattern, mostly solid brown, without spots. **Size:** maximum standard length 19.5 cm. **Distribution:** distributed in the Andaman Sea and the western Pacific, from the Philippines south to northern Australia. **Remarks:** occurs on sandy or mud-sand bottom less than 50 m depth. A highly venomous species.

Inimicus cuvieri
KAUM–I. 17233, 9.6 cm SL
Setiu, 5 Jan. 2009

Inimicus didactylus (Pallas, 1769)

Bearded Ghoulfish

D XV–XVII, 7–9; A II, 10–12; GR 9–11. Body oblong, moderately compressed. Head relatively small. Orbit only slightly elevated. Snout length longer than postorbital length. Interspinous membrane from fourth rewards less than one-third spine height. Lower pectoral fin rays free and detached from remainder of fin; no filamentous upper pectoral fin rays in adults. **Color:** body color variable. Inner surface of pectoral fin with a broad band medially, remaining parts of fin blackish with numerous whitish spots and lines. **Size:** maximum standard length 14.3 cm. **Distribution:** distributed in the western Pacific Ocean, from Japan to Australia and Vanuatu. **Remarks:** occurs on sandy or sandy-mud bottom less than 80 m depth. A highly venomous species.



Inimicus didactylus
UMTF 1344 (KAUM–I. 16574), 14.7 cm SL
Bidong Island, 12 Oct. 2008

Inimicus sinensis (Valenciennes, 1833)

Spotted Stonefish

D XVII–XVIII, 7–9; A II, 11–13; GR 7–10. Body oblong, moderately compressed. Head relatively small. Orbit only slightly elevated. Snout length equal to or longer than postorbital length. Interspinous membrane from fourth rewards less than one-fourth spine height. Lower pectoral fin rays free and detached from remainder of fin; no filamentous upper pectoral fin rays in adults. **Color:** body brown or grayish brown dorsally, paler ventrally. Inner surface of pectoral fin dark with various sized, white or yellow spots, without bands. **Size:** maximum standard length 15 cm. **Distribution:** distributed in the eastern Indian and western Pacific Oceans, from Sri Lanka to China and Australia. **Remarks:** occurs on sandy or mud-sand bottom. A highly venomous species.

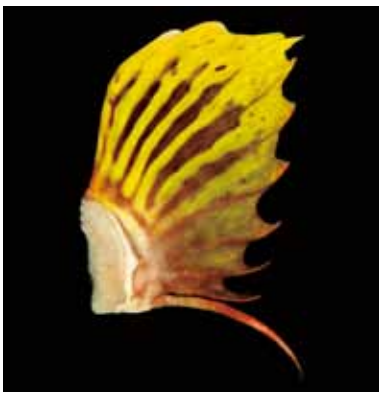
Inimicus sinensis
KAUM–I. 17236, 8.1 cm SL
Setiu, 5 Jan. 2009

Minous pictus Günther, 1880

Painted Stinger

D X–XII, 11–13; A II, 9–11; GR 13–17. Body oblong, moderately compressed. Posterior lacrimal spine much longer than anterior lacrimal spine. Posterior tip of pectoral fin reaching a vertical through middle of anal fin base. Dorsal fin spines moderately strong; first dorsal fin spine shorter than second spine. **Color:** body reddish brown without distinct bands or spots. Inner surface of pectoral fin reddish brown with yellowish irregular bands between rays, the band becoming wider posteriorly, forming a broad marginal band. Caudal fin pale, without dark markings. **Size:** maximum standard length 12 cm. **Distribution:** widely distributed in the tropical western Pacific Ocean. **Remarks:** occurs in depths of 27–90 m.

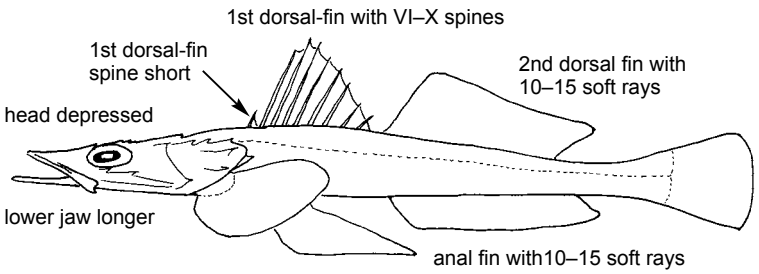
Minous pictus
KAUM–I. 17160, 7.8 cm SL
off Terengganu (KR), 5 Jan. 2009



PLATYCEPHALIDAE

Flatheads

by Hisashi Imamura



Small to large marine fishes, usually ranging from 7 to 50 cm, a few attaining to 70cm or greater. Body elongate. Head moderately or strongly depressed, usually armed by many spines and ridges. Eye small to relatively large. Snout prominent. Mouth large, lower jaw longer than upper. Teeth present on upper and lower jaws, vomer and palatine. Gill rakers few, relatively short or mere stubs. Gill membrane free from isthmus. Two dorsal fins well separated; 1st dorsal fin with VI–X spines, first short, isolated or scarcely connected to second; second dorsal fin with 10–15 soft rays. Anal fin with 10–15 soft rays; no spines present. Pelvic fin with 1 spine and 5 soft rays. Lateral line complete, with about 30 to more than 100 scales. Upper surface of body covered by ctenoid scales and lower by cycloid. **Color:** usually dark above and pale below; the dark colors with various shades of brown, gray or black.

Remarks: platycephalids known from less than 300 m, most found at less than 100 m and inhabiting on the mud, sand, rocky shore and coral reef. Many species excellent for eating.

Similar family occurring in the area: Plectrogeniidae and Bembridae – lower jaw shorter than or equal to upper jaw. Parabembridae – anal fin with 3 spine. Holpichthyidae – head and body extremely depressed and lateral line with bony plates. Percophidae – head without spines and ridges.

Elates ransonnettii (Steindachner, 1876)

Dwarf Flathead

D VI + 12–14 (usually 13); A 12–14 (usually 13); P_1 19–22; P_2 I, 5; LLp 83–107. Body slender and elongate. Head moderately depressed. Preopercle with 1 long spine. Eye without ocular flaps. Iris lappet absent. Teeth on vomer in 2 separate patches. Interopercular flap absent. Cheek region lacking skinny sensory tubes. Caudal fin concaved posteriorly; upper lobe with an elongate ray. Lateral line scales with single opening to exterior. **Color:** body and head pale brown, with a series of small brownish spots along body sides; 1st and 2nd dorsal, and caudal fins with dark spots; anal fin pale. **Size:** maximum length about 19 cm. **Distribution:** widespread in West Pacific, including Philippines, Indonesia, Malaysia and Australia. **Remarks:** taken from sandy and muddy bottoms in 5–53 m depths.

Elates ransonnettii, KAUM–I. 17277, 14.3 cm SL
off Terengganu (KT), 18 Jan. 2009

Elates ransonnettii, KAUM–I. 16902, 13.2 cm SL
off Terengganu (KT), 6 Dec. 2008

Grammoplites scaber (Linnaeus, 1758)

Rough Flathead

D I-VIII or I-VII-I + 11–13 (usually 12); A 11–12 (usually 12); P_1 19–22; P_2 I, 5; LLp 51–55. Body elongate. Head moderately depressed. Suborbital ridge with 4–5 spines. Eye without ocular flaps. Iris lappet simple and broad. Teeth on vomer in 2 separate patches. Interopercular flap absent. Cheek region lacking skinny sensory tubes. Lateral line scales with spine and single opening to exterior. **Color:** body and head brownish above, whitish below, with about 6 dark bands crossing dorsal surface in some, obscure or absent in others; 1st dorsal and pelvic fins dusky; 2nd dorsal fin with small dark spots; anal fin white or with a submarginal row of dark spots; caudal fin dusky, some with a row of dark spots along upper edge; pectoral fin spotted on upper half, dusky on lower. **Size:** maximum length about 30 cm, commonly to 20 cm. **Distribution:** Indo-West Pacific, including southern Arabian Sea, Bay of Bengal, Malaysia, Indonesia, Gulf of Thailand, Hong Kong, Taiwan and southern Philippines. **Remarks:** taken by trawls over mud and sand in about 55 m depth.

Grammoplites scaber, KAUM–I. 17074, 17.8 cm SL
off Terengganu (KT), 27 Dec. 2008

Inegocia japonica, KAUM–I. 16966, 16.8 cm SL
off Terengganu (KT), 11 Dec. 2008

Inegocia japonica, KAUM–I. 17221, 14.4 cm SL
off Terengganu (KT), 11 Jan. 2009

Kumococius rodericensis, KAUM–I. 17222, 17.7 cm SL
off Terengganu (KT), 11 Jan. 2009

Inegocia japonica (Cuvier, 1829)

Japanese Flathead

D I-VIII or IX + 11–13; A 11–13; P_1 19–21; P_2 I, 5; LLp 51–55. Body elongate. Head moderately depressed. Suborbital ridge with 2 spines. Eye without ocular flaps. Iris lappet cirrose. Teeth on vomer in 2 separate patches. Finger-like interopercular flap present. Cheek region lacking skinny sensory tubes. Lateral line scales with 2 openings to exterior. **Color:** body and head grayish or brown above, whitish below, with 6 obscure dark bands crossing dorsal surface; 1st and 2nd dorsal, pectoral, pelvic and caudal fins with dark spots; anal fin dusky posteriorly in smaller specimens or entirely in larger specimens. **Size:** maximum length about 25 cm. **Distribution:** widespread in Indo-West Pacific, ranging from Sri Lanka to northern Australia and to southern Japan. **Remarks:** occurring in muddy or sandy bottom to depths of 85 m.

Kumococius rodericensis (Cuvier, 1829)

Spiny Flathead

D I-VIII or IX + 11–12 (usually 11); A 11–13 (usually 12); P_1 19–22; P_2 I, 5; LLp 50–54. Body elongate. Head moderately depressed. Suborbital ridge with many spines. Preopercle with 3 spines; uppermost longest, reaching nearly to or just past opercular margin. Eye without ocular flaps. Iris lappet simple or slightly bilobed. Teeth on vomer in 2 separate patches. Finger-like interopercular flap present. Cheek region lacking skinny sensory tubes. Pectoral fin concaved posteriorly. Lateral line scales with 1 opening to exterior. **Color:** body and head brownish above, whitish below, with about 5 dark bands crossing dorsal surface; pectoral fin dark brown, with a clear or pale area in center. **Size:** maximum length about 25 cm. **Distribution:** widespread in Indo-West Pacific, including Gulf of Oman, southern Japan and Australia. **Remarks:** occurring in muddy or sandy bottom at depths of 18–130 m.

Platycephalus cultellatus Richardson, 1846

D I-VII + 13; A 13; P_1 20; P_2 I, 5; LLp 67. Body elongate. Head strongly depressed. Spines on dorsal surface of head obscure. Preopercle with 2 spines. Eye without ocular flaps. Iris lappet simple elongated lobe. Teeth on vomer in single band. Finger-like interopercular flap present. Cheek region lacking skinny sensory tubes. Single short spine between first and second dorsal fins present or absent. Lateral line scales with single opening to exterior. **Color:** body and head light brown above, whitish below; dorsal fins with small dark spots; anal fin pale; pectoral and pelvic fins light brown with brown spots; caudal fin with 4 horizontal blackish bands, including that on middle of the fin. **Size:** attaining to at least about 45 cm SL. **Distribution:** South China Sea, including Canton, Vietnam and Malaysia.

Platycephalus cultellatus, KAUM–I. 16999, 25.0 cm SL
off Terengganu (KT), 14 Dec. 2008

Platycephalus indicus, KAUM–I. 16733, 12.3 cm SL
Setiu, 28 Oct. 2008

Platycephalus indicus (Linnaeus, 1758)

Bartail Flathead

D I-VII–VIII + 13; A 13; P_1 18–20; P_2 I, 5; LLp 68–82. Body elongate. Head strongly depressed. Spines on dorsal surface of head obscure in adults. Preopercle with 2 spines. Eye without ocular flaps. Iris lappet simple elongated lobe. Teeth on vomer in single band. Finger-like interopercular flap present. Cheek region lacking skinny sensory tubes. Single short spine between first and second dorsal fins present or absent. Lateral line scales with single opening to exterior. **Color:** body and head covered by many small spots, whitish below; 1st and 2nd dorsal, pectoral and pelvic fins with dark spots; anal fin pale; caudal fin with 2 horizontal dark bands, single yellow blotch near middle of fin. **Size:** maximum length about 50 cm. **Distribution:** widespread in Indo-West Pacific. Population in the eastern Mediterranean is migrant. **Remarks:** occurring in muddy or sandy shallow coastal waters. Records from Japan and Korea are doubtful.

Rogadius tuberculatus, KAUM–I. 16832, 6.9 cm SL
off Terengganu (KT), 5 Dec. 2008

Rogadius tuberculatus (Cuvier, 1829)

D I-VIII or IX + 10–12; A 10–12; P_1 19–22; P_2 I, 5; LLp 47–54. Body elongate. Head moderately depressed. Dorsal surface of head with spines and tubercles. Two to 6 preocular spines present. Suborbital ridge with fine serrations. Lower half of preopercle roughly serrated, lacking the antrorse spine. Eye without ocular flaps. Iris lappet scalloped. Teeth on vomer in 2 separate patches. Interopercular flap absent. Cheek region with well developed skinny sensory tubes. Lateral line scales with two opening to exterior. Scales on anterior portion of body with one or more spines. **Color:** body and head light brown above, whitish below; body with several indistinct brown bands dorsally; dorsal fins with many brownish spots; pectoral fin with many irregular brownish bands, posterior portion of pectoral fin blackish except for upper; pelvic fin with irregular brownish spots; caudal fin dusky. **Size:** maximum length about 15 cm. **Distribution:** widespread in Indo-West Pacific. **Remarks:** occurring in mud and sand to a depth of ca. 80 m.

Suggrundus macracanthus (Bleeker, 1869)

Largespined Flathead

D I-VIII + 11–12 (usually 12); A 12–13 (usually 12); P_1 20–23; P_2 I, 5; LLp 50–55. Body elongate. Head moderately depressed. Suborbital ridge with many spines. Eye without ocular flaps. Iris lappet bilobed in adults, crenate in juveniles. Teeth on vomer in 2 separate patches. Interopercular flap present. Cheek region partially covered by skinny sensory tubes. Uppermost preopercular spine beyond the posterior margin of opercle. Lateral line scales with 2 openings to exterior. **Color:** body and head brown above, whitish below, with about 7 obscure dark bands crossing dorsal surface in some; 1st dorsal fin dusky, with black blotches; 2nd dorsal fin with small brown spots; anal fin pale, a few dark streaks on posterior rays; caudal fin with yellowish marking; pectoral fin grayish below, with dark spots above; pelvic grayish. **Size:** maximum length about 26 cm, commonly to 18 cm. **Distribution:** widespread in Indo-West Pacific, ranging from southern India and Sri Lanka to Taiwan and to Coral Sea. **Remarks:** occurring in muddy or sandy bottom to depths to 132 m.

Suggrundus macracanthus, KAUM–I. 17220, 15.1 cm SL
off Terengganu (KT), 11 Jan. 2009

Thysanophrys chiltonae, UMTF 1890, 21.1 cm SL
off Terengganu (KT), 11 Jan. 2009

Thysanophrys chiltonae, KAUM–I. 17219, 15.8 cm SL
off Terengganu (KT), 11 Jan. 2009

Thysanophrys chiltonae Schultz, 1966

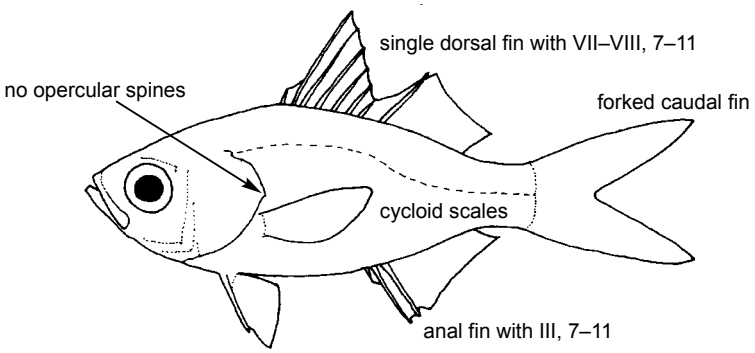
Longsnout Flathead

D I-VII–VIII + 11–12 (usually 11); A 12; P_1 19–22; P_2 I, 5; LLp 50–54. Body elongate. Head moderately depressed. Suborbital ridge with many spines. Eye without ocular flaps. Iris lappet with short branches. Teeth on vomer in 2 separate patches. Interoperclar margin incised, forming a broad lobe. Cheek region completely covered by skinny sensory tubes. Lateral line scales with 2 openings to exterior. **Color:** body light tan mottled with numerous white spots, white below, with about 5–7 brown bands crossing back; 1st dorsal fin with a large black submarginal blotch; 2nd dorsal fin with alternating white and brown spots on rays; anal fin pale; caudal fin with rows of small white spots separating 2–3 dark bands; pectoral fin white below, with several small brown blotches in middle and a series of blackish blotches above; pelvic fin with a prominent blackish blotch near base. **Size:** maximum length about 22 cm, commonly to 16 cm. **Distribution:** widespread in Indo-West Pacific, ranging from Red Sea to southern Japan and to Marquesas Islands, including Malaysia, Indonesia, northern Australia, and Mariana and Marshall Islands. **Remarks:** inhabits sand area adjacent to coral reefs to a depth of ca. 38 m.

AMBASSIDAE

Perchlets (Glassfishes)

By Koichi Shibukawa



Small to moderate sized (up to 12 cm), oblong and compressed fishes. Lateral line continuous or interrupted at midway. Head compressed; eyes large; lower jaw subequal or projecting beyond upper jaw; spines or serrations on various parts of head (e.g., round of eye, snout, and margins of preopercle and interopercle); no opercular spine; villiform teeth on jaws and roof of buccal cavity; branchiostegals 6. Dorsal fin single, deeply notched before last spine, with VII or VIII spines and 7–11 soft rays; anal fin with III spines and 8–11 soft rays; pectoral fin with 11–17 soft rays; pelvic fin I, 5; caudal fin forked. Scales cycloid, moderately large and thin, and usually easy to be deciduous. Vertebratae 24–25. **Color:** subtranslucent or opaque, with silvery head and belly; fins hyaline, usually with black streaks and/or blotches on dorsal and caudal fins, tinged with yellow in some species.

Remarks: found in freshwaters, brackish estuaries, mangroves, and shallow coastal water; usually forming aggregations, and feed on small crustaceans, insects, and fishes. Minor importance in fisheries, often marketed as dried and salted; some freshwater species treated as popular aquarium fish.

Similar families occurring in the area: Apogonidae – two separate dorsal fins; II anal-fin spines.

Ambassis interrupta Bleeker, 1853

Longspined Perchlet

D VII + I, 9–10; A III, 9–10; P_1 14–16; LL 11–13 + 9–13; LR 27–28. Body deep, compressed; lateral line interrupted at midway, anterior and posterior series with 11-13 and 9-13 scales, respectively. Single supraorbital spine (posteriorly-directed spine at dorsoposterior margin of orbit); hind margin of preopercle smooth; 2 scale rows on cheek. **Color:** body semitransparent, beige dorsally; head and belly silvery; dorsal fins hyaline, exclusive of 2nd spine and membrane between 2nd and 3rd spines of first dorsal fin blackish; caudal fin tinged with yellow or yellowish orange, narrowly margined dusky posteriorly. **Size:** 9 cm SL. **Distribution:** Indo-West Pacific. **Remarks:** found in brackish estuaries and tidal creeks, especially mangroves.

Ambassis interrupta, UMTF 1513 (KAUM–I. 16705), 4.5 cm SL
Setiu, 27 Oct. 2008

Ambassis nalua (Hamilton, 1822)

Scalloped Perchlet

D VII + I, 10–11; A III, 9; P_1 15–17; LL 27–29; LR 27–29. Body deep, compressed; lateral line continuous. Single supraorbital spine (posteriorly-directed spine at dorsoposterior margin of orbit); hind margin of preopercle smooth; 2 scale rows on cheek. **Color:** body semitransparent, head and belly silvery; dorsal fins hyaline, exclusive of 2nd spine and membrane between 2nd and 3rd spines of first dorsal fin blackish. **Size:** 9.5 cm SL. **Distribution:** Indo-West Pacific. **Remarks:** found in bays, brackish estuaries and tidal creeks, especially mangroves.

Ambassis nalua, UMTF 1511 (KAUM–I. 16701), 4.4 cm SL
Setiu, 27 Oct. 2008

Ambassis urotaenia Bleeker, 1852

Bleeker's Perchlet

D VII + I, 10; A III, 9–10; P_1 16; LR 26–27. Body oblong, compressed; lateral line continuous with 26–27 tubed scales. A single supraorbital spine (posteriorly-directed spine at dorsoposterior margin of orbit); hind and ventral margins of preopercle serrate; single scale row on cheek. **Color:** body semitransparent, head and belly silvery; dorsal fins hyaline, exclusive of membrane between 2nd and 3rd spines of first dorsal fin blackish; dusky longitudinal streak on each caudal-fin lobe. **Size:** 5 cm SL. **Distribution:** Eastern Indian Ocean and West Pacific. **Remarks:** found in brackish estuaries and tidal creeks, especially mangroves.

Ambassis urotaenia, UMTF 1126 (KAUM–I. 16503), 6.3 cm SL
Cendering, 6 Oct. 2008

Ambassis vachellii Richardson, 1846

Vachell's Glass Perchlet

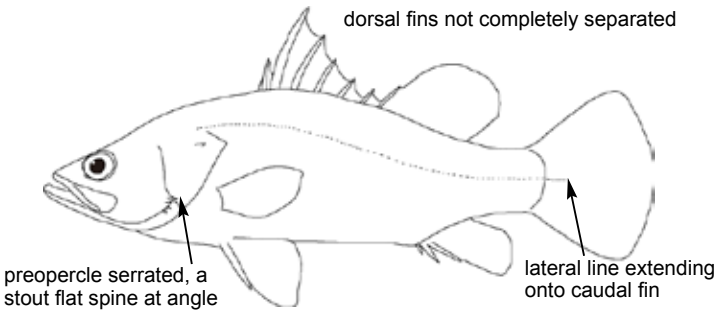
D VII + I, 9; A III, 9; P_1 14–16; LL 10–13 + 12–14; LR 27–28. Body oblong, compressed; lateral line interrupted at midway, anterior and posterior series with 10–13 and 12–14 scales, respectively. Some or more (most frequently 3–5) supraorbital spines (posteriorly-directed spines at dorsoposterior margin of orbit); hind and ventral margins of preopercle with serrate; 2 or more scale rows on cheek. **Color:** body semitransparent, head and belly silvery; dorsal fins hyaline, exclusive of membrane between 2nd and 3rd spines of first dorsal fin blackish; caudal fin often tinged with yellow. **Size:** 5.5 cm SL. **Distribution:** Indo-West Pacific. **Remarks:** found in bays, brackish estuaries and tidal creeks, especially mangroves.

Ambassis vachellii, KAUM–I. 16445, 4.2 cm SL
estuary near UMT, 28 Sept. 2008

LATIDAE

Lates

By Mizuki Matsunuma



Medium to large sized (up to 2 m TL) percoid fishes. Body elongate, compressed; dorsal profile behind eyes concave or convex. Eyes medium sized, relatively close to tip of snout and dorsal profile. Preopercle with serrated posterior or ventral margins and a stout flat spine at angle; opercle with small flat spine; serrated supracleithrum exposed, near beginning of lateral line. Snout rounded. Mouth large, almost horizontal. Teeth small, in villiform bands on upper and lower jaws, vomer, and palatines (may be present on tongue). Dorsal fin deeply incised between spiny and soft portions; but not completely separated or, if separated, with one or two isolated spines present between them; with VII–IX spines and 10–14 soft rays. Anal fin with III spines and 7–9 soft rays. Pelvic fin with axillary scale, and I spine and 5 soft rays. Pectoral fin with 16 or 17 rays and spiny flap just above fin base. Caudal fin rounded. Scales large, ctenoid; covering bases of caudal, soft dorsal, and anal fins; lateral-line scales 45–50, extending onto caudal fin in 1 or 3 series. Vertebrae 11 + 14 = 25. Branchiostegal rays 7. **Color:** adults greenish or silvery gray to brown, juveniles with stripes; eyes with characteristic red reflection.

Remarks: occurring in coastal marine and estuarine to fresh-water habitats. Important and popular food fish.

Similar families occurring in the area: Serranidae – preopercle usually without large flat spines or serrations; opercle with 3 flat spines; lateral line not extending onto caudal fin.

Lates calcarifer (Bloch, 1790)

Barramundi

D VII–IX, 10–11; A III, 7–8; P_1 17–18; LLp 54–57; LGR 16–17; V 25. Body moderately deep, elongate, and compressed; dorsal profile of head concave anteriorly; snout and jaws pointed; lower edge of preopercle with 3 or 4 (rarely more) large flat triangular spines; anterior and posterior nostrils close together near eye; mouth large, posterior tip of maxilla extending beyond eye. Dorsal fin deeply incised before last dorsal-fin spine; 3rd anal fin spine longest; caudal fin rounded. Scales firmly fixed, ctenoid; lateral line extending onto caudal fin. **Color:** silver with olive-gray or gray-blue bakes; eyes brown to golden; juveniles brown to grayish brown with 3 white stripes on head and scattered white patches on body sides. **Size:** maximum over 2 m TL. **Distribution:** widely distributed in the Indo-West Pacific, from the Persian Gulf to Papua New Guinea and northern Australia, north to China. **Remarks:** found in coastal marine and estuarine waters. Feeds on fishes and some crustaceans.

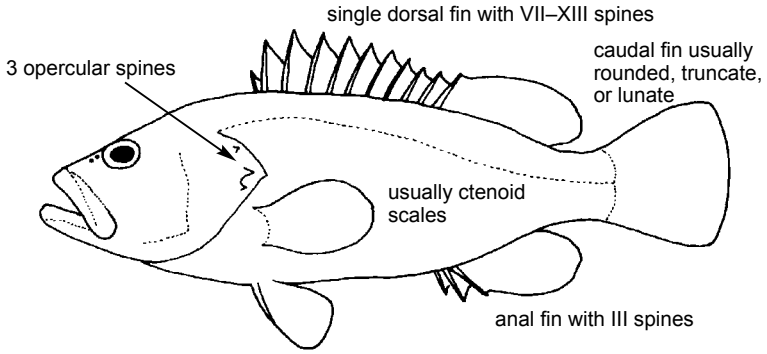
Lates calcarifer, UMTF 1898, 23.5 cm SL
off Terengganu (KT), 12 Jan. 2009

Lates calcarifer, UMTF 1518 (KAUM–I. 16749), 11.7 cm SL
Setiu, 30 Oct. 2008

SERRANIDAE

Groupers (Sea Basses, Fairy Basslets)

By Yusri Yusuf and Hiroyuki Motomura



Body variable in shape, from deep-bodied to elongate and little compressed to notably compressed. Opercle bearing 3 flat spines; posterior margin of preopercle nearly always serrate or with 1–4 spines. Mouth large, terminal; maxilla exposed when mouth closed; lower jaw usually projecting; bands of small, slender teeth in jaws; canines usually present at front of jaw and sometimes at side; small teeth present on vomer and palatines of most species; no molar or incisiform teeth. Opercular membrane separate, with 7 branchiostegal rays. Dorsal fin single or may be notched, with IV–XIII spines and 9–25 soft rays; anal fin with III (rarely II) spines and 6–24 soft rays; caudal fin rounded to lunate in shape with 12–15 branched rays; pelvic fins with I spine and 5 soft rays, no scaly axillary pelvic process. Scales small to moderate, adherent, ctenoid (or secondarily cycloid). A single complete lateral line, extending on caudal fin less than ½ length of middle caudal fin rays. **Color:** variable with patterns of light or dark stripes, spots, vertical or diagonal bars, or nearly plain.

Remarks: benthic or bottom-orientated fishes, usually found on coral reefs or rocky substrata; most species occur on continental or insular shelves in depths less than 200 m. All are predaceous, the larger species feeding mainly on fishes, crustaceans, and cephalopods, while the smaller ones feed on zooplankton. Most species are protogynous hermaphrodites.

Similar families occurring in the area: Latidae – lateral line extends to rear margin of caudal fin; opercle with a single flat spine. Lutjanidae – no spines on opercle; scaly axillary process at base of pelvic fins usually well developed. Haemulidae – no teeth on vomer or palatines; no spines on opercle. Sparidae – jaws with incisiform and/or molariform teeth; no spines on opercle; edge of preopercle smooth. Lobotidae – no spines on opercle; no teeth on vomer or palatines. Kuhliidae – rear edge of opercle froming only 2 flat points; branchiostegal rays 6; scaly sheath at bases of dorsal and anal fins. Acropomatidae – rear edge of opercle forming 2 flat points, or the lowest point developed as a cluster of sharp spines; several distinct, spaced canines along lower jaw.

Cephalopholis boenak (Bloch, 1790)

Chocolate Hind

D IX, 15–17; A III, 8; P_1 16–17; P_2 I, 5; LLp 46–51; GR 7–9 + 14–17. Body moderately elongate; body depth less than head length, 2.6–3.0 in SL. Head length 2.3–2.7 in SL. Teeth on palatines. Dorsal-fin membranes distinctly incised between spines. Caudal fin rounded. Pectoral fin middle rays longest, its length 1.3–1.6 in head length. Longest pelvic-fin soft ray length 1.7–2.2 in head length. No sclaes on maxilla; no axillary scales on body. **Color:** body dark brown, often dark reddish brown, usually with 7 or 8 dark bars on body. Black spot between upper and middle opercular spines. **Size:** maximum length 26 cm. **Distribution:** widely distributed in the Indo-West Pacific, from east coast of Africa east to New Caledonia, including southern Japan and northern Australia. **Remarks:** usually found on silty dead reefs in protected waters in depths of 4 to 64 m. Feeds mainly on crustaceans. Common in the area.

(H. Motomura & Y. Yusuf)

Cephalopholis boenak, KAUM–I. 16987, 14.2 cm SL
off Terengganu (KT), 13 Dec. 2008

Cephalopholis formosa (Shaw, 1812)

Bluelined Grouper

D IX, 15–17; A III, 7–8; P_1 16–18 ; LLp 47–51; GR 7–10 + 15–18. Body moderate; its depth 2.5–2.9 in SL. Caudal fin rounded; pectoral fins short, 1.6–1.8 in head length. Snout largely scaled; maxilla partially scaled; scales on abdomen ctenoid. **Color:** dark brown to yellowish brown, with irregular dark blue lines on head, body and fins; snout, lips, and ventral part of head and chest with small dark blue spots. **Size:** maximum length about 34 cm. **Distribution:** Indo-West Pacific. **Remarks:** found in shallow coastal waters with dead coral, rocky or silty reefs; depth range 10–30 m.

(Y. Yusuf)

Cephalopholis formosa, UMTF 1357 (KAUM–I. 16646), 20.7 cm SL
Bidong Island, 13 Oct. 2008

Cephalopholis microprion (Bleeker, 1852)

Freckled Hind

D IX, 14–16; A III, 8; P_1 14–16; LLp 45–51; GR 7–9 + 14–17. Body depth 2.5–2.8 in SL; head length 2.3–2.5 in SL; interorbital area flat or slightly concave; preopercle rounded, finely serrate, lower edge fleshy; subopercle and interopercle smooth or finely serrate; upper edge of operculum very convex; maxilla naked, extending past eye. Pectoral fin usually reaching past vertical at anus, its length 1.4–1.6 in head length; pelvic fin length 1.9–2.1 in head length; caudal fin well rounded. **Color:** dark brown; proximal part of each scale darker than posterior part; somewhat with indistinct dark bars on body; head including jaws and anterior part of body with numerous small dark-edged blue spots; somewhat blue spots extending onto fins; soft dorsal, anal, and caudal fins usually with a grayish blue margin. **Size:** maximum length about 24 cm. **Distribution:** tropical eastern Indian Ocean and western Pacific. **Remarks:** found in shallow coastal waters with silty bottoms; depth range 2–20 m. Often confused with *Cephalopholis boenak*, but have small blue spots on anterior part of body.

(Y. Yusuf)

Cephalopholis microprion, KAUM–I. 17050, 13.2 cm SL
off Terengganu (KT), 18 Dec. 2008

Cephalopholis sonnerati, KAUM–I. 17073, 15.7 cm SL
off Terengganu (KT), 27 Dec. 2008

Cephalopholis sonnerati (Valenciennes, 1828)

Tomato Hind

D IX, 14–16; A III, 9; P_1 18–20; P_2 I, 5; LLp 66–80; GR 7–9 + 14–16. Body relatively deep; body depth greater than or subequal to head length, 2.3–2.7 in SL. Head length 2.5–2.7 in SL. Dorsal-fin membranes distinctly incised between spines. Caudal fin rounded. Pectoral fin middle rays longest, its length, subequal to longest pelvic-fin ray, 1.5–1.7 in head length for specimens of 15–40 cm length. **Color:** body generally pale reddish to yellowish brown, with small brownish red or dark brown spots on head and fainter spots on body and fins. **Size:** maximum length 57 cm. **Distribution:** widely distributed in the Indo-Pacific. **Remarks:** usually found on coral reefs in lagoon and outer reef, depths of 10 to 150 m.

(H. Motomura & Y. Yusuf)

Diploprion bifasciatum Cuvier, 1828

Barred Soapfish

D VIII, 13–16; A II, 12–13; P_1 17–18; P_2 I, 5; LLp 71–76: GR 9–10 + 20–22. Body deep, compressed; body depth greater than head length, 2.0–2.4 in SL. Preopercular, subopercular and interopercular margins serrated. Caudal fin rounded. Posterior tip of depressed pelvic fin extending beyond anal fin origin. Scales mainly ctenoid, not deeply embedded. **Color:** body yellow with a black bar through eye and a broad one in middle of body continuing onto posterior two thirds of spinous portion of dorsal fin. **Size:** maximum length 25 cm. **Distribution:** Indo-West Pacific. **Remarks:** found in coral reefs and adjacent habitats in depths of 5–50 m. Secrete skin toxin under stress.

(H. Motomura & Y. Yusuf)

Diploprion bifasciatum, KAUM–I. 16842, 12.3 cm SL
off Terengganu (KT), 5 Dec. 2008

Epinephelus amblycephalus (Bleeker, 1857)

Banded Grouper

D XI, 15–16; A III, 8; P_1 18–19; P_2 I, 5; LLp 47–52; GR 8 + 14–16. Body moderately elongate; body depth less than head length, 2.5–3.0 in SL. Head length 2.1–2.4 in SL. Posteroventral preopercular margin with 3–6 enlarged serrae. Dorsal-fin membranes slightly incised between spines. Caudal fin rounded. Pectoral fin middle rays longest, its length equal to longest pelvic-fin ray, 1.7–2.3 in head length. Lateral body scales ctenoid, with a few axillary scales in adults. **Color:** body pale gray, with 5 broad dark brown bars, first 2 extending into spinous portion of dorsal fin, third and fourth bars extending into soft-rayed portions of dorsal and anal fins, fifth dark bar at base of caudal fin. Small black spots on dorsal parts of body bars, mainly along the edges of the bars. **Size:** maximum length 50 cm. **Distribution:** eastern Indian Ocean and central western Pacific. **Remarks:** usually found on offshore coral and rocky reefs in depths of 80–130 m. (H. Motomura & Y. Yusuf)

Epinephelus amblycephalus, KAUM–I. 17230, 34.5 cm SL
off Terengganu (KT), 12 Jan. 2009

Epinephelus areolatus (Forsskål, 1775)

Areolate Grouper

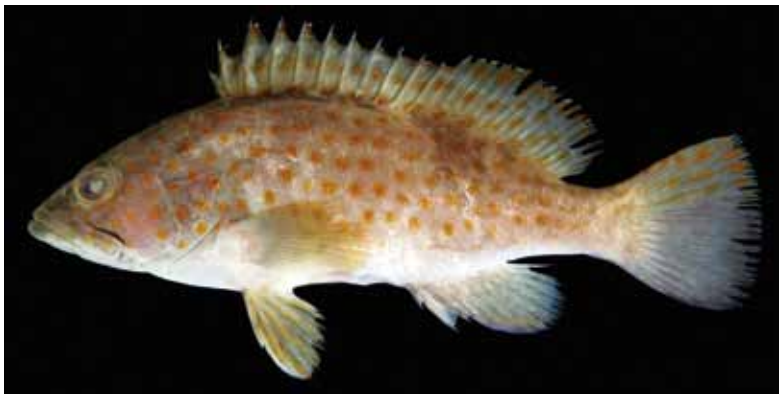
D XI, 15–17; A III, 7–8; P_1 17–19; LLp 49–53; GR 8–10 + 14–16. Body moderately elongate; depth 2.8–3.3 in SL. Caudal fin slightly convex in juvenile, truncate or emarginate in adults; pectoral fins relatively long, 1.5–1.8 in head length, longer than pelvic fins. Scales on body ctenoid, except for thorax and ventrally on abdomen; maxilla with very small scales. **Color:** head, body and fins pale gray, with numerous close-set roundish to polygonal brown to yellowish brown spots; pectoral fin pale, with small dark spots; caudal fin with distinct white straight margin. **Size:** 40 cm. **Distribution:** Indo-West Pacific. **Remarks:** usually found in rocky reefs, dead coral, or alcyonarians; depth range 6–200m. (Y. Yusuf)

Epinephelus areolatus, KAUM–I. 16889, 10.7 cm SL
off Terengganu (KT), 6 Dec. 2008

Epinephelus bleekeri (Vaillant, 1878)

Duskytail Grouper

D XI, 16–18; A III, 8–9; P_1 17–19; LLp 49–53; GR 9–11 + 15–18. Body elongate; its depth 3.0–3.5 in SL. Preopercle with 2–9 enlarged serrate at the angle. Caudal fin truncate to slightly convex. Scales on body ctenoid except for nape, thorax, and ventrally on abdomen; maxilla with very small scales. **Color:** brownish to purplish gray, with numerous small orange-yellow spots on head, body, dorsal fin, and upper third of caudal fin; lower two-thirds of caudal fin dark purplish gray, with white margin. **Size:** maximum length 76 cm. **Distribution:** Indo-West Pacific. **Remarks:** occurs on silty coastal reef areas, but is not known from well developed coral reefs; depth to 50m. Marketed fresh. (Y. Yusuf)



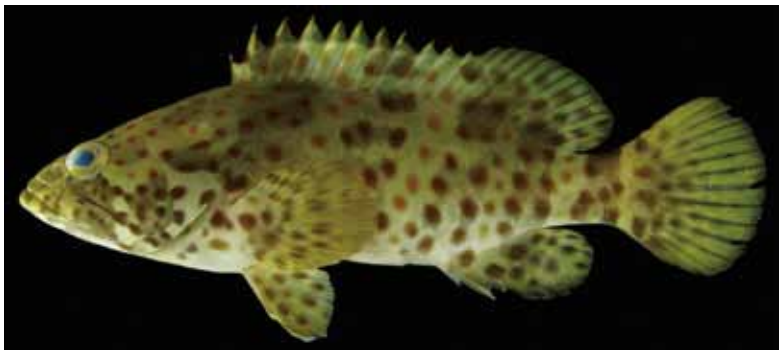
Epinephelus bleekeri, KAUM–I. 16985, 14.4 cm SL
off Terengganu (KT), 13 Dec. 2008

Epinephelus coeruleopunctatus (Bloch, 1790)

White-spotted Grouper

D XI, 15–17; A III, 8; P_1 17–19; LLp 51–61; GR 7–10 + 14–17. Body moderately elongate; its depth 3.0–3.4 in SL; head pointed, dorsal profile nearly straight; preopercle rounded, finely serrate; opercular spines inconspicuous. Caudal fin rounded; pectoral fins large and fleshy, its length 1.5–2.1 in head length. Scales on body of adults in a broad ctenoid zone along side of body, cycloid elsewhere; a patch of small scales on maxilla. **Color:** adults brownish gray; body, posterior head, and dorsal fin scattered with large whitish spots, and numerous pale spots; dorsal, caudal and pectoral fins with a very narrow white margins; a series of indistinct dark blotches at base of dorsal fin, and one on caudal peduncle; prominent black streak on maxillary groove. Juveniles dark gray to black, covered with prominent pupil- size white spots and smaller white dots. **Size:** maximum length 60 cm. **Distribution:** Indo-West Pacific. **Remarks:** found in rocky or coral areas; depth range 2–65 m. (Y. Yusuf)

Epinephelus coeruleopunctatus, KAUM–I. 16511, 7.4 cm SL
Cendering, 6 Oct. 2008



Epinephelus coioides, UMTF 1218 (KAUM–I. 16512), 11.8 cm SL
Cendering, 6 Oct. 2008

Epinephelus coioides (Hamilton, 1822)

Orange-spotted Grouper

D XI, 13–16; A III, 8; P_1 18–20; LLp 58–65; GR 8–10 + 14–17. Body elongate; its depth 2.9–3.7 in SL; preopercle with enlarged serrae at angle. Caudal fin rounded. Scales on body ctenoid; anterior lateral line scales of adults branched. **Color:** head and body gray-brownish dorsally, shading to whitish ventrally, with numerous small brownish orange or reddish brown spots on head, body, and median fins; body with 5 faint, irregular, oblique, dark bars which bifurcate ventrally. **Size:** maximum length 95 cm. **Distribution:** Indo-West Pacific. **Remarks:** found in coral or rocky reefs. Important commercial fish and reared in cage culture in Malaysia.

(Y. Yusuf)

Epinephelus erythrurus (Valenciennes, 1828)

Cloudy Grouper

D XI, 15–17; A III, 8; P_1 17–19; P_2 I, 5; LLp 53–62; GR 8–9 + 14–17. Body moderately elongate; body depth less than head length, 2.8–3.2 in SL. Head length 2.4–2.7 in SL. Preopercular margin finely serrated. Dorsal-fin membranes not incised or moderately incised between spines. Caudal fin rounded. Pectoral fin middle rays longest. Lateral body scales distinctly ctenoid, with axillary scales. **Color:** body olive to reddish brown, usually with irregular pale spots and blotches. Three dark streaks across opercle. Median and pelvic fins mottled. Pectoral fin uniform. **Size:** maximum length about 43 cm. **Distribution:** Indo-West Pacific. **Remarks:** inhabits in coral reef area, harbors and estuaries; depth range 1–20 m.

(H. Motomura & Y. Yusuf)

Epinephelus erythrurus, KAUM–I. 16333, 8.0 cm SL
Cendering, 16 Sept. 2008

Epinephelus fasciatus (Forsskål, 1775)

Blacktip Grouper

D XI, 15–17; A III, 8; P_1 18–20; P_2 I, 5; LLp 49–75; GR 6–8 + 15–17. Body moderately elongate; body depth less than head length, 2.8–3.3 in SL. Head length 2.3–2.6 in SL. Posteroventral preopercular margin serrated. Dorsal-fin membranes distinctly incised between spines. Caudal fin slightly to moderately rounded. Pectoral fin middle rays longest, its length longer than longest pelvicfin ray length, 1.5–2.0 in head length. Lateral body scales distinctly ctenoid, with numerous axillary scales; nape and dorsoposterior part of head densely covered with minute axillary scales. **Color:** body greenish gray, pale reddish yellow to scarlet, often with 5 or 6 faint dark bars. Fins reddish orange, pale yellowish green or greenish brown; outer triangular part of interspinous membranes of dorsal fin black. **Size:** maximum length about 40 cm. **Distribution:** Indo-West Pacific. **Remarks:** inhabits in shallow coral and rocky reefs; depths range 3–160 m.

(H. Motomura & Y. Yusuf)

Epinephelus fasciatus, KAUM–I. 17151, 19.1 cm SL
off Terengganu (KR), 4 Jan. 2009

Epinephelus fuscoguttatus (Forsskål, 1775)

Brown-marbled Grouper

D XI, 14–15; A III, 8; P_1 18–20; P_2 I, 5; LLp 52–58; GR 10–12 + 18–21. Body depth 2.6–2.9 in SL; head length 2.3–2.5 in SL; interorbital margin flat or slightly concave; preopercle rounded, finely serrated; upper edge of operculum distinctly convex; anterior edge of preorbital deeply indented below nostrils; maxilla extends well posterior to eye; midlateral part of lower jaw with 3 or 4 rows of teeth, inner teeth about twice longer than outer teeth; canines inconspicuous. **Color:** pale yellowish brown, with irregular 5 vertical series of dark brown blotches; head, body, and fins with numerous small brown spots; small black saddle spot on rear half of caudal peduncle; 2 or 3 faint, dark bars at side of jaws. **Size:** maximum length 95 cm. **Distribution:** Indo-Pacific. **Remarks:** found in shallow coral or rocky reefs to depths of 60 m. Important commercial fish and reared in cage culture in Malaysia.

(Y. Yusuf)

Epinephelus fuscoguttatus, KAUM–I. 17053, 18.5 cm SL
off Terengganu (KT), 18 Dec. 2008

Epinephelus heniochus Fowler, 1904

Bridled Grouper

D IX, 14–15; A III, 8; P_1 16–18; P_2 I, 5; LLp 54–60; GR 7–9 + 14–16. Body depth 2.7–3.2 in SL; interorbital area slightly convex; dorsal head profile distinctly convex; preopercle angular, with 2–4 large spines; upper edge of operculum approximately straight; maxilla usually reaching to or slightly past a vertical at rear edge of eye; lower edge of maxilla with a step-like bend in adults; canines at front of jaws well developed; midlateral part of lower jaw with 2 rows of teeth. **Color:** head and body pale brown dorsally, shading to whitish or pale pink ventrally; faint dark brown stripe from eve to end of operculum, another darker stripe from lower edge of eye to subopercle and a third from edge of preorbital to interopercle; dorsal, pectoral, and caudal fins hyaline grayish yellow. **Size:** maximum length 43 cm. **Distribution:** western Pacific. **Remarks:** often found on soft bottom, rather than rocky areas; depth range 40–235 m. (Y. Yusuf)

Epinephelus heniochus, KAUM–I. 17144, 17.0 cm SL
off Terengganu (KT), 1 Jan. 2009

Epinephelus quoyanus, KAUM–I. 17153, 15.0 cm SL
off Terengganu (KR), 4 Jan. 2009

Epinephelus quoyanus (Valenciennes, 1830)

Longfin Grouper

D XI, 16–18; A III, 8; P_1 16–19; LLp 48–52; GR 6–8 + 14–16. Body depth 2.8–3.2 in SL; serrae at corner of preopercle enlarged. Caudal fin rounded; pelvic fins not reaching or just reaching anus. Scales on body ctenoid; maxilla naked or with a few very small scales. **Color:** body whitish, with numerous large dark brown to black spots on head, body and fins; chest with 2 dark brown bands joining below pectoral fin bases; ventral edge of anal and caudal fins and leading edge of pelvic fins with white line and blackish submarginal band. **Size:** maximum length about 40 cm. **Distribution:** the Andaman Sea and western Pacific. **Remarks:** usually found on inshore silty reefs; less than 50 m. The enlarged fleshy pectoral fins appear to be related to its habit of sitting on the substrate, with its pectoral fins in contact with the bottom. (Y. Yusuf)

Epinephelus sexfasciatus, KAUM–I. 16888, 9.6 cm SL
off Terengganu (KT), 6 Dec. 2008

Epinephelus sexfasciatus (Valenciennes, 1828)

Sixbar Grouper

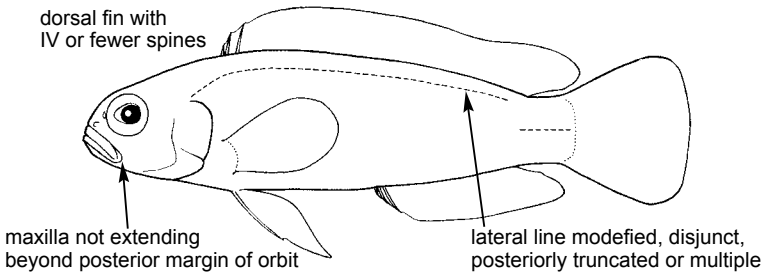
D XI, 14–16; A III, 8–9; P_1 17–19; LLp 46–51; GR 7–8 + 13–15. Body depth 2.7–3.2 in SL; anterodorsal head profile convex; preopercle with 2–4 greatly enlarged serrae at angle. Caudal fin rounded; pectoral fins not fleshy; pelvic fins not reaching to anus. Scales on body ctenoid except anterodorsally above lateral line, on thorax, and abdomen; maxilla naked. **Color:** head and body pale brownish gray, with 5 dark brown bars; scattered with pale spots may be present on body, and some faint small brown spots are often visible on the edges of the dark bars; soft dorsal, caudal, and anal fins with dark brown spots, pectoral fins grayish or dusky orange-red; jaws and ventral parts of the head sometimes pale reddish brown. **Size:** maximum length about 28 cm. **Distribution:** the Andaman Sea and western Pacific. **Remarks:** usually found on silty sand or muddy bottoms at depths of 10–80 m. (Y. Yusuf)

PSEUDOCHROMIDAE

Dottybacks

By Mizuki Matsunuma and Hiroyuki Motomura

Small to moderate fishes, up to 45 cm. Body moderately elongate and compressed. Mouth moderate, weakly protrusible; maxilla not extending beyond posterior margin of orbit. Dorsal fin with IV or fewer spines and 21–74 soft rays; base of fin long; pelvic fin (absent in some species) with one spine and 3–5 soft rays, inserted below or in front of pectoral fin. Branchiostegal rays 6, with a single ray articulating with posterior ceratohyal. Lateral line modified, disjunct, posteriorly truncated or multiple. **Color:** highly variable with stripes, spots, blotches or nearly plain in each species; colorful in most species; sexually dichromatic in some species.



Remarks: occurs in shallow intertidal areas to depths of about 100 m; preferring coral and rocky reefs. Feeds on fishes, crustaceans, molluscs, and worms. Sequental hermaphrodite in some species. Of commercial importance in aquarium trade in colorful species.

Similar families occurring in the area: Opistognathidae and Plesiopidae – dorsal fin with IX or more spines. Serranidae – opercle usually with 3 spines; dorsal fin with VII or more spines.

Pseudochromis fuscus Müller & Troschel, 1849

Dusky Dottyback

D III, 25–28; A III, 13–15; P_1 17–20; P_2 I, 5; LLp 23–36 + 4–13. Body elongate, relatively deep; caudal peduncle short; posterior margin of maxilla below pupil; lower lip interrupted at symphysis. Caudal fin rounded to truncate or emarginate. Lateral line disjunct; circumpeduncular scales usually 20; dorsal and anal fins with weakly to strongly developed scaly sheaths. **Color:** bright yellow to dark gray, usually with blue spots on nape and at least anterior part of body; upper part of body and dorsal fin sometimes abruptly yellow; caudal peduncle and fin sometimes abruptly pale. **Size:** 4 cm SL. **Distribution:** eastern Indian Ocean and West Pacific. **Remarks:** found on reef habitats at depths of 1–30 m. (M. Matsunuma)

Pseudochromis fuscus, KAUM–I. 16571, 6.2 cm SL
Bidong Island, 14 Oct. 2008

Pseudochromis ransonneti, UMTF 1336 (KAUM–I. 16564), 3.4 cm SL
Bidong Island, 14 Oct. 2008

Pseudochromis ransonneti Steindachner, 1870

Yellowbelly Dottyback

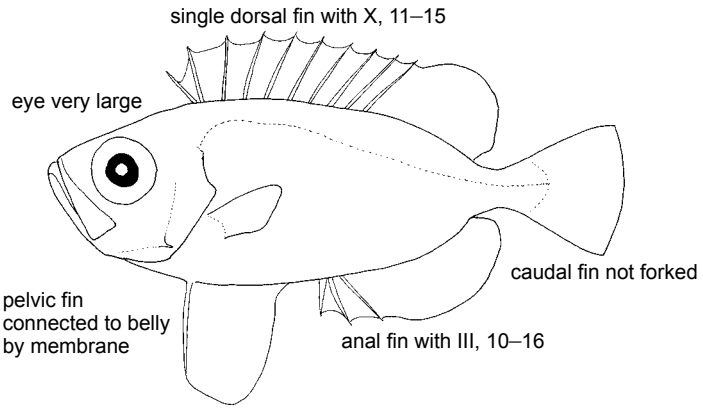
D III, 23–24; A III, 13–14; P_1 17–19; P_2 I, 5; LLp 25–32 + 6–14. Body elongate, moderately compressed; caudal peduncle short; posterior margin of maxilla below pupil; lower lip incomplete. Caudal fin rounded to emarginate. Lateral line disjunct; circumpeduncular scales 19–20; dorsal and anal fins without scaly sheaths. **Color:** bluish gray dorsally, pinkish or yellow ventrally; a dark gray to dark blue stripe extending from snout tip to anterior edge of eye; dorsal fin bluish gray with irregular pale blue markings; anal fin bluish gray with 3 or 4 indistinct yellow stripes. **Size:** 6 cm SL. **Distribution:** western Pacific. **Remarks:** found in coral and rocky reefs at depths of 1–20 m.

(M. Matsunuma)

PRIACANTHIDAE

Bigeyes

By Mizuki Matsunuma



Medium sized (up to 36 cm) marine fishes. Body deep, laterally compressed. Eye extremely large (about 1/2 head length); upturned mouth. Weak spine on posterior opercle and prominent to remnant spine at angle of preopercle. Branchiostegal rays 6. Total gill rakers on first gill arch 17–32. Dorsal fin single, with X spines and 11–15 soft rays; spinous and soft-rayed portions of fin continuous, relatively short to long, soft-rayed portion broadly rounded to broadly pointed. Anal fin with III spines and 10–16 soft rays; soft-rayed portion of fin relatively short to long and broadly rounded to broadly pointed. Caudal fin rounded, emarginate, or lunate, with 16 principal rays. Pectoral fin with 17–21 rays. Pelvic fins with I spine and 5 soft rays, broadly attached to belly by membrane and positioned in advance of pectoral fins. Head and body mostly covered with extremely adherent, rough, spiny scales. **Color:** head and body generally reddish, sometimes with silvery blotches or, in some species, occasionally a pattern of red and silver-white bars; fins reddish to dusky or black, occasionally yellowish in some species; some species with dark spots or speckling on fin membranes.

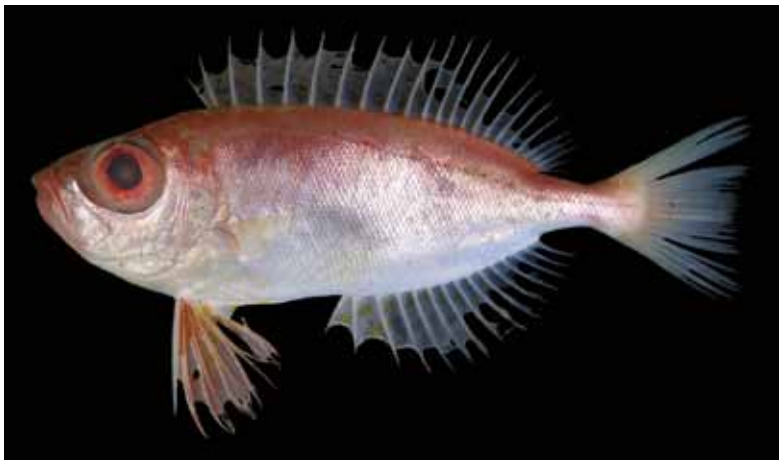
Remarks: occurring near coral reefs or rock formations but occasionally in more open areas at depths of 5–400 m, or deeper. Not important in most fisheries but some species occasionally common in trawl catches of southeast Asian waters.

Similar families occurring in the area: Holocentridae – opercular margin with spines; spinous and soft portions of dorsal fin separated; anal fin with IV spines; pelvic fin with a spine and usually 7 soft rays and not attached to belly by membrane; caudal fin deeply forked with 18–19 rays. Berycidae – dorsal fin with short base, only IV–VII spines; anal fin with IV spines; pelvic fin with 7–13 rays; caudal fin deeply forked. Pempheridae – dorsal-fin with short base, IV or V spines and 8 or 9 soft rays; anal fin with very long base, III spines and 22 or more soft rays.

Priacanthus macracanthus Cuvier, 1829

Brownspot Bigeye

D X, 12–14; A III, 13–14; P_1 18–19; LLp 72–82. Body relatively deep, ovate and compressed; anterior profile slightly asymmetrical, protruding lower jaw tip above midline of body; One strong spine at angle of preopercle. Caudal fin generally truncate. Scales modified; with posterior field elevated as a separate flange with spinules both on surface and posterior edge. **Color:** pinkish silver, reddish dorsally; fins pinkish; dorsal, anal and pelvic fins with numerous rusty yellow or yellowish brown spots, being equal to 1/ 2 of pupil diameter. **Size:** maximum length 35 cm. **Distribution:** widespread in the Indo-West Pacific. **Remarks:** found in around the sandy and rocky shore or open sandy bottom. Marketed fresh, dried, salted, and as fish balls.



Priacanthus macracanthus, KAUM–I. 17011, 13.8 cm SL
off Terengganu (KT), 15 Dec. 2008

Priacanthus tayenus Richardson, 1846

Purplespot

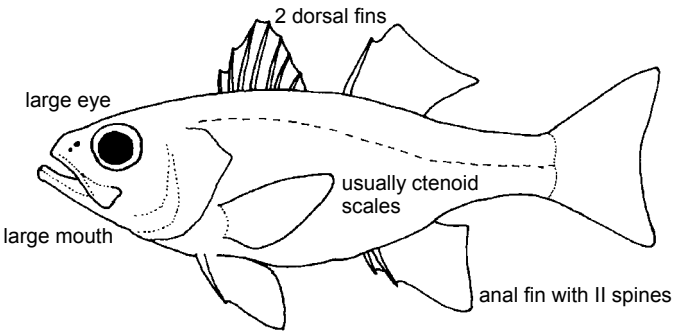
Priacanthus tayenus, KAUM–I. 16841, 14.8 cm SL
off Terengganu (KT), 5 Dec. 2008

D X, 12–14; A III, 13–14; P_1 18–19; LLp 72–82. Body moderately deep, laterally compressed. A strong spine at angle of preopercle. Caudal fin truncate but becoming very lunate in some males. Scales modified; scales ofmid-lateral region with elevated posterior field reduced and lacking spinules in larger specimens. **Color:** pinkish silver, reddish dorsally; fins pinkish; pelvic fins with numerous mall deep purple to inky black spots in membrane. **Size:** maximum length 29 cm. **Distribution:** the Andaman Sea and West Pacific. **Remarks:** found in around the sandy and rocky shore or open sandy bottom.

APOGONIDAE

Cardinalfishes

By Mizuki Matsunuma and Koichi Shibukawa



Small sized (up to about 20 cm) compressed and oblong or moderately elongate fishes. Eyes large; mouth large, oblique with variable dentition; a single opercular spine. Scales usually ctenoid, but cycloid in some groups and absent in *Gymnapogon* and *Paxton*; lateral line continuous, incomplete or absent in some groups. Two separated dorsal fins, the first with VI–VIII spines and the second with one spine and 8–14 soft rays (except for *Paxton* having a single dorsal fin); anal fin with II spines (except for *Paxton* with a single spine) and 8–18 soft rays; pelvic fin I, 5; caudal fin forked, emarginate, truncate, or rounded. **Color:** variable with patterns of colored stripes, reticulation, spots, vertical or diagonal bars, or nearly plain.

Remarks: chiefly inhabit marine coastal waters, but also found in fresh and brackish water areas in some groups.

Similar families occurring in the area: Ambassidae – a single dorsal fin but deeply notched, III anal-fin spines.

Apogon cavitensis (Jordan & Seale, 1907)

Caviti Cardinalfish

Apogon cavitensis, UMTF 1222 (KAUM–I. 16633), 4.2 cm SL
Bidong Island, 13 Oct. 2008

D VII + I, 9; A II, 8; LL 24. Body oblong, moderately deep and compressed; lateral line well developed. Snout moderately pointed. Posterior margin of preopercle serrated. No enlarged caninoid teeth on jaws. Base of anal fin subequal to base of second dorsal fin in length; caudal fin emarginate. **Color:** head and body pinkish, with narrow yellow stripe on back; yellow to bronze stripe with silvery white margins on mid-laterally; small black spot (much smaller than pupil) on front middle of caudal fin, which is smaller than pupil diameter; fins subtranslucent. **Size:** 8 cm SL. **Distribution:** western Pacific from Australia to Philippines. **Remarks:** found in silty coastal reefs to 20 m. (M. Matsunuma)

Apogon endekataenia Bleeker, 1852

Candystripe Cardinalfish

D VII + I, 9; A II, 8; P_1 14–15; LL 27–28; GR 2 + 10. Body oblong, moderately deep and compressed; lateral line well developed, extending posteriorly to caudal-fin base. Snout moderately pointed. Posterior margin of preopercle weakly serrated. No enlarged caninoid teeth on jaws. Base of anal fin subequal to base of second dorsal fin in length; caudal fin emarginate. **Color:** body pale white, with about 7 longitudinal yellowish brown stripes on body sides; fifth stripe (middle stripe) posteriorly reaching to caudal-fin base; a large black spot (about size of eye) at caudal-fin base; fins subtranslucent with pinkish rays. **Size:** 11 cm SL. **Distribution:** western Pacific from Australia to southern Japan. **Remarks:** found in coral and rocky reefs. (M. Matsunuma)

Apogon endekataenia, KAUM–I. 16634, 3.1 cm SL
Bidong Island, 13 Oct. 2008

Apogon endekataenia, KAUM–I. 16637, 5.9 cm SL
Bidong Island, 13 Oct. 2008

Apogon fasciatus (White, 1790)

Broadbanded Cardinalfish

D VII + I, 9; A II, 8; P_1 15–16 (usually 16); LL 24–25; GR 2–4 + 10–14. Body oblong, moderately deep and compressed; lateral line well developed, extending posteriorly to caudal-fin base. Snout moderately pointed. Posterior margin of preopercle serrated. No enlarged caninoid teeth on jaws. Base of anal fin subequal to base of second dorsal fin in length; caudal fin emarginate. **Color:** body pinkish, with two black stripes on body sides, the upper stripe extending from snout to the dorsal portion of the caudal-fin base, the lower stripe from snout extending onto caudal-fin margin; lower stripe (middle stripe) without extensional bar on lower margin; fins semitranslucent to pinkish; second dorsal and anal fins with an indistinct reddish brown stripe basally. **Size:** 5 cm SL. **Distribution:** widely distributed in the Indo-West Pacific, from the east coast of Africa to eastern Australia north to southern Japan. **Remarks:** found in coastal waters at depths of 2–128 m. (M. Matsunuma)

Apogon fasciatus, KAUM–I. 17223, 6.0 cm SL
off Terengganu (KT), 11 Jan. 2009

Apogon hyalosoma Bleeker, 1852

Humpbacked Cardinalfish

D VI + I, 9; A II, 8; P_1 14; LL 24–25; 1–3 + 6–7. Body deep, compressed; lateral line well developed, extending posteriorly to caudal-fin base. Snout moderately pointed; dorsal profile of head distinctly concaved, forming hump-back appearance. Posterior margin of preopercle serrated. No enlarged caninoid teeth on jaws. Base of anal fin subequal to base of second dorsal fin in length; caudal fin emarginate. **Color:** head and body gray dorsally, becoming silvery ventrally; a distinct, large (about size of eye) black spot at caudal-fin base; fins transparent, exclusive of anterodorsal margin of first dorsal fin black. **Size:** 12 cm SL. **Distribution:** Western Central Pacific. **Remarks:** inhabits estuaries, especially mangrove areas.

(K. Shibukawa)

Apogon hyalosoma, UMTF 1501 (KAUM–I. 16696), 8.2 cm SL
Setiu, 27 Oct. 2008

Apogon lineatus Temminck & Schlegel, 1842

Indian Perch

D VII + I, 9; A II, 8; P_1 14–16 (usually 15); LL 27; GR 2–3 + 11–12. Body oblong, moderately deep; lateral line well developed, extending posteriorly to caudal-fin base. Snout blunt. Posterior margin of preopercle serrated. No enlarged caninoid teeth on jaws. Base of anal fin subequal to base of second dorsal fin in length; caudal fin rounded, or slightly emarginate. **Color:** body pinkish to yellowish white, darker dorsally; 7–11 narrow dark brown bars on body sides; a dark bar on cheek; distal third to half of first dorsal fin black; second dorsal fin and caudal fins dusky with darker distal margin. **Size:** 8 cm SL. **Distribution:** Western Central Pacific. **Remarks:** found in sandy mud bottom of coastal waters. Belonging to subgenus *Jaydia*. (M.Matsunuma)

Apogon lineatus, KAUM–I. 16881, 4.8 cm SL
off Terengganu (KT), 6 Dec. 2008

Apogon nigrocincta, KAUM–I. 17267, 7.4 cm SL
off Terengganu (KT), 18 Jan. 2009

Apogon nigrocincta (Smith & Radcliffe, 1912)

D VII + I, 9; A II, 8; P_1 14; LL 24; GR 3 + 14. Body oblong, moderately deep and compressed; lateral line well developed, extending posteriorly to caudal-fin base. Snout moderately pointed. Posterior margin of preopercle serrated. No enlarged caninoid teeth on jaws. Base of anal fin subequal to base of second dorsal fin in length; caudal fin emarginate. **Color:** body plain light purplish brown; brown to black stripe on snout, from tip of lower jaw extending upper jaw to anterior margin of eye; a vertical dark bar on caudal fin base, with small black spot (much smaller than pupil) on middle; anterior distal margin of first dorsal fin reddish brown to black; second dorsal and anal fins with narrow reddish brown to black stripe basally; caudal fin reddish. **Size:** 9 cm SL. **Distribution:** Western Central Pacific. **Remarks:** found in coral and rocky reefs. (M. Matsunuma)

Apogon pleuron Fraser, 2005

D VII + I, 9; A II, 8; P1 15–16 (usually 15); LL 24–25; GR 3–5 + 13–17. Body oblong, moderately deep and compressed; lateral line well developed, extending posteriorly to caudal-fin base. Snout moderately pointed. Posterior margin of preopercle serrated. No enlarged caninoid teeth on jaws. Base of anal fin subequal to base of second dorsal fin in length; caudal fin emarginate. **Color:** body pinkish, with two black stripes on body sides, the upper stripe extending from snout to dorsal portion of caudal-fin base, the lower stripe from snout extending onto caudal-fin margin; lower stripe (middle stripe) with about 5–9 narrow vertical bars on lower edge. **Size:** 5 cm SL. **Distribution:** eastern Indian Ocean and West Central Pacific. **Remarks:** found in coastal waters at depths of 3–91 m. (M. Matsunuma)

Apogon pleuron, KAUM–I. 16928, 6.8 cm SL
off Terengganu (KT), 11 Dec. 2008

Apogon poecilopterus Cuvier, 1828

Pearly-finned Cardinalfish

D VII + I, 9; A II, 8; P_1 14-17; LL 27–29. Body oblong, moderately deep and compressed; lateral line well developed, extending posteriorly to caudal-fin base. Snout moderately pointed. Posterior margin of preopercle smooth. No enlarged caninoid teeth on jaws. Base of anal fin subequal to base of second dorsal fin in length; caudal fin truncate. **Color:** head and body gray, darkened dorsally, shading to silvery gray ventrally; several faint horizontal wavy lines on side of body; gill chamber and first gill arch dusky; distal part of first dorsal fin dusky; second dorsal fin with some series of small blackish gray spots; distal edge of caudal fin dusky. **Size:** 11 cm SL. **Distribution:** Indo-West Pacific. **Remarks:** found in inshore areas with sandy or muddy bottom. Belonging to subgenus *Jaydia*. (K. Shibukawa)

Apogon poecilopterus, KAUM–I. 17121, 8.0 cm SL
off Terengganu (KT), 31 Dec. 2008

Apogon seminigracaudus, UMTF 1413 (KAUM–I. 16560), 1.7 cm SL
Bidong Island, 13 Oct. 2008

Apogon seminigracaudus Greenfield, 2007

D VII + I, 9; A II, 8; P_1 14; LL 24; GR 4–5 + 13–15. Body oblong, moderately deep and compressed; caudal peduncle relatively long and low; lateral line well developed, extending posteriorly to caudal-fin base; one scale (plus 1/2 sometimes) between lateral line and base of third spine of first dorsal fin. Snout moderately pointed; anterior nasal pore without posterior flap. Posterior margin of preopercle serrated. No enlarged caninoid teeth on jaws. Base of anal fin subequal to base of second dorsal fin in length; caudal fin forked. **Color:** body semitransparent, pinkish to reddish; red gill filaments visual through opercle; blackish pigment on caudal peduncle increasing posteriorly, becoming black at caudal-fin base and onto lower caudal-fin lobe; upper caudal-fin lobe and the other fins pink to red. **Size:** 5 cm SL. **Distribution:** West Pacific, from the Gulf of Thailand east to Fiji and Tonga, north to southern Japan. **Remarks:** found in reefs on sand, silt, and algae. (M. Matsunuma)

Apogon truncatus Bleeker, 1854

Flagfin Cardinalfish

D VII + I, 9; A II, 8; P_1 16–17; LL 25; GR 1 + 10. Body oblong, moderately deep; lateral line well developed, extending posteriorly to caudal-fin base. Snout blunt. Posterior margin of preopercle serrated. No enlarged caninoid teeth on jaws. Base of anal fin subequal to base of second dorsal fin in length; caudal fin rounded. **Color:** body silvery white, darkish dorsally; 4–6 indistinct dark bars on body sides; a dark bar on cheek; distal half of 1st dorsal fin black; 2nd dorsal fin white, with black stripe marginally, a black stripe on middle; anal fin white with a black stripe on basally; caudal fin with black margin, white submarginally, yellowish basally. **Size:** 12 cm SL. **Distribution:** Indo-West Pacific. **Remarks:** found in sandy mud bottoms at depths of 50–80 m. Belonging to subgenus *Jaydia*. (M. Matsunuma)

Apogon truncatus, KAUM–I. 17203, 12.4 cm SL
off Terengganu (KT), 10 Jan. 2009

Apogonichthyoides niger (Döderlein, 1883)

D VII + I, 9; A II, 8; P_1 15; LLp 26; GR 2 + 8. Body oblong, deep and compressed; lateral line well developed, extending posteriorly to caudal fin base. Snout blunt. Posterior margin of preopercle serrated. No enlarged caninoid teeth on jaws. Base of anal fin subequal to base of second dorsal fin in length; posterior tip of pelvic fin extending beyond anal fin origin when depressed; caudal fin slightly emarginate. **Color:** head and body dusky gray, darker dorsally; eye pale yellow. **Size:** 10 cm SL. **Distribution:** West Central Pacific. **Remarks:** Fraser and Allen (2010) placed this species in genus *Apogonichthyoides*, previously treated as synonym of *Apogon*.
(M. Matsunuma)

Apogonichthyoides niger, KAUM–I. 17296, 6.3 cm SL
off Terengganu (KT), 20 Jan. 2009

Archamia fucata (Canton, 1849)

Orangelined Cardinalfish

D VII, 9; A II, 15–17; P_1 13–15; LLp 25. Body oblong, moderately deep and compressed; lateral line well developed, extending posteriorly to caudal fin base. Snout moderately pointed. Posterior margin (at least posteroventral corner) of preopercle serrated. No enlarged caninoid teeth on jaws. Base of anal fin longer than base of second dorsal fin in length; caudal fin emarginate. Scaly sheath developed around base of anal fin. **Color:** body translucent gray with a large black spot (near eye-sized) at caudal fin base; 20–23 narrow, curved oblique orange lines on body; fins largely transparent. **Size:** 7 cm SL. **Distribution:** Indo-Pacific. **Remarks:** inhabits coral and rocky reefs. (K. Shibukawa)

Archamia fucata, KAUM–I. 16647, 5.7 cm SL
Bidong Island, 13 Oct. 2008

Cheilodipterus quinquelineatus Cuvier, 1828

Five-lined Cardinalfish

D VI + I, 9; A II, 8; P_1 12–13; LL 26–28. Body relatively elongate, compressed; lateral line well developed, extending posteriorly to caudal-fin base. Snout moderately pointed. Posterior margin of preopercle serrated (maybe near smooth in large specimen). Some enlarged, fang-like canines on jaws, but canines absent around lower-jaw symphysis. Base of anal fin subequal to base of second dorsal fin in length; caudal fin emarginate. **Color:** body with 4–5 broad dusky longitudinal stripes (distinctly narrower than paler interspaces); a small black spot (smaller than pupil) encircled by yellow at caudal-fin base; anterodorsal part of first dorsal fin tinged with black. **Size:** 10 cm SL. **Distribution:** Indo-West Pacific. **Remarks:** inhabits coral reefs.

(K. Shibukawa)

Cheilodipterus quinquelineatus, UMTF 1012 (KAUM–I. 16596), 4.8 cm SL
Bidong Island, 12 Oct. 2008

Ostorhinchus cooki Macleay, 1881

Cook's Cardinalfish

D VII + I, 9; A II, 8; P_1 15; LL 24. Body oblong, moderately deep and compressed; lateral line well developed, extending posteriorly to caudal-fin base. Snout moderately pointed. Posterior margin of preopercle serrated. No enlarged caninoid teeth on jaws. Base of anal fin subequal to base of second dorsal fin in length; caudal fin emarginate. **Color:** head and body pale with 6 longitudinal dark brown stripes with various widths; 3rd stripe short and extends from dorsal margin of eye to, or slightly beyond, a vertical through origin of second dorsal fin; a dusky rounded spot (larger than pupil) at caudal-fin base; fins subtranslucent or a little tinged with red. **Size:** 8 cm SL. **Distribution:** Indo-Pacific. **Remarks:** inhabits rocky or coral reefs. Randall (2005) placed this species in genus *Ostorhinchus*, previously treated as subgenus of *Apogon*.

(K. Shibukawa)

Ostorhinchus cooki, UMTF 1057 (KAUM–I. 16410), 4.7 cm SL
Dungun, 24 Sept. 2008

Ostorhinchus cyanosoma (Bleeker, 1853)

Yellow-striped Cardinalfish

D VII + I, 9; A II, 8; P_1 14; LL 28; GR 6–7 + 15–16. Body oblong, moderately deep and compressed; lateral line well developed, extending posteriorly to caudal-fin base. Snout moderately pointed. Posterior margin of preopercle serrated. No enlarged caninoid teeth on jaws. Base of anal fin subequal to base of second dorsal fin in length; caudal fin emarginate. **Color:** head and body pale with 6 longitudinal yellow stripes with various; 3rd stripe short and extends from dorsal margin of eye to, or slightly beyond, a vertical through origin of second dorsal fin; 4th (middle stripe) stripe reaching onto caudal fin margin; a narrow stripe on whitish interspace on cheek and flank. **Size:** 8 cm SL. **Distribution:** Indo-Pacific. **Remarks:** inhabits rocky or coral reefs. Randall (2005) placed this species in genus *Ostorhinchus*, previously treated as subgenus of *Apogon*.

(M. Matsunuma)

Ostorhinchus cyanosoma, KAUM–I. 16632, 4.3 cm SL
Bidong Island, 13 Oct. 2008

Pristicon trimaculatus (Cuvier, 1828)

Cheekbar Cardinalfish

D VI + I, 9; A II, 8; P_1 14; LL 25–26; GR 2 + 10. Body deep, compressed; lateral line well developed, extending posteriorly to caudal-fin base. Snout moderately pointed; dorsal profile of head almost straight. Posterior margin of preopercle serrated. No enlarged caninoid teeth on jaws. Base of anal fin subequal to base of second dorsal fin in length; caudal fin emarginate. **Color:** body dark reddish brown with 3 dark saddle bands below dorsal fins; a small black spot on opercle; a small black spot at caudal-fin base. **Size:** 12 cm SL. **Distribution:** West Central Pacific. **Remarks:** found in coastal reefs.

Pristicon trimaculatus, KAUM–I. 17046, 10.5 cm SL
off Terengganu (KT), 18 Dec. 2008

Randall (2005) placed this species in genus *Pristicon*, previously treated as subgenus of *Apogon*.

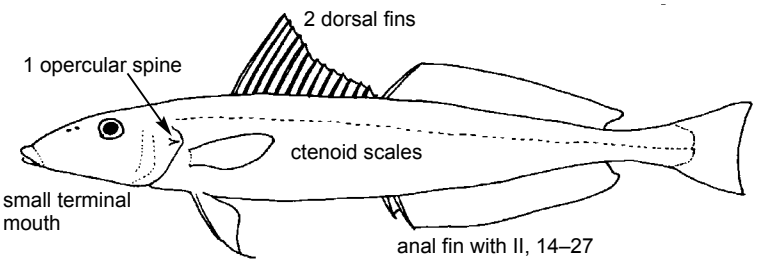
(M. Matsunuma)

SILLAGINIDAE

Sillagos (Smelts, Whitings)

By Mizuki Matsunuma

Moderate-sized (up to 70 cm) elongate perciform fishes. Opercle with small sharp spine; lower part of preopercle horizontal. Snout long and conical. Mouth small, terminal; end of upper jaw sliding below preorbital bone. Teeth villiform, in broad bands; small teeth on roof of mouth restricted to anterior part of vomer, none on palatines. Two separate dorsal fins, the first with 9–12 slender spines; the second with I spine and 16–27 soft rays; anal fin long, with II weak spines and 14–27 soft rays; caudal fin emarginate. Scales small, ctenoid; lateral line slightly arched. Swimbladder absent or vestigial to highly complex with various extensions. **Color:** silvery to sandy gray or green, sometimes with black spots on body and pectoral fin base.



Remarks: bottom-dwelling, schooling fishes; found in inshore brackish estuaries and shallow coastal waters.

Similar families occurring in the area: Branchiostegidae – a single continuous dorsal fin; mouth large with fleshy lips. Pinguipedidae – dorsal fin spines short; spinous dorsal fin sometimes joined to soft dorsal fin; pelvic fin base in advance of pectoral fin base.

Sillago aeolus Jordan & Evermann, 1902

Oriental Sillago

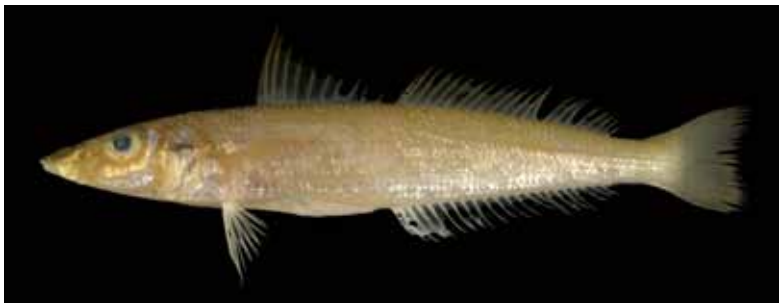
D XI + I, 18–20; A II, 17–19; LL 67–72. Body elongate, subcylindrical, covered with ctenoid scales. First pelvic-fin ray normal, not thickened club-like structure; caudal fin slightly forked with rounded tips. Swimbladder with 3 rudimentary anterolateral extensions instead of 4; no divided posterior extension. **Color:** body silvery, with scattered dark brown elongate blotches on body sides; pelvic fin yellowish; caudal fin dusky. **Size:** 30 cm. **Distribution:** Indo-West Pacific. **Remarks:** found in coastal inshore waters.

Sillago aeolus, KAUM–I. 17060, 15.3 cm SL
off Terengganu (KT), 26 Dec. 2008

Sillago asiatica McKay, 1983

Asian Sillago

D XI + I, 20–21; A II, 21–23; LL 67–70. Body elongate, subcylindrical, covered with ctenoid scales. First pelvic-fin ray normal, not thickened club-like structure; caudal fin relatively small, slightly forked with rounded tips. Swimbladder with 3 anterior extensions, the middle one projecting forwards and the anterolateral ones recurved backwards up to 1/2 length of swimbladder; a single posterior extension. **Color:** body silvery, brownish dorsally; somewhat with an indistinct pale midlateral band; upper and lower margins of caudal fin dark brown to almost black. **Size:** 16 cm. **Distribution:** West Central Pacific. **Remarks:** found in inshore waters.

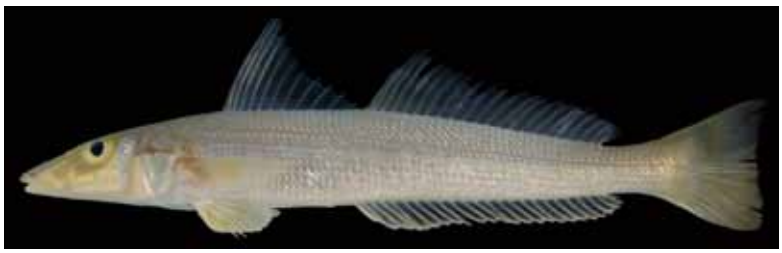


Sillago asiatica, KAUM–I. 17062, 15.7 cm SL
off Terengganu (KT), 26 Dec. 2008

Sillago chondropus Bleeker, 1849

Clubfoot Sillago

D XI–XII + I, 20–21; A II, 22–23; LL 66–73. Body elongate, subcylindrical, covered with ctenoid scales. First pelvic-fin ray modified into a laterally compressed thickened club-like structure; caudal fin truncate. Swimbladder reduced in size, no duct-like process from the ventral surface to the urogenital aperture. **Color:** body silvery, head yellowish; pectoral and pelvic fins yellowish; distal margin of anal fin yellowish; caudal fin dusky. **Size:** 35 cm. **Distribution:** Indo-West Pacific. **Remarks:** found in shallow coastal waters. Marketed fresh.

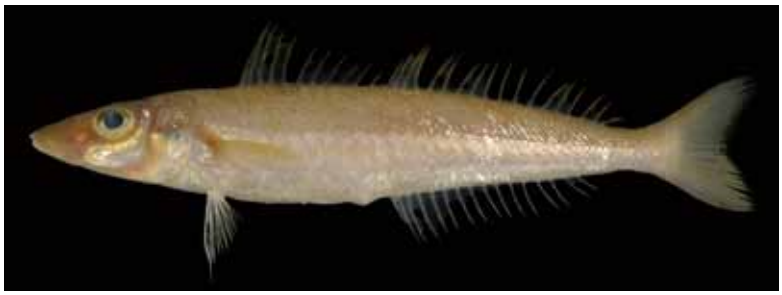


Sillago chondropus, UMTF 1346 (KAUM–I. 16545), 19.1 cm SL
beach near UMT, 8 Oct. 2008

Sillago ingenuua McKay, 1985

Bay Sillago

D XI + I, 17; A II, 17; LL 66–70. Body elongate, subcylindrical; cheek covered with ctenoid scales. First pelvic-fin ray normal, not thickened club-like structure; caudal fin relatively large, moderately emarginate. Swimbladder with a short median anterior extension and about 5 small pointed anterolateral projections. **Color:** body silvery, brownish dorsally; no markings on body sides; dorsal fins brownish distally. **Size:** 20 cm. **Distribution:** eastern Indian Ocean and West Pacific. **Remarks:** found in inshore coastal waters. Marketed fresh.



Sillago ingenuua, KAUM–I. 17061, 16.7 cm SL
off Terengganu (KT), 26 Dec. 2008

Sillago sihama, KAUM–I. 16678, 19.8 cm SL
Kemaman, 21 Oct. 2008

Sillago sihama (Forsskål, 1775)

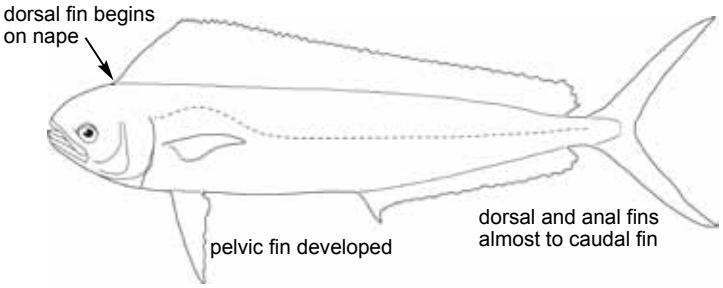
Silver Sillago

D XI + I, 20–23; A II, 21–23; LL 66–72. Body elongate, subcylindrical. First pelvic-fin ray normal; caudal fin truncate to almost rounded. Swimbladder with 2 anterior extensions extending forward and diverging to terminate on each side of the basioccipital; 2 lateral extensions commence anteriorly; 2 posterior tapering extensions of the swimbladder project into caudal region. **Color:** body silvery, brownish dorsally; no markings on body sides; pelvic fin yellow; distal margin of anal fin broadly yellow; caudal fin brownish. **Size:** 30 cm. **Distribution:** Indo-West Pacific. **Remarks:** found in inshore coastal waters.

CORYPHAENIDAE

Dolphinfishes ("dolphins")

By Mizuki Matsunuma



Large sized (up to 2.1 m) marine fishes. Body elongate, compressed. Mouth large, with many fine teeth in bands; adult males develop a bony crest on front of head. Lateral line curved upward above pectoral fins. Dorsal and anal fins very long, continuing almost to caudal fin, without sharp spines, or finlets; dorsal-fin origin on nape; anal-fin origin at or before midpoint of body; caudal fin deeply forked, without any keels on fin or caudal peduncle; pelvic fins fitting into a groove on body. Scales small and cycloid. **Color:** in life very variable, sides with golden hues and back brilliant metallic greens and blues; numerous small, black spots on head and body; specimens less than 15 cm have dark vertical bars.

Remarks: pelagic fishes. Feed on small fishes and crustaceans associated with floating weed. Taken by both commercial and recreational fisheries wherever they occur.

Similar families occurring in the area: none. No other fishes have a combination of characters such as dorsal fin from nape almost to caudal fin; anal fin from about midpoint of body almost to caudal fin; no sharp spines in dorsal and anal fins; caudal fin deeply forked; and pelvic fins well developed.

Coryphaena hippurus Linnaeus, 1758

Common Dolphinfish

D 55–67; A 25–30; P_1 17–20; LL 200–300. Body elongate and compressed, greatest body depth in adults less than 25% SL; head profile becoming vertical with development of a bony crest with growth, in males. Tooth patch on tongue small and oval. Dorsal fin long, extending from above eyes almost to caudal fin; anal fin concave, extending from anus almost to caudal fin; pectoral and pelvic fins large; caudal fin deeply forked. **Color:** back brilliant metallic blue-green in life, after death fading to gray with a green tinge; sides silvery with a golden sheen, and 1 row of dark spots or golden blotches running below dorsal fin and 1, 2, or more rows on and below lateral line, some scattered irregularly; dorsal and anal fins black, the latter with a white edge; pectoral fins pale; caudal fin silvery with a golden sheen. **Size:** commonly 1 m, maximum about 2 m. **Distribution:** worldwide in tropical and subtropical seas. **Remarks:** pelagic, inhabiting open waters, but also approaching the coast. Marketed fresh.

Coryphaena hippurus, KAUM–I. 17213, 45.0 cm SL off Terengganu (KT), 10 Jan. 2009

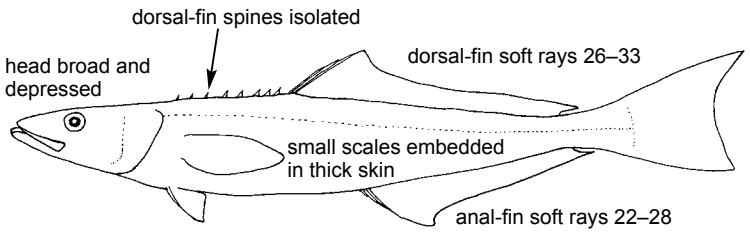
RACHYCENTRIDAE

Cobia

By Hiroyuki Motomura

This family is represented by a single species; see the following species account.

Similar families occurring in the area: Echeneidae – dorsal fin spines absent. Sucking disc present. Carangidae – II detached spines in front of anal fin.



Rachycentron canadum (Linnaeus, 1766)

Cobia

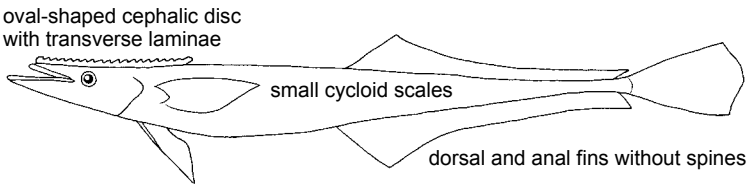
D VII–IX, 26–33; A II–III, 22–28; P_1 21–22; P_2 I, 5. Body elongate, subcylindrical, body depth 5.6–8.0 in standard length. Head broad and depressed; sucking disc absent. Dorsal fin spines short, not connected by a membrane; longest dorsal fin soft rays shorter than longest anal fin soft rays. Caudal fin truncate in young, progressively more emarginate with growth. Pectoral fins pointed, becoming more falcate with growth. Scales small, embedded in thick skin; lateral line slightly wavy anteriorly. **Color:** body grayish to blackish dorsally, whitish to grayish ventrally, with a pale gray stripe from front of snout through eye to upper caudal peduncle and a faint dark stripe on lower side of trunk. **Size:** maximum total length about 2 m. **Distribution:** circumglobal in tropical to warm temperate seas, except for the eastern Pacific. **Remarks:** semipelagic, but also found over shallow coral and rocky reefs, occasionally in estuaries. Occurs more in continental than insular waters.

Rachycentron canadum, KAUM–I. 16991, 27.0 cm SL off Terengganu (KT), 14 Dec. 2008

ECHENEIDAE

Remoras

By Hiroyuki Motomura



Medium-sized (up to 90 cm), elongate and fusiform fishes. Head wide, depressed; a transversely laminated, oval-shaped cephalic disc. Opercle without spines. 8–11 branchiostegal; rays. Dorsal fin with 18–45 soft rays. Anal fin with 18–41; dorsal and anal fin bases long, lacking spines. Caudal fin slightly forked, emarginate, or slightly rounded in adults; with elongate median caudal fin filament in juveniles of some species. Pectoral fin with 18–32 rays. Pelvic fin with I spine and 5 soft rays. Scales small, cycloid, usually embedded in skin. No swimbladder. **Color:** body brown, grayish to black, sometimes whitish, with light and dark longitudinal stripes on trunk.

Remarks: attaching to other fishes, cetaceans, sea turtles, whales, or dolphins with a sucking disc on head; a great preference or specificity toward certain hosts in some species. Feeds on parasitic copepods attached to a host and food scraps dropped by the host. No commercial importance, but some species are taken in coastal fisheries along with other fishes and sold in local markets.

Similar families occurring in the area: no other family of fishes has a sucking disc on dorsally on the head.

Echeneis naucrates Linnaeus, 1758

Sharksucker

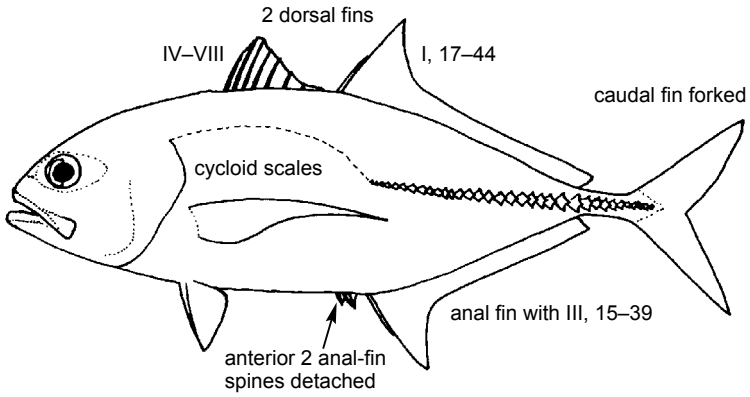
D 34–42; A 31–41; P_1 21–24; P_2 I, 5; LGR 11–16. Body elongate, body depth 8–14 in standard length. Sucking disc large, with 18–28 laminae. Caudal fin lanceolate in young, middle rays elongate and filamentous; almost truncate in adults, with upper and lower lobes longer than middle rays. Pectoral fins pointed. **Color:** body gray to blackish, with a white-edged black stripe from tip of lower jaw to caudal fin base. Upper and lower margins of fins whitish in juveniles. Pectoral fins blackish. Pelvic fins grayish to whitish. **Size:** maximum standard length about 1 m. **Distribution:** circumglobal in tropical to warm temperate seas, except for Pacific coast of America. **Remarks:** attaching temporarily to a wide variety of hosts such as sharks, sea turtles and ships. Often found free-swimming and occurring in inshore waters.

Echeneis naucrates, KAUM–I. 17004, 23.2 cm SL
off Terengganu (KT), 14 Dec. 2008

CARANGIDAE

Jacks (Scads, Trevallies)

By Seishi Kimura



Medium to large sized marine fishes; maximum size about 2 m. Body shape extremely variable, ranging from elongate and fusiform to deep and strongly compressed. Adipose eyelid developed in some species; jaw teeth small, villiform, or absent in some species. Two dorsal fins, the first with IV–VIII spines (obsolete or embedded in adult of some species) and the second with one spine and 17–44 soft rays; anal fin usually with III spines, the anterior two (rarely only one) detached from the rest of the fin (becoming embedded in adults of some species), and 15–39 soft rays; caudal fin forked; pectoral fin usually long, extending beyond a vertical through second dorsal-fin origin except for some species; pelvic fin I, 5. Scales small cycloid in most species; scutes present and prominent on the lateral line in most species, but reduced in some species and absent in some genera. Vertebral counts 24–27. **Color:** body silvery, darker (brownish or greenish) dorsally, paler ventrally; dark bars or spots on body, and/or yellowish fins in some species.

Remarks: occurring in tropical to temperate marine, estuarine, and sometimes freshwater areas. Almost all species having commercial importance.

Similar families occurring in the area: Carangidae is distinguished from the following similar families in having 2 detached anal fin spines (sometimes completely embedded in adults in several genera), and enlarged scutes usually along at least posterior lateral line. Centrolophidae and Lactariidae – no detached anal fin spine; no scutes in the lateral line. Scombridae – dorsal-fin spines IX–XXVII; no detached anal fin spine; no scutes in the lateral line. Stromateid genus *Pampus* very similar to *Parastromateus niger* in body shape, but the former lacking a lateral keel of scutes at caudal peduncle.

Alectis ciliaris (Bloch, 1787)

African Pompano

D IV–VII (embedded) + I, 18–20; A II (embedded) + I, 15–17; GR 4–6 + 12–17 = 18–22; V 10 + 14. Body deep, strongly compressed, diamond shaped in juvenile, becoming more elongated with growth; profile of forehead to nape rounded; anterior soft rays of dorsal and anal fins very long, filamentous in juveniles; pelvic fins elongated in juveniles; body superficially naked, scales minute and embedded where present; straight part of lateral line with scutes (8–30) only posteriorly. **Color:** body silvery bluish or grayish dorsally, silvery white ventrally; 5 chevron-shaped blackish bands on body in juveniles; a black botch at base of anterior soft portion of dorsal fin. **Size:** maximum length about 150 cm. **Distribution:** worldwide in tropical seas. **Remarks:** occurring in coastal waters; feeds mainly on fishes and crustaceans.

Alectis ciliaris, KAUM–I. 17210, 16.8 cm SL
off Terengganu (KT), 10 Jan. 2009

Alectis indicus (Rüppell, 1830)

Indian Threadfish

D V–VI (embedded) + I, 18–20; A II (embedded) + I, 15–17; GR 7–11 + 21–26 = 29–37; V 10 + 14. Body deep, strongly compressed, diamond shaped in juvenile, becoming more elongated with growth; profile of forehead to nape somewhat angular; anterior soft rays of dorsal and anal fins very long, filamentous in juveniles; pelvic fins elongated in juveniles; body superficially naked, scales minute and embedded where present; straight part of lateral line with scutes (6–13) only posteriorly. **Color:** body silvery greenish or grayish dorsally, silvery white ventrally; dark bands on body in juveniles; anal fin yellowish. **Size:** maximum length about 160 cm. **Distribution:** widely in Indo-West Pacific, from East Africa to New Guinea, north to southern Japan. **Remarks:** occurring in coastal waters; feeds mainly on fishes, squids, and crustaceans.

Alectis indicus, KAUM–I. 17215, 9.1 cm SL
off Terengganu (KT), 11 Jan. 2009

Alepes djedaba (Forsskål, 1775)

Shrimp Scad

D VIII + I, 23–26; A II + I, 18–21; GR 10–14 + 25–33 = 35–47; V 10 + 14. Body oblong, compressed; dorsal and ventral profiles almost equally convex; snout pointed; adipose eyelid well developed on posterior half of eye; a single row of small slender teeth on both jaws; straight part of lateral line almost entirely with scutes (39–51 following 0–3 cycloid scales), longer than curved part (31–36 cycloid scales + 0–3 scutes). **Color:** body silvery blue dorsally, silvery white ventrally; a distinct black spot on upper margin of opercle. **Size:** maximum length about 40 cm. **Distribution:** widely in Indo-Pacific, from East Africa to Hawaii, north to southern Japan, south to Australia. **Remarks:** occurring in coastal waters; feeds mainly on crustaceans and small fishes.

Alepes djedaba, KAUM–I. 17077, 9.0 cm SL
off Terengganu (KT), 27 Dec. 2008

Alepes melanoptera (Swainson, 1839)

Blackfin Scad

D VIII + I, 23–26; A II + I, 18–21; GR 7–9 + 17–24 = 24–30; V 10 + 14. Body deep, compressed; dorsal and ventral profiles almost equally convex; snout rounded; adipose eyelid well developed on posterior half of eye; a single row of small slender curved teeth on both jaws; straight part of lateral line almost entirely with scutes (49–69 following 0–4 cycloid scales), longer than curved part (31–50 cycloid scales + 0–2 scutes). **Color:** body silvery blue or green dorsally, silvery white ventrally; a large black spot on upper margin of opercle; first dorsal fin black. **Size:** maximum length about 25 cm. **Distribution:** Indo-West Pacific, from the Persian Gulf to western Indonesia, north to southern China. **Remarks:** occurring in inshore waters; feeds mainly on shrimps and copepods.

Alepes melanoptera, KAUM–I. 16906, 14.3 cm SL
off Terengganu (KT), 6 Dec. 2008

Alepes vari (Cuvier, 1833)

Herring Scad

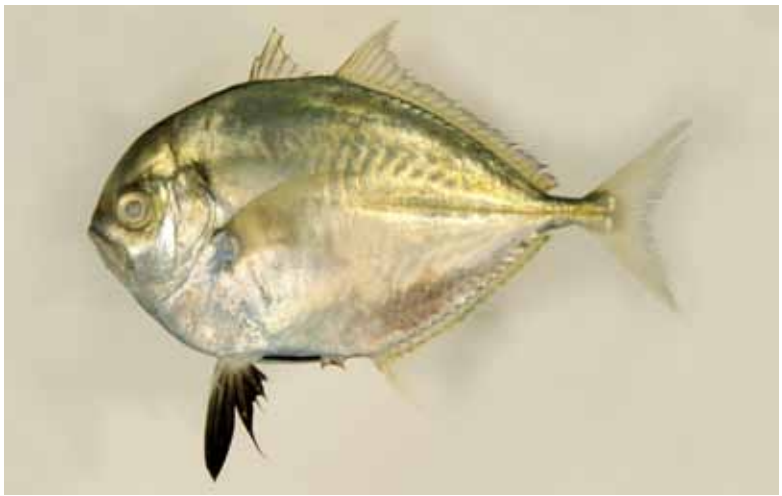
D VIII + I, 23–27; A II + I, 20–23; GR 9–12 + 23–27 = 32–38; V 10 + 14. Body oblong, compressed; dorsal and ventral profiles almost equally convex; snout pointed; adipose eyelid well developed on posterior half of eye; a single row of small slender curved teeth on both jaws; straight part of lateral line almost entirely with scutes (48–69 following 0–7 cycloid scales), longer than curved part (42–50 cycloid scales + 0–2 scutes). **Color:** body silvery blue or green dorsally, silvery white ventrally; a diffuse dark spot on upper margin of opercle. **Size:** maximum length about 50 cm. **Distribution:** widely in Indo-West Pacific, from Red Sea to northern Australia, north to southern Japan. **Remarks:** occurring in shallow waters; feeds mainly on shrimps and fishes.

Alepes vari, KAUM–I. 17287, 32.0 cm SL
off Terengganu (KT), 19 Jan. 2009

Atropus atropos (Bloch & Schneider, 1801)

Cleftbelly Trevally

D VIII + I, 19–22; A II + I, 17–18; GR 8–11 + 19–23 = 29–34; V 10 + 14. Body deep, ovate, strongly compressed; nape strongly convex; a deep mid-ventral groove on belly, accommodating pelvic fins and anal-fin spines; adipose eyelid not developed; upper jaw with a narrow band of small teeth, lower jaw with a single series of small teeth; central rays of second dorsal and anal fins produced into filaments in adult male; pelvic fins long; straight part of lateral line entirely with scutes (31–37), longer than curved part. **Color:** body bluish green dorsally, silvery ventrally; pelvic fins black. **Size:** maximum length about 50 cm. **Distribution:** Indo-West Pacific, from Arabian Gulf to Philippines, north to southern Japan. **Remarks:** occurring in shallow waters; feeds mainly on shrimps and copepods.



Atropus atropos, KAUM–I. 17202, 10.5 cm SL
off Terengganu (KT), 10 Jan. 2009

Atule mate, KAUM–I. 17003, 11.1 cm SL
off Terengganu (KT), 14 Dec. 2008

Atule mate (Cuvier, 1833)

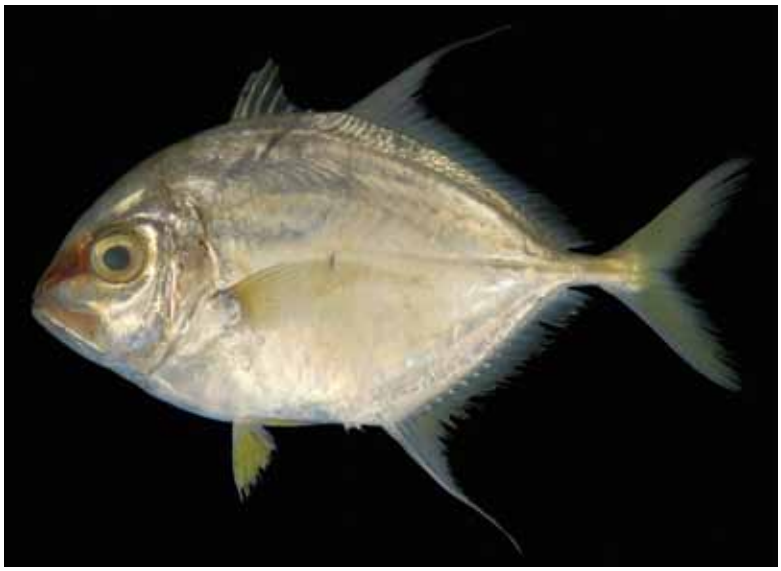
Yellowtail Scad

D VIII + I, 22–25; A II + I, 18–21; GR 10–13 + 24–31 = 36–44; V 10 + 14. Body elongate oval, moderately compressed; dorsal and ventral profiles almost equally convex; snout pointed; adipose eyelid well developed and completely covering eye except for a vertical slit centered on pupil; shoulder girdle (cleithrum) margin smooth; last rays of dorsal and anal fins about twice as long as penultimate rays and more separated; straight part of lateral line almost entirely with scutes (36–49), shorter than curved part. **Color:** body silvery olive-green dorsally, silvery white ventrally; a black spot posteriorly on opercle; caudal fin yellow. **Size:** maximum length about 30 cm. **Distribution:** widely in Indo-Pacific, from East Africa to Hawaii. **Remarks:** occurring in schools at depths to about 50 m.

Carangoides coeruleopinnatus (Rüppell, 1830)

Coastal Trevally

D VIII + I, 20–23; A II + I, 16–20; GR 5–8 + 15–19 = 21–27; V 10 + 14. Body ovate, strongly compressed; dorsal profile more strongly convex than ventral profile; breast widely naked to pectoral-fin base and behind insertion of pelvic fins, but naked area not extending above pectoral-fin base; rarely scaled area present between pectoral-fin base and breast; anterior second dorsal- and anal-fin rays elongated, filamentous in juveniles, becoming shorter with growth: straight part of lateral line shorter than curved part, with 16–20 week scutes posteriorly. **Color:** body silvery blue-gray dorsally, silvery white ventrally, with numerous small yellow spots laterally; dark blotch usually on upper margin of opercle. **Size:** maximum length about 40 cm. **Distribution:** widely in Indo-Pacific, from East Africa to Fiji, north to southern Japan. **Remarks:** occurring in deep coastal waters.



Carangoides coeruleopinnatus, KAUM–I. 17251, 11.8 cm SL
off Terengganu (KT), 17 Jan. 2009

Carangoides gymnostethus (Cuvier, 1833)

Bludger

D VIII + I, 28–32; A II + I, 24–27; GR 7–9 + 19–22 = 27–31; V 10 + 14–15. Body ovate, deep, compressed in young, becoming elongate and subcylindrical with growth; dorsal profile of head and nape gently convex; breast naked ventrally beyond insertion of pelvic fins; lateral naked area extending to pectoral fin base; lobes of second dorsal and anal fins falcate; straight part of lateral line shorter than curved part, with 21–37 week scutes posteriorly. **Color:** body silvery greenish tan dorsally, silvery white ventrally; a few yellow spots sometimes laterally on body. **Size:** maximum length about 80 cm. **Distribution:** widely in Indo-West Pacific, from East Africa to New Caledonia, north to southern Japan. **Remarks:** occurring in offshore reefs; feeds mainly on crustaceans and small fishes.

Carangoides gymnostethus, KAUM–I. 17105, 16.6 cm SL
off Terengganu (KT), 28 Dec. 2008

Carangoides gymnostethus, KAUM–I. 16907, 16.4 cm SL
off Terengganu (KT), 6 Dec. 2008

Carangoides hedlandensis (Whitley, 1934)

Bumpnose Trevally

D VIII + I, 19–22; A II + I, 16–18; GR 6–11 + 14–17 = 20–27; V 10 + 14. Body deep, strongly compressed; dorsal contour of forehead convex, with "bump" on interorbital space; breast widely naked to pectoral fin base and behind insertion of pelvic fins, but naked area not extending above pectoral fin base; second dorsal- and anal-fin soft rays produced into filaments in adult males; straight part of lateral line shorter than curved part, with 17–29 week scutes posteriorly. **Color:** body silvery blue-gray or green-gray dorsally, silvery white ventrally; a black spot on upper margin of opercle; caudal fin yellowish. **Size:** maximum length about 30 cm. **Distribution:** widely in Indo-Pacific, from South Africa to Samoa, north to southern Japan. **Remarks:** occurring in coastal waters.

Carangoides hedlandensis, KAUM–I. 16910, 24.0 cm SL
off Terengganu (KT), 6 Dec. 2008

Carangoides malabaricus (Bloch & Schneider, 1801)

Malabar Trevally

D VIII + I, 20–23; A II + I, 17–19; GR 7–12 + 21–27 = 32–38; V 10 + 14. Body ovate, strongly compressed; dorsal profile more strongly convex than ventral profile; naked area of breast very wide, extending dorsally beyond pectoral fin base and posteriorly beyond insertion of pelvic fins, usually extending to anal-fin origin; straight part of lateral line shorter than curved part, with 19–36 week scutes posteriorly. **Color:** body silvery blue-gray dorsally, silvery white ventrally, dark or black blotch on upper margin of opercle. **Size:** maximum length about 60 cm. **Distribution:** widely in Indo-West Pacific, from South Africa to northern Australia, north to southern Japan. **Remarks:** occurring in coastal waters.

Carangoides malabaricus, KAUM–I. 17250, 11.9 cm SL
off Terengganu (KT), 17 Jan. 2009

Caranx sexfasciatus Quoy & Gaimard, 1825

Bigeye Trevally

D VIII + I, 19–22; A II + I, 14–17; GR 6–8 + 15–19 = 21–25; V 10 + 15. Body oblong, compressed; dorsal profile moderately convex anteriorly, ventral profile slightly convex; adipose eyelid developed on posterior half of eye; posterior end of upper jaw extending to or beyond posterior margin of eye; breast completely scaled; straight part of lateral line almost entirely with scutes (27–36). **Color:** body silvery yellowish-green dorsally, silvery white ventrally; small black opercular spot; anal and caudal fins yellowish; scutes dark or black. **Size:** maximum length about 120 cm. **Distribution:** widely in Indo-Pacific and tropical eastern Pacific Ocean. **Remarks:** found in coastal waters; juveniles occurring in brackish waters; feeds mainly on fishes and crustaceans.

Caranx sexfasciatus, KAUM–I. 17286, 24.5 cm SL
off Terengganu (KT), 19 Jan. 2009

Decapterus macrosoma Bleeker, 1851

Shortfin Scad

D VIII + I, 32–38 +1; A II + I, 26–30 + 1; GR 10–12 + 34–38 = 43–50; V 10 + 14. Body elongate, slender, cylindrical; adipose eyelid well developed and completely covering eye except for a vertical slit centered on pupil; posterior end of maxilla slightly concave above, rounded and produced below; predorsal scaled area not reaching to level of center of eye; shoulder girdle (cleithrum) margin with 2 small papillae; a single detached finlet in dorsal and anal fins; straight part of lateral line with scutes (24–40) posteriorly. **Color:** body blue-gray dorsally, silvery ventrally; a black spot posteriorly on opercle. **Size:** maximum length about 35 cm. **Distribution:** widely in Indo-Pacific, from East Africa to Hawaii, and eastern Pacific Ocean, from Gulf of California to Peru. **Remarks:** pelagic species, feeds mainly on planktonic crustaceans and larval fishes.

Decapterus macrosoma, KAUM–I. 17103, 14.3 cm SL
off Terengganu (KT), 28 Dec. 2008

Decapterus russelli, KAUM–I. 17001, 13.5 cm SL
off Terengganu (KT), 14 Dec. 2008

Decapterus russelli (Rüppell, 1830)

Indian Scad

D VIII + I, 27–32 + 1; A II + I, 24–28 + 1; GR 10–14 + 30–39 = 41–53; V 10 + 14. Body elongate, slender, cylindrical; adipose eyelid well developed and completely covering eye except for a vertical slit centered on pupil; posterior end of maxilla almost truncate; predorsal scaled area not reaching to level of center of eye; shoulder girdle (cleithrum) margin with 2 small papillae; a single detached finlet in dorsal and anal fins; straight part of lateral line usually entirely with scutes (30–40), but rarely a few cycloid scales anteriorly. **Color:** body bluish gray dorsally, silvery ventrally; a black spot posteriorly on opercle. **Size:** maximum length about 30 cm SL. **Distribution:** widely in Indo-Wesxt Pacific, from East Africa to eastern Australia, north to southern Japan. **Remarks:** inhabits inshore waters up to 100 m depth.

Elagatis bipinnulata (Quoy & Gaimard, 1825)

Rainbow Runner

D V–VI + I, 23–28+2; A (I) + I, 15–20 + 2; GR 9–11 + 25–26; V 10 + 14. Body elongated and almost fusiform; snout pointed; mouth small, upper jaw not extending to anterior margin of eye in adult; villiform teeth bands on jaws; caudal peduncle grooves present; a detached 2-rayed finlet in dorsal and anal fins; a single isolated anal-fin spine covered by skin in adults; no scutes. **Color:** dark olive-green dorsally, yellow laterally, white ventrally; 2 narrow light blue stripes along body; caudal and pelvic fins yellowish. **Size:** maximum length 180 cm. **Distribution:** widespread circumtropical species. **Remarks:** pelagic species; feeds on crustaceans and fishes.

Elagatis bipinnulata, KAUM–I. 16973, 16.4 cm SL
off Terengganu (KT), 12 Dec. 2008

Gnathanodon speciosus (Forsskål, 1775)

Golden Trevally

D VII–VIII + I, 18–21; A II + I, 15–17; GR 7–9 + 19–22 = 27–30; V 10 + 14. Body oblong, somewhat deep; compressed; both jaws without teeth in adults, a few feeble teeth on lower jaw in juveniles; lips fleshy and remarkably thick; breast completely scaled; straight part of lateral line with scutes (17–26) posteriorly, shorter than curved part. **Color:** body silvery yellow with 7–11 black vertical bands, usually alternating broad and narrow in juveniles and young adults; the first band oblique through eye; all fins yellow, caudal fin tips black. **Size:** maximum length about 120 m. **Distribution:** widely in Indo-Pacific from East Africa to Tuamotu Islands, including Hawaii, and tropical eastern Pacific Ocean, from Mexico to Peru. **Remarks:** occurs in deep lagoon and seaward reefs; feeds mainly on crustaceans and small fishes.

Gnathanodon speciosus, KAUM–I. 17052, 16.6 cm SL
off Terengganu (KT), 18 Dec. 2008

Megalaspis cordyla, KAUM–I. 16846, 17.2 cm SL
off Terengganu (KT), 5 Dec. 2008

Megalaspis cordyla (Linnaeus, 1758)

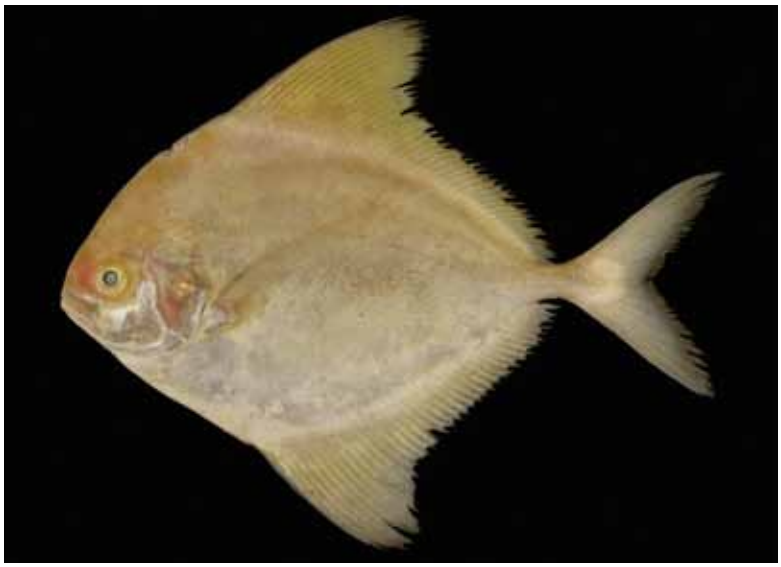
Torpedo Scad

D VIII + I, 9–11 + 7–9; A II + I, 8–10 + 6–8; GR 8–11 + 18–22 = 26–32; V 10 + 14. Body elongate, somewhat compressed; caudal peduncle depressed; adipose eyelid well developed and completely covering eye except for a vertical slit centered on pupil; shoulder girdle (cleithrum) margin smooth without papillae; several detached finlets in dorsal and anal fins; straight part of lateral line entirely with large scutes (51–59), much longer than curved part; scutes on caudal peduncle forming a lateral keel. **Color:** body silvery brownish-green dorsally, silvery white ventrally; a large black spot posteriorly on opercle. **Size:** maximum length about 80 cm. **Distribution:** widely in Indo-West Pacific, from East Africa to Fiji, north to southern Japan. **Remarks:** pelagic, schooling fish; feeds mainly on fishes.

Parastromateus niger (Bloch, 1795)

Black Pomfret

D IV–V + I, 40–45; A II + I, 35–39; GR 5–7 + 13–16; V 10 + 14. Body deep, rhomboidal, strongly compressed; dorsal and anal profiles equally much convex; mouth small, terminal; a single row of small conical teeth on both jaws; spinous portion of dorsal fin and detached anal-fin spines embedded, not seen in adults; pelvic fins absent in young and adults (> 10 cm FL), present at jugular anterior to pectoral-fin base in juvenile; straight part of lateral line much shorter than curved part, with 8–19 week scutes. **Color:** body dark brown or black uniformly. **Size:** maximum length about 75 cm. **Distribution:** widely in Indo-West Pacific, from East Africa to northern Australia. **Remarks:** inhabits coastal waters with muddy bottom; feeds on zooplankton.



Parastromateus niger, KAUM–I. 16909, 13.8 cm SL
off Terengganu (KT), 6 Dec. 2008

Scomberoides commersonnianus Lacepède, 1801

Talang Queenfish

D VI–VII + I, 19–21; A II + I, 16–19; GR 0–3 + 7–12 = 8–15; V 10 + 16. Body oblong, somewhat deep, strongly compressed; no caudal peduncle groove; posterior tip of upper jaw extending well beyond a vertical through posterior margin of eye in adults; two rows of small conical teeth and 1–2 symphyseal canines on lower jaw; body covered with broadly lanceolate scales; no scutes along lateral line. **Color:** body blue-greenish gray dorsally, silvery white ventrally, with a series of 6–8 dusky roundish blotches dorsolaterally in adults; dorsal and caudal fins uniformly dusky; anal and pelvic fins whitish in young. **Size:** maximum length about 120 cm. **Distribution:** widely in Indo-West Pacific, from East Africa to Australia. **Remarks:** inhabit shallow coastal waters to offshore areas; feeds on mainly fishes.

Scomberoides commersonnianus, KAUM–I. 16877, 26.0 cm SL
off Terengganu (KT), 5 Dec. 2008

Scomberoides tol, KAUM–I. 17076, 11.9 cm SL
off Terengganu (KT), 27 Dec. 2008

Scomberoides tol (Cuvier, 1832)

Barred Queenfish

D VI–VII + I, 19–21; A II + I, 18–22; GR 4–7 + 17–20 = 21–26; V 10 + 16. Body slender, strongly compressed; posterior tip of upper jaw not reaching to a vertical through posterior margin of eye in adults; dentary with 2 teeth rows separated by a shallow groove in adults, teeth in both rows almost same sized; body covered with slender, needle-like scales; no scutes along lateral line. **Color:** body blue-greenish gray dorsally, silvery white ventrally, with a series of 5–8 oblong dark blotches laterally in adults; lobe of second dorsal fin black. **Size:** maximum length about 60 cm. **Distribution:** widely in Indo- Pacific, from East Africa to Fiji, north to southern Japan, south to northern Australia. **Remarks:** found in coastal waters; feeds on mainly fishes.

Selar boops (Cuvier, 1833)

Oxeye Scad

D VIII + I, 23–25; A II + I, 19–21; GR 8–12 + 25–29; V 10 + 14. Body elongated and compressed; eye very large; adipose eyelid well developed and completely covering eye except for a vertical slit centered on pupil; shoulder girdle (cleithrum) margin with upper (small) and lower (large) papillae; dorsal and anal fins without detached finlets; straight part of lateral line almost entirely covered by relatively large scutes (37–46), longer than curved part. **Color:** body blue-green dorsally, silvery white ventrally, with a narrow yellow longitudinal stripe from border of opercle to caudal peduncle. **Size:** maximum length about 25 cm FL. **Distribution:** Indo-West Pacific, from Pakistan to Solomon Islands; East Atlantic (Portugal). **Remarks:** feeds mainly on planktonic or benthic crustaceans.

Selar boops, KAUM–I. 16843, 13.1 cm SL
off Terengganu (KT), 5 Dec. 2008

Selar crumenophthalmus (Bloch, 1793)

Bieye Scad

D VIII + I, 24–27; A II + I, 21–23; GR 9–12 + 27–31; V 10 + 14. Body elongated and compressed; eye very large; adipose eyelid well developed, completely covering eye except for a vertical slit centered on pupil; shoulder girdle (cleithrum) margin with upper (small) and lower (large) papillae; dorsal and anal fins without detached finlets; straight part of lateral line almost entirely covered by relatively small scutes (29–42), almost the same length as curved part. **Color:** body blue-green dorsally, silvery white ventrally, with a narrow yellow longitudinal stripe from border of opercle to caudal peduncle. **Size:** maximum length about 70 cm. **Distribution:** worldwide in tropical and subtropical waters. **Remarks:** found mainly in shallow inshore waters; feeds on planktonic and benthic invertebrates.

Selar crumenophthalmus, KAUM–I. 16893, 11.7 cm SL
off Terengganu (KT), 6 Dec. 2008

Selaroides leptolepis, KAUM–I. 16948, 11.6 cm SL
off Terengganu (KT), 11 Dec. 2008

Selaroides leptolepis (Cuvier, 1833)

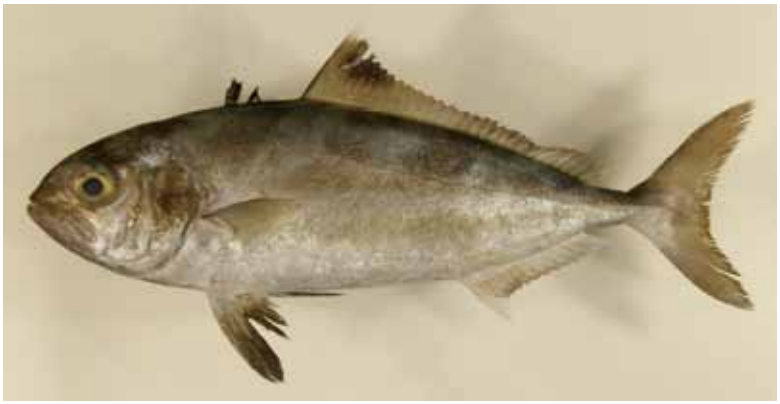
Yellowstripes Scad

D VIII + I, 24–26; A II + I, 20–23; GR 10–14 + 27–32 = 40–46; V 10 + 14. Body oblong, compressed; adipose eyelid well developed on posterior half of eye; no teeth on upper jaw, a single row of minute teeth on lower jaw; shoulder girdle (cleithrum) margin smooth without papillae; dorsal and anal fins without finlets; straight part of lateral line with 13–25 cycloid scales followed by 24–29 relatively small scutes. **Color:** body metallic blue-green dorsally, silvery white ventrally, with a broad longitudinal yellow stripe from upper margin of eye to caudal peduncle; upper opercle with a prominent black spot. **Size:** maximum length about 22 cm. **Distribution:** Indo-West Pacific, from Persian Gulf to eastern Australia. **Remarks:** inhabits soft bottom area at depths shallower than 50 m.

Seriolina nigrofasciata (Rüppell, 1829)

Blackbanded Trevally

D VII–VIII + I, 30–37; A II + I, 15–18; GR 4–10; V 11 + 13. Body elongate, slightly compressed; posterior tip of upper jaw broadly rounded, reaching to a vertical through posterior margin of eye; teeth on both jaws minute, forming a broad band; gill rakers on first gill arch consisting mostly of rudiments; caudal peduncle with fleshy lateral keel and dorsal and ventral grooves; no scutes. **Color:** body dark brown, paler below, with 5–7 black oblique bands dorsolaterally; tips of dorsal and anal fin lobes whitish. **Size:** maximum length about 70 cm. **Distribution:** widely in Indo-West Pacific, from East Africa to Australia, north to southern Japan. **Remarks:** found mainly in offshore reefs; feeds on benthic fishes, crustaceans and cephalopods.



Seriolina nigrofasciata, KAUM–I. 17157, 20.1 cm SL
off Terengganu (KR), 4 Jan. 2009

Seriolina nigrofasciata, UMTF 1889, 27.6 cm SL
off Terengganu (KT), 11 Jan. 2009

Ulua mentalis (Cuvier, 1833)

Whitemouth Jack

D VIII + I, 21–22; A II + I, 17–18; GR 23–27 + 51–61 = 74–86; V 10 + 14. Body deep, strongly compressed; dorsal profile strongly convex in adults; breast widely naked to pectoral fin base and insertion of pelvic fins; teeth on both jaws small, pointed in a single row in adults, or in a irregular row or a narrow band in juveniles; posterior 2 or 3 spines in first dorsal fin and detached anal fin spines usually embedded; straight part of lateral line almost entirely with 24–39 scutes. **Color:** body silvery blue-green dorsally, silvery white ventrally; juveniles with 7–8 dark bands laterally. **Size:** maximum length 1 m. **Distribution:** widely in Indo-West Pacific, from South Africa to northeastern Australia, north to southern Japan. **Remarks:** occurring in shallow coastal waters.

Ulua mentalis, KAUM–I. 17114, 8.6 cm SL
off Terengganu (KT), 31 Dec. 2008

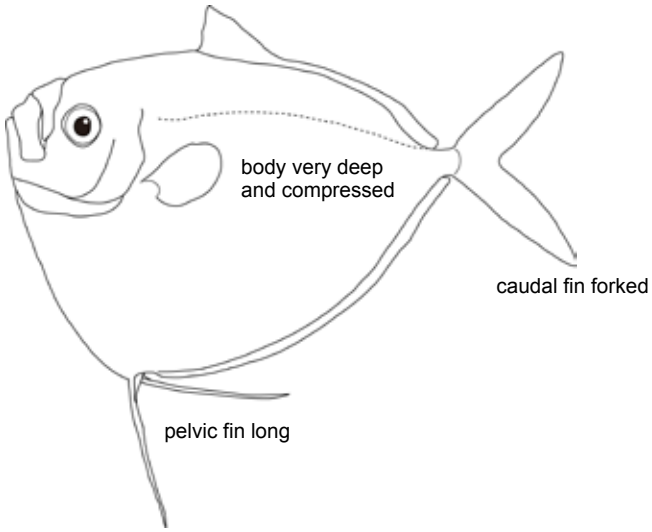
MENIDAE

Moonfish

By Mizuki Matsunuma

This family is represented by a single species; see the following species account.

Similar families occurring in the area: none. No other fishes have a combination of characters such as body very deep, almost triangular, extremely compressed; long dorsal and anal fin bases; thin, flexible and rudimental dorsal fin spines; extremely long pelvic fin, the first 2 soft rays fused.



Mene maculata (Bloch & Schneider, 1801)

Moonfish

D III–IV + 40–45; A 30–33; P_1 15; P_2 I, 5; GR 6–8 + 23–25. Body very deep, almost triangular, extremely compressed; breast sharp-edged; covered with minute scales, invisible to the naked eye. Mouth small, almost vertical, protrusible; villiform bands in jaws. Dorsal fin long-based, and low posteriorly; spines thin and flexible. Anal fin long-based, commencing at point of insertion of pelvic fins, uniformly very low. Caudal fin deeply forked. Pectoral fins shorter than head length. Pelvic fins inserted slightly in front of pectoral fins, first 2 soft rays fused and greatly elongated. **Color:** upper sides deep metallic blue, remainder silvery, with a row of round to ovoid, dark slaty-blue spots above and below lateral line, sometimes a few additional spots above and below these rows; pelvic fins with a trace of blue, other fins hyaline or slightly dusky. **Size:** commonly 20 cm, maximum 30 cm. **Distribution:** Indo-West Pacific from the east coast of Africa east to Melanesia, Australia north to Japan. **Remarks:** found in coastal waters to depths of 200 m. Marketed fresh and dried.

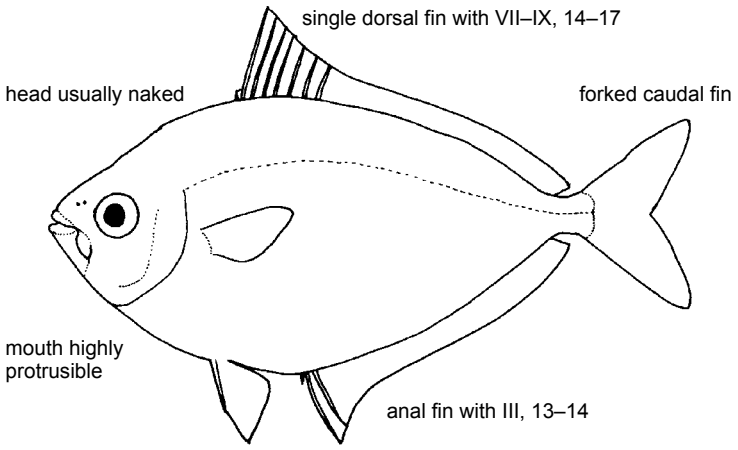
Mene maculata, KAUM–I. 16946, 10.1 cm SL
off Terengganu (KT), 11 Dec. 2008

LEIOGNATHIDAE

Slipmouths (Ponyfishes)

By Seishi Kimura

Small to medium-sized marine and brackish fishes; maximum size about 25 cm. Body slimy and deep, ovate, strongly compressed, except a few species. Head usually naked (cheek scales present in some species) with bony ridges on dorsal surface, a median bony ridge (crest) on nape; mouth small, highly protrusible; no pseudobranchiae; gill membranes united with isthmus. Unique light organ encircling the posterior part of esophagus. A single dorsal fin, lacking a distinct notch, with VII–IX spines (usually VIII) and 15–17 (usually 16) soft rays; anal fin usually with III spines and 13–15 (usually 14) soft rays; caudal fin forked; pelvic fin I, 5. Scales small cycloid easily shed. Vertebral counts 22–24. **Color:** body generally silver; dark vertical bars or yellow spots on body, a black blotch on top of dorsal fin, yellow vertical fin margins in some species.



Remarks: occurring in tropical to temperate marine and estuarine areas. The generic names follow Kimura et al. (2008a, b, c).

Similar families occurring in the area: Leiognathidae is distinguished from the following similar families in having strongly protrusible mouth, naked head (except cheek in some species), and small cycloid scales on body. Carangidae – 2 dorsal fins; mouth not highly protrusible. Gerreidae – scales large; head scaled; scaly sheath along the bases of dorsal and anal fins well developed.

Equulites laterofenestra (Sparks & Chakrabarty, 2007)

D VIII, 16; A III, 14; P_1 17–19; LL 69–77; GR 5–6 + 13–16 = 18–22; V 10 + 14. Body somewhat elongate, compressed; body depth 31–39% SL; mouth protruding downwards; ventral profile of lower jaw slightly concave or almost straight; cheek naked; breast naked below a line from lower tip of opercle to pelvic fin insertion; second dorsal fin spine somewhat elongated. **Color:** body brownish silver dorsally, brilliant silvery-white ventrally; peculiar dark irregular ring marks and oblique wavy dark lines dorsolaterally on body. **Size:** maximum length about 12 cm SL. **Distribution:** West Pacific from Philippines to Indonesia. **Remarks:** this species is distinguishable from very similar congeners, *E. leuciscus* and *E. stercorarius* by having a naked area on lower breast and peculiar ring marks dorsolaterally on body.

Equulites laterofenestra, KAUM–I. 17110, 8.4 cm SL
off Terengganu (KT), 31 Dec. 2008

Equulites leuciscus (Günther, 1860)

Whipfin Ponyfish

D VIII, 15–16 (usually 16); A III, 14; P_1 16–19; LL 55–68; GR 5–7 + 12–15 = 17–22; V 10 + 14. Body oblong, somewhat elongate, compressed; body depth 35–47% SL; dorsal and ventral profiles similarly convex; mouth protruding downwards; ventral profile of lower jaw slightly concave or almost straight; small slender teeth on both jaws; cheek naked; breast completely scaled laterally with narrow naked area ventrally; second dorsal fin spine distinctly elongated, filamentous; second anal fin spine also elongated in adults. **Color:** body brownish silver dorsally, brilliant silvery-white ventrally; irregular oblique dark lines dorsolaterally on body; a few yellow spots sometimes laterally on body. **Size:** maximum length about 12 cm SL. **Distribution:** widely in Indo-West Pacific, from East Africa to Australia, northward to southern Japan. **Remarks:** usually found in shallow waters; feeds on small crustaceans and polychaetes.

Equulites leuciscus, KAUM–I. 17266, 11.7 cm SL
off Terengganu (KT), 18 Jan. 2009

Equulites oblongus (Valenciennes, 1835)

Oblong Ponyfish

D VIII, 16; A III, 13–14 (usually 14); P_1 16–19; LL 52–63; GR 4–6 + 12–15 = 17–20; V 10 + 14. Body oblong, compressed; body depth 35–46% SL; dorsal profile more strongly convex than ventral profile; mouth protruding downwards; ventral profile of lower jaw slightly concave; small slender teeth on both jaws; cheek naked; breast completely scaled laterally with narrow naked area ventrally; second dorsal- and anal-fin spines not distinctly elongated. **Color:** body brownish silver dorsally, brilliant silvery-white ventrally; irregular oblique dark lines dorsolaterally on body; dorsal, anal and caudal fins yellowish. **Size:** maximum length about 10 cm SL. **Distribution:** widely in Indo-West Pacific, from Mauritius to Australia. **Remarks:** usually found in shallow waters; feeds on small crustaceans and polychaetes.

Equulites oblongus, KAUM–I. 16861, 6.7 cm SL
off Terengganu (KT), 5 Dec. 2008

Equulites stercorarius (Evermann & Seale, 1907)

Slender Ponyfish

D VIII, 16; A III, 14; P_1 16–18; LL 58– 61; GR 5–6 + 11–14 = 16–20. Body elongate, moderately compressed; body depth 30–36% SL; mouth protruding downwards; profile of lower jaw almost straight; a single row of small slender teeth on jaws; retrorse spines of dorsal- and anal-fin pterygiophores embedded; cheek, breast, and belly completely scaled. **Color:** body brownish dorsally, silvery-white ventrally; black blotch on snout; dark irregular oblique lines indistinctly on dorsolateral body surface; dorsal and anal fins with yellow bands. **Size:** maximum length about 12 cm. **Distribution:** found in Philippines, Vietnam, Thailand, Malaysia, and Indonesia. **Remarks:** inhabits soft bottom area at depths shallower than 50 m.

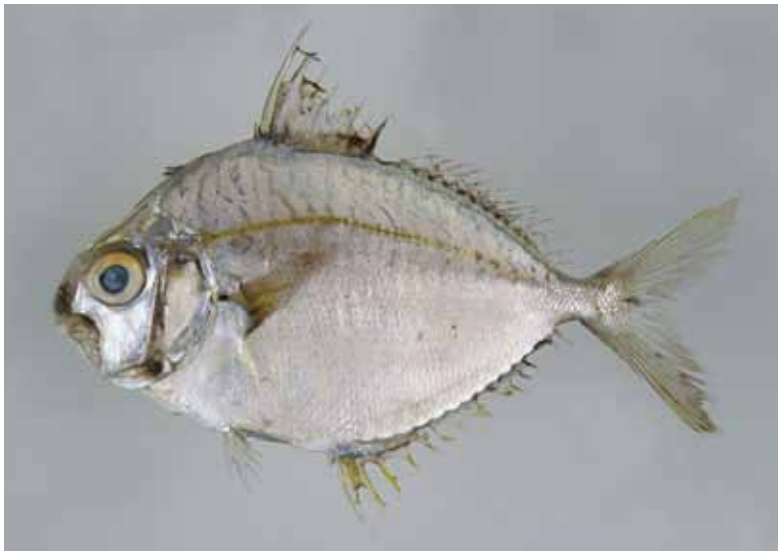
Equulites stercorarius, KAUM–I. 16860, 9.9 cm SL
off Terengganu (KT), 5 Dec. 2008

Eubleekeria jonesi (James, 1971)

Yellowlined Ponyfish

D VIII, 16; A III, 14–15 (usually 14); P_1 16–19; LL 50–61; GR 5–7 + 21–24 = 24–31; V 10 + 14. Body deep, ovate, strongly compressed; dorsal and ventral profiles similarly convex; lower margin of eye located above level of mouth gape; mouth protruding downwards; ventral profile of lower jaw almost straight; small slender teeth on both jaws; cheek naked; breast almost completely scaled; semicircular naked area on nape. **Color:** head and body almost uniformly silvery-white; tip of snout dark; lateral line scales prominent yellow but easily fade out; distal half of fin membranes between second and fifth spines of dorsal fin with a somewhat pale black blotch. **Size:** maximum length about 14 cm SL. **Distribution:** Indo-West Pacific, from Mauritius to Indonesia, northward to Hainan Island, China, south to Australia. **Remarks:** usually found in muddy bottoms in shallow waters.

Eubleekeria jonesi, KAUM–I. 16864, 8.8 cm SL
off Terengganu (KT), 5 Dec. 2008



Eubleekeria jonesi, KAUM–I. 16865, 7.3 cm SL
off Terengganu (KT), 5 Dec. 2008

Gazza minuta (Bloch, 1795)

Toothpony

D VIII, 16; A III, 13–14 (usually 14); P1 14–19; LL 52–69; LGR 13–18; V 10 + 14. Body oval, compressed, somewhat elongated; mouth protruding forwards, not downwards, with distinct canine teeth on both jaws; a long narrow anterodorsal extension of subocular silvery region, proximal contact only with orbit; pelvic-fin tips not reaching to origin of anal fin when appressed; scaled area of anterior dorsolateral surface of body extending anteriorly beyond a vertical through posterior tip of sensory canal on temporal; breast completely naked. **Color:** body bluish silver dorsally, brilliant silvery-white ventrally; anal fin yellowish distally; caudal fin yellowish with faintly black margin. **Size:** maximum length about 16 cm. **Distribution:** widely in Indo-West Pacific, from East Africa to northern Australia, north to southern Japan. **Remarks:** feeds on benthic animals and small fishes.

Gazza minuta, KAUM–I. 16858, 8.8 cm SL
off Terengganu (KT), 5 Dec. 2008

Gazza rhombea Kimura, Yamashita & Iwatsuki, 2000

Rhomboid Toothpony

D VIII, 16; A III, 14; P_1 15–18; LL 56–66; LGR 13–17; V 10 + 14. Body deep, rhomboid, strongly compressed in adults, oblong in juveniles; dorsal and ventral profiles similarly convex; mouth protruding forwards, not downwards, with distinct canine teeth on both jaws; a long narrow anterodorsal extension of subocular silvery region, proximal contact only with orbit; pelvic-fin tips not reaching to origin of anal fin when appressed; scaled area of anterior dorsolateral surface of body not reaching to a vertical through posterior tip of sensory canal on temporal; breast completely naked. **Color:** body bluish silver dorsally, brilliant silvery-white ventrally; anal fin yellowish distally. **Size:** maximum length about 18 cm SL. **Distribution:** Indo-West Pacific, from Pakistan to Vanuatu, northward to southern Japan. **Remarks:** usually found in sandy or muddy bottoms in coastal and brackish waters.

Gazza rhombea, KAUM–I. 17163, 11.5 cm SL (preserved specimen)
off Terengganu (KR), 5 Jan. 2009 (photo by Seishi Kimura)

Leiognathus equulus (Forsskål, 1775)

Common Ponyfish

D VII–VIII, 16–17 (usually VIII, 16); A III, 13–14 (usually 14); P_1 19–22; LL 54–68; GR 4–7 + 13–18 = 19–24; V 10 + 14. Body extremely deep, compressed, hump-back shaped; mouth protruding downwards; small slender teeth on both jaws; profile of lower jaw strongly concave; supraorbital ridge serrated; cheek, breast, and belly completely naked; second dorsal- and anal-fin spines slightly elongated, but not filamentous; retrorse spines of dorsal and anal-fin pterygiophores strong and exposed. **Color:** body blue-grayish silver dorsally, brilliant silvery white ventrally; dorsolateral body with 17–22 narrow dark vertical lines. **Size:** maximum length about 30 cm. **Distribution:** widely in Indo-West Pacific, from East Africa to Fiji, north to southern Japan and south to northern Australia. **Remarks:** inhabits shallow coastal areas, usually entering into estuaries; feeds chiefly on polychaetes, small crustaceans, and small fishes.

Nuchequula longicornis Kimura, Kimura & Ikejima, 2008

Longspine Ponyfish

D VIII, 16–17 (usually 16); A III, 14; P_1 18–19; LL 54–58; GR 5–6 + 16–17 = 22–23; V 10 + 14. Body deep, oval, compressed; dorsal and ventral profiles equally convex; mouth protruding downward; a narrow band of small, slender, villiform teeth in both jaws; minute, sparse, slender projections on the upper oral valve; cheek naked; no naked area on nape; breast naked; second dorsal-fin spine elongated, extending beyond the base of fifth soft ray when fin appressed; second anal-fin spine not elongated, not reaching to the base of fifth soft ray when fin appressed. **Color:** body almost uniformly silver; a distinct dark blotch on the nape; a yellow marking on the abdomen between base of pectoral fin and origin of anal fin. **Size:** maximum length about 80 cm SL. **Distribution:** West Pacific, from Gulf of Thailand to Java.

Leiognathus equulus, KAUM–I. 16862, 11.3 cm SL
off Terengganu (KT), 5 Dec. 2008

Leiognathus equulus, UMTF 1497 (KAUM–I. 16729), 8.4 cm SL
Setiu, 28 Oct. 2008

Nuchequula longicornis, KAUM–I. 16920, 9.9 cm SL
off Terengganu (KT), 10 Dec. 2008

Photopectoralis bindus (Valenciennes, 1835)

Orangefin Ponyfish

D VIII, 15–16 (usually 16); A III, 14; P1 15–19; LL 51–88; GR 4–7 + 16–20 = 21–27; V 10 + 14. Body rounded, disc-like, strongly compressed; ventral profile similarly convex as, or more strongly convex than ventral profile; mouth protruding forwards; a single row of small conical teeth in both jaws; ventral profile of lower jaw almost straight or slightly concave; cheek naked; breast almost completely scaled laterally with narrow naked area ventrally. **Color:** body brownish silver dorsally, brilliant silvery-white ventrally; irregular oblique dark lines and/or dark vermiculation dorsolaterally on body; spinous portion of dorsal fin dark orange to yellow distally, anterior anal fin yellowish distally. **Size:** maximum length about 10 cm SL. **Distribution:** Indo-West Pacific, from Red Sea to New Caledonia, north to southern Japan. **Remarks:** usually found in muddy bottoms of coastal inshore waters.

Photopectoralis bindus, KAUM–I. 17263, 7.5 cm SL
off Terengganu (KT), 18 Jan. 2009

Secutor hanedai Mochizuki & Hayashi, 1989

Haneda's Ponyfish

D VIII, 16; A III, 14; P_1 15–18; GR 5–7 + 17–20 = 22–26; V 10 + 14. Body oblong, compressed; ventral profile more strongly convex than dorsal profile; mouth protruding upwards; minute teeth on both jaws; ventral profile of lower jaw slightly concave; cheek and breast naked; lateral line incomplete, number of scale pockets along lateral line to caudal-fin base 60–70; scale rows above and below lateral line 16–22 and 42–53, respectively. **Color:** body silvery brownish green dorsally, brilliant silvery-white ventrally; 9 or 10 vertical series of dark bars or blotches dorsolaterally on body. **Size:** maximum length about 10 cm. **Distribution:** western and eastern coasts of Malay Peninsula, Gulf of Thailand, Sumatra, Java, and Borneo. **Remarks:** usually found in muddy bottoms in shallow waters.

Secutor hanedai, KAUM–I. 17276, 5.1 cm SL
off Terengganu (KT), 18 Jan. 2009

Secutor hanedai, KAUM–I. 17275, 3.4 cm SL
off Terengganu (KT), 18 Jan. 2009

Secutor indicius Monkolprasit, 1973

Dots-and-dashes Ponyfish

D VIII, 16; A III,14; P1 16–18; LGR 20–21; V 10 + 14. Body oblong, somewhat elongated, compressed; ventral profile more strongly convex than dorsal profile; mouth protruding upwards; minute teeth on both jaws; ventral profile of lower jaw concave; cheek naked; breast naked ventrally; lateral line incomplete, number of scale pockets along lateral line to caudal-fin base 87–111; scale rows above and below lateral line 18–22 and 39–48, respectively. **Color:** body silvery brownish dorsally, brilliant silvery-white ventrally; about 15 irregular vertical dark markings consisted of dots and dashes dorsolaterally on body. **Size:** maximum length about 10 cm. **Distribution:** West Pacific Ocean, from Gulf of Thailand to New Guinea, north to southern Japan. **Remarks:** usually found in muddy bottoms in shallow waters.

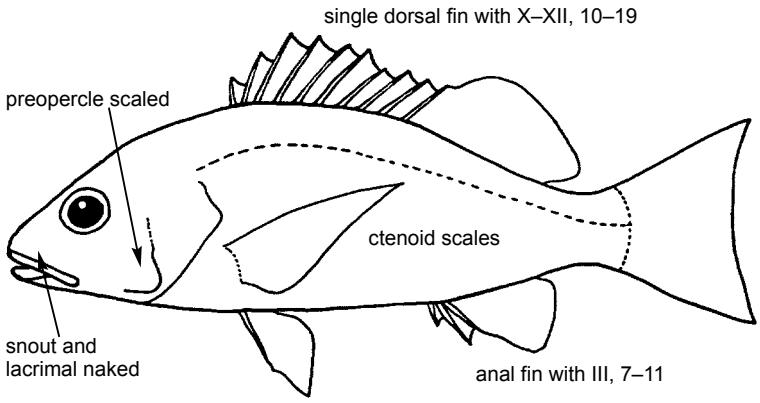
Secutor indicius, KAUM–I. 16857, 8.7 cm SL
off Terengganu (KT), 5 Dec. 2008

Secutor indicius, KAUM–I. 17265, 8.4 cm SL
off Terengganu (KT), 18 Jan. 2009

LUTJANIDAE

Snappers

By Siti Tafzilmeriam S. A. K.



Typical perch-like fishes, body symmetrical and moderately compressed, oblong in shape (size to 160 cm). Eye usually moderate; premaxilla usually moderately protrusible; mouth terminal and fairly large; supramaxilla absent. Jaws usually with more or less distinct canines; vomer and palatines usually with teeth; pterygoids usually toothless. Cheek and operculum scaly; snout, lacrimal, and lower jaw naked. Dorsal fin single, continuous or slightly notched, with X–XII spines and 10–19 soft rays; anal fin with III spines and 7–11 soft rays; pectoral fin rays 14–19; pelvic fins with I spine and 5 soft rays; caudal fin shape variable frequently truncate, emarginated or lunate. Scales moderate to rather small, ctenoid. Lateral line complete. Pelvic axillary process usually well developed. Branchiostegal rays 7. Vertebrae 24 (10 + 14). **Color:** highly variable; mainly from red through yellow to blue; often with blotches, lines, or other patterns.

Remarks: mostly bottom-associated fishes, occurring from shallow inshore areas to depths of about 500 m, mainly over reefs or rocky outcrops. Active predators, mostly nocturnal, feeding on crustaceans, mollusks, and fishes.

Similar families occurring in the area: Caesionidae – mouth small; premaxillae extremely protrusible; teeth small and minute. Haemulidae – scales present on snout and lacrimal; preoperculomandibular canal lateral system opening under chin; usually no teeth on vomer and palatines. Lethrinidae – opercular membranes broadly united to each other; preopercular margin typically smooth; branchiostegal rays 6; soft rays of dorsal fin 9 or 10; no teeth on vomer or palatines. Nemipteridae – preopercular margin typically smooth; soft rays of dorsal fin 9; soft rays of anal fin usually 7; branchiostegal rays 6. Sparidae – preopercular margin typically smooth; branchiostegal rays 6; teeth in jaws variable-conical, incisiform, or molariform.

Lutjanus argentimaculatus (Forsskål, 1775)

Mangrove Red Snapper

Lutjanus argentimaculatus, UMTF 1519 (KAUM–I. 16722), 16.9 cm SL Setiu, 28 Oct. 2008

D X, 13–14; A III, 8; P_1 16–17; P_2 I, 5; LLp 44–48; GR 6–8 + 9–12. Body moderately deep, its depth 2.5–3.1 in standard length. Preorbital bone relatively broad, wider than eye diameter; preopercular notch and knob poorly developed. Posterior profile of dorsal and anal fins rounded; caudal fin emarginated to nearly truncate. Scale rows on back more or less parallel to lateral line, or parallel below spinous part of dorsal fin and sometimes rising obliquely posteriorly, or rarely with entirely oblique rows. **Color:** generally greenish brown on back, grading to reddish on sides and ventral parts; scales usually with dark centers and white margins, giving a reticulated appearance; pectoral fin hyaline; pelvic and anal fins dark brown becoming paler towards base; specimens from deep water frequently overall reddish; juveniles with a series of about 8 whitish bars crossing sides, and 1 or 2 blue lines across cheek. **Size:** 120 cm. **Distribution:** Indo-West Pacific. **Remarks:** a euryhaline species. Juveniles and young adults occur in mangrove estuaries and in the lower reaches of freshwater streams.

Lutjanus fulviflamma (Forsskål, 1775)

Blackspot Snapper

D X, 12–14; A III, 8; P_1 16–17; P_2 I, 5; LLp 46–49; GR 6–7 + 9–12. Body moderately deep to somewhat slender; its depth 2.6 to 2.9 times in standard length. Preopercular notch and knob poorly developed. Caudal fin truncate or slightly emarginate. Scale rows on back rising obliquely above lateral line. **Color:** back and upper sides reddish brown; lower sides whitish or light brown; whitish to yellow on belly; 6 or 7 yellow stripes on sides; a prominent black spot at level of lateral line below base of anterior part of soft-rayed portion of dorsal fin; fins yellowish. **Size:** 35 cm. **Distribution:** Indo-Pacific. **Remarks:** inhabits coastal waters around coral reef areas. Juveniles sometimes found in estuary.

Lutjanus fulviflamma, KAUM–I. 16504, 7.5 cm SL
Cendering, 6 Oct. 2008

Lutjanus lutjanus (Bloch, 1790)

Bigeye Snapper

D X–XII, 12; A III, 8; P_1 16–17; P_2 I, 5; LLp 48–50; GR 6–8 + 17–19. Body fusiform, slender; its depth 2.9 to 3.3 times in standard length. Preorbital bone very narrow, much less than eye diameter. Vomerine tooth patch triangular, with a medial posterior extension. Caudal fin truncate or slightly emarginated. Scale rows on back rising obliquely above lateral line. **Color:** upper back golden brown; a broad yellow to brownish stripe from eye to caudal-fin base; yellow horizontal lines (1 per scale row) on lower half of body, and similar lines running obliquely above lateral line; fins yellowish. **Size:** 30 cm. **Distribution:** Indo-West Pacific. **Remarks:** inhabits offshore coral reefs.

Lutjanus lutjanus, UMTF 1010 (KAUM–I. 16639), 12.4 cm SL
Bidong Island, 12 Oct. 2008

Lutjanus malabaricus (Bloch & Schneider, 1801)

Malabar Blood Snapper

D XI, 12–14; A III, 8–9; P_1 16–17; P_2 I, 5; LLp 46–50; GR 4–7 + 12–14. Body relatively deep; its depth 2.2 to 2.8 times in standard length. Preopercular notch and knob poorly developed. Vomerine tooth patch crescentic or triangular, without a medial posterior extension. Caudal fin truncate. Scale rows on back rising obliquely above lateral line. **Color:** back and sides red or red-orange, lighter on lower parts; fins reddish; juveniles with a broad, oblique band of brown or black from upper jaw to beginning of dorsal fin, and a prominent black band across caudal peduncle with a pearly white anterior border. **Size:** 100 cm. **Distribution:** Indo-West Pacific. **Remarks:** inhabits both coastal and offshore reefs; depth range 12–100 m.

Lutjanus malabaricus, KAUM–I. 17019, 11.5 cm SL
off Terengganu (KT), 16 Dec. 2008

Lutjanus quinquelineatus (Bloch, 1790)

Five-lined Snapper

D X, 13–15; A III, 8; P_1 16–17; P_2 I, 5; LLp 47–50; GR 7–8 + 13–15. Body moderately deep, its depth 2.3–2.9 in standard length. Preorbital width usually less than eye diameter; preopercular notch and knob well developed. Caudal fin truncate or slightly emarginate. Scale rows on back rising obliquely above lateral line. **Color:** body generally bright yellow, with 5 blue stripes on side; 4 originating from behind eye and the other originating from cheek below eye; a round black spot, about the size of eye or larger, on side below soft-rayed portion of dorsal fin; fins yellowish. **Size:** 38 cm. **Distribution:** Indo-Pacific. **Remarks:** inhabits sheltered lagoons and exposed outer slope coral reefs at depth range of 2–40 m.

Lutjanus quinquelineatus, KAUM–I. 16974, 12.5 cm SL
off Terengganu (KT), 12 Dec. 2008

Lutjanus russellii (Bleeker, 1849)

Russell's Snapper

D X, 14; A III, 8; P_1 16–17; P_2 I, 5; LLp 47–50; GR 6–7 + 7–11. Body moderately deep to somewhat slender; its depth 2.6-2.8 in standard length. Anterodorsal profile of head steeply to moderately sloped; preorbital width about equal to, or slightly less than eye diameter. Caudal fin truncate or slightly emarginate. Scale rows on back rising obliquely above lateral line. **Color:** body brownish dorsally, pink to whitish ventrally with a silvery sheen; a large black spot, sometimes faint, on lateral line below the anterior portion of soft-rayed portion of dorsal fin; adults usually with 6–8 narrow golden brown stripes on sides; juveniles, whitish with about 4 black stripes on sides, and a round black spot on upper back. **Size:** 45 cm. **Distribution:** Indo-West Pacific.**Remarks:** juveniles are often found in mangrove areas. Marketed fresh.

Lutjanus russellii, UMTF 1043 (KAUM–I. 16796), 7.8 cm SL
Merang, 2 Nov. 2008

Lutjanus vitta, KAUM–I. 16941, 10.9 cm SL
off Terengganu (KT), 11 Dec. 2008

Lutjanus vitta (Quoy & Gaimard, 1824)

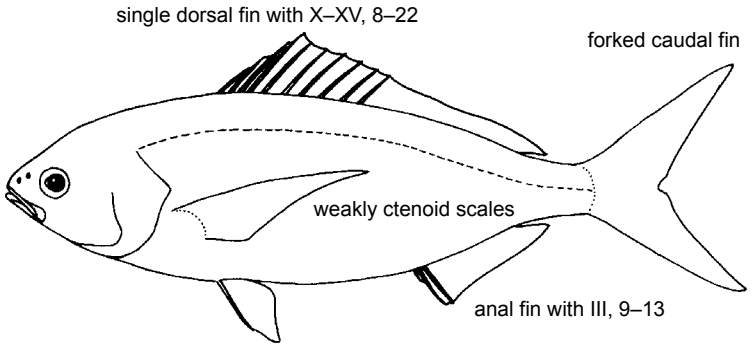
Brownstripe Snapper

D X, 12–13; A III, 8–9; P_1 15–16; P_2 I, 5; LLp 49–51; GR 6–7 + 9–12. Body moderately deep to relatively slender; its depth 2.6 to 3 times in standard length. Preorbital width about equal to eye diameter; preopercular notch and knob poorly developed. Caudal fin emarginated. Scales rows on back rising obliquely above lateral line. **Color:** generally whitish or pink, with a dark brown to blackish stripe on side from eye to upper half of caudal peduncle; narrow brown lines, 1 per scale row, on sides; fins yellowish. **Size:** 40 cm. **Distribution:** Indo-West Pacific. **Remarks:** inhabits the vicinity of coral reefs.

CAESIONIDAE

Fusiliers

By Mizuki Matsunuma



Medium sized (up to 50 cm) marine fishes. Body oblong to fusiform, moderately compressed; longitudinal axis from tip of snout to middle of caudal fin passing through center of eye. Eye moderately large, its diameter longer than snout length. Mouth small and highly protrusible. Dentition variously reduced; small or minute conical teeth; premaxilla, vomer, and palatines with or without teeth. Dorsal fin with X–XV slender weak spines and 8–22 soft rays; anal fin with III spines and 9–13 soft rays; pelvic fin with I spine and 5 soft rays; pectoral fin with 16–24 rays; caudal fin distinctly forked, with pointed lobes. Branchiostegal rays 7. Scales moderate to small, weakly ctenoid; lateral line scales 45–88; scale rows on body running horizontally; dorsal and anal fins with scales in most species. **Color:** sides with or without longitudinal stripes; caudal fin either without markings, with blackish blotch on tips of lobes, or with a longitudinal blackish streak in middle of each lobe; axil of pectoral fins black.

Remarks: found mostly on coral reefs; occur near the surface to depths of 60 m. Feed by picking zooplankton. Major importance in coral-reef fisheries.

Similar families occurring in the area: Lutjanidae – closely allied to Caesionidae and difficult to distinguish from Caesionidae on the basis of any single external character, but most members of Lutjanidae having a deeper body, the eye well above the horizontal axis of the body, and lacking a strongly forked caudal fin; those lutjanid genera with the horizontal passing near the center of eye either having scale rows running obliquely upward, fewer than 9 anal fin rays, no scales on dorsal and anal fins, or the caudal fin much less deeply forked. Nemipteridae – eye above horizontal axis in most species; 9 dorsal and 7 or 8 anal fins soft rays. Lethrinidae – eye always above horizontal axis of body; base of soft part of dorsal fin generally shorter than base of spinous part; 8–10 anal fin soft rays; usually enlarged canines in front of jaws, sometimes lateral molars. Emmelichthyidae – superficially similar but caught in deep water; maxilla fully scaly; dorsal fin with IX spines and usually 12 soft rays.

Caesio cuning (Bloch, 1791)

Redbelly Yellowtail Fusilier

D X, 14–16; A III, 10–12; P_1 17–20; LL 45–51. Body fairly deep and compressed. A single postmaxillary process; small conical teeth in jaws, vomer and palatines. Scale rows above lateral line 7–9; supratemporal band of scales confluent at dorsal midline; 4–5 scales on cheek; predorsal scales 20–26; dorsal and anal fins scaly, the dorsal fin with about 1/2 of its greatest spinous height covered with scales; supratemporal band of scales confluent at dorsal midline. **Color:** head and body bluish white, pinkish ventrally; posterior portion of back, upper caudal peduncle, and caudal fin yellow; axil and upper base of pectoral fin black; dorsal fin yellow posteriorly and grayish blue anteriorly; pelvic and anal fins reddish. **Size:** maximum length 50 cm. **Distribution:** Indo-West Pacific. **Remarks:** inhabits coastal areas to the depth of 60 m.

Caesio cuning, KAUM–I. 16984, 10.5 cm SL
off Terengganu (KT), 13 Dec. 2008

Dipterygonotus balteatus (Valenciennes, 1830)

Mottled Fusilier

D XII–XV, 8–11; A III, 9–11; P_1 17–19; LL 68–80. Body slender, fusiform, elongate, and moderately compressed. Two postmaxillary processes; small conical teeth on dentary and vomer; premaxilla and palatines without teeth. Scales above lateral line to origin of dorsal fin 9–11; scales below lateral line to origin of anal fin 15–18; usually 6–9 scale rows on cheek; predorsal scales usually 29–34; dorsal and anal fins without scales. **Color:** body brownish bronze dorsally, silvery white ventrally; with a thin, straight, tan stripe about 1 scale wide from orbit to caudal fin, above lateral line; above and parallel to this stripe 2 thin, irregular, and usually interrupted stripes of same color; caudal fin tan to pinkish. **Size:** maximum length 14 cm. **Distribution:** Indo-West Pacific. **Remarks:** feeds on zooplankton. Marketed fresh.

Dipterygonotus balteatus, KAUM–I. 17169, 7.9 cm SL
off Terengganu (KR), 5 Jan. 2009

Pterocaesio chrysozona, KAUM–I. 16989, 12.8 cm SL
off Terengganu (KT), 14 Dec. 2008

Pterocaesio chrysozona (Cuvier, 1830)

Goldband Fusilier

D X–XI, 14–16; A III, 11–12; P_1 17–20; LL 64–69. Body fusiform, elongate, and moderately compressed. Two postmaxillary processes; small conical teeth in jaws, vomer, and palatines. Scales above lateral line to origin of dorsal fin 7–9; scales below lateral line to origin of anal fin 14–16; predorsal scales usually 23–26; dorsal and anal fins scaly, dorsal fin with about 1/2 of its greatest spinous height covered with scales. **Color:** body light blue to brownish dorsally, white to pinkish ventrally; a bright yellow band directly below lateral line for most of its length, from behind eye to base of caudal fin, 2 to 3 scales wide anteriorly, tapering to 1 scale in width on caudal peduncle where it is above lateral line; a less conspicuous yellow stripe along dorsal midline; dorsal fin slightly dusky distally; tips of caudal-fin lobes black. **Size:** maximum length 21 cm. **Distribution:** Indo-West Pacific. **Remarks:** schooling fish found in coral reefs.

Pterocaesio digramma, KAUM–I. 17226, 14.9 cm SL
off Terengganu (KT), 12 Jan. 2009

Pterocaesio digramma (Bleeker, 1864)

Doublelined Fusilier

D X, 14–16 (usually 15); A III, 11–12 (usually 12); P_1 20–22; LL 66–75. Body fusiform, elongate, and moderately compressed. Two postmaxillary processes; small conical teeth in jaws, vomer, and palatines. Scales above lateral line to origin of dorsal fin 9–11; scales below lateral line to origin of anal fin 17–18; cheek with 4–5 scale row; upper peduncular scales usually 12–13; dorsal and anal fins scaly. **Color:** body blue to greenish dorsally, white ventrally; with 2 yellow longitudinal stripes laterally, the lower running from behind upper orbit about 1 scale below the lateral line to a vertical at about middle of soft portion of dorsal fin where it crosses and usually passes above lateral line for the length of caudal peduncle; upper stripe 1–2 scales below dorsal profile foremost of length of body, ending dorsally on caudal peduncle; caudal fin lobes with black tips. **Size:** maximum length 30 cm. **Distribution:** western Pacific. **Remarks:** schooling fish found in coastal areas, primarily around coral reefs. Marketed fresh and dried salted.

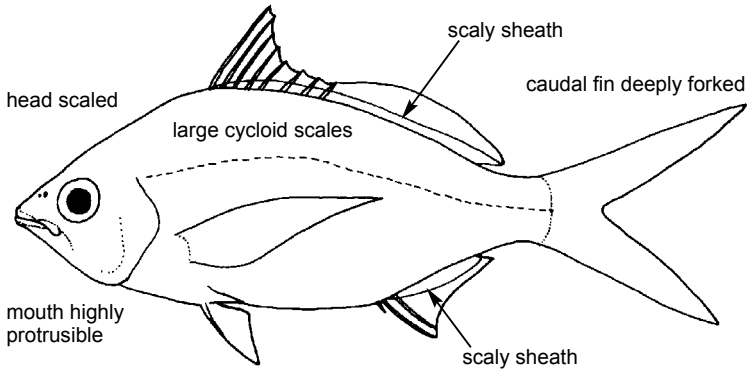
GERREIDAE

Mojarras

By Seishi Kimura and Siti Tafzilmeriam S. A. K.

Small to medium sized marine and brackish fishes; maximum size about 40 cm. Body compressed, depth variable, oblong to rhomboidal. Head scaled; mouth small, highly protrusible; teeth on jaws small, brush-like; gill membrane free from isthmus. A single dorsal fin, lacking a distinct notch, with IX–X spines and 9–17 soft rays; anal fin usually with II–IV spines and 6–18 soft rays; scaly sheath along bases of dorsal and anal fins; pelvic fin I, 5; caudal fin deeply forked. Scales thin, cycloid, moderately large, but deciduous. Vertebral counts 24. **Color:** body generally brilliant silver, with dark vertical bars or spots on body in some species.

Remarks: occurring in tropical to temperate marine and estuarine areas. Feed mainly on benthic animals.



Similar families occurring in the area: Gerreidae is distinguished from the following similar families in having strongly protrusible mouth, scaled head, moderately large cycloid scales on body, and scaly sheath along the bases of dorsal and anal fins. Haemulidae, Lutjanidae, and Sparidae – mouth not highly protrusible.

Gerres erythrourus (Bloch, 1791)

Deepbody Silverbiddy

D IX, 10; A III, 7; P_1 15–16; LL 35–38; GR 4–5 + 8–9. Body deep, compressed; anterodorsal profile almost straight. Dorsal- and anal-fin spines strong; second dorsal-fin spine longer than the third; second anal-fin spine robust, nearly the same in length of anal-fin base; caudal fin short, deeply forked, tips broadly rounded. **Color:** body brownish silver dorsally, brilliant silver ventrally, with indistinct dark longitudinal stripes along scale rows above and 4–6 rows immediately below lateral line; often 4–11 indistinct vertical narrow dark bars on side of body; anal and pelvic fins yellow. **Size:** maximum length about 37 cm. **Distribution:** Indo-Pacific, from western India to Micronesia. **Remarks:** inhabits soft bottom. Juveniles often observed in estuarine waters. Caught by bottom set nets and bottom trawls. Marketed fresh or dried and salted.

(S. Kimura & S. Tafzilmeriam)

Gerres erythrourus, KAUM–I. 16879, 11.8 cm SL
off Terengganu (KT), 5 Dec. 2008

Gerres filamentosus Cuvier, 1829

Whipfin Mojarra

D IX, 10; A III, 7; P_1 15–16; LL 43–46 (usually 44–45); GR 4–6 + 8. Body deep, compressed, anterodorsal profile somewhat convex. Second dorsal-fin spine very long and filamentous, reaching slightly beyond base of last dorsal-fin ray; anal-fin spines generally robust, third longest; caudal fin deeply forked, lobes pointed. Preopercle with 3 scale rows; 4½–5½ scales between 5th dorsal fin spine base and lateral line. **Color:** body brownish silver dorsally, brilliant silver ventrally, with vertical rows of indistinct dark ovoid spots laterally in adults and subadults; all fins tinged with tan, caudal fin with a blackish margin. **Size:** maximum length about 32 cm. **Distribution:** widely distributed in tropical Indo-Pacific, from eastern coast of Africa to Micronesia. **Remarks:** inhabits sandy or muddy bottoms in coastal areas to depths of at least 50m. Marketed fresh or dried, sometimes used in making fish crackers. Caught mainly by beach seines and bottom trawls. (S. Kimura & S. Tafzilmeriam)

Gerres filamentosus, KAUM–I. 16878, 17.8 cm SL
off Terengganu (KT), 5 Dec. 2008

Gerres limbatus Cuvier, 1830

Saddleback Silverbiddy

D IX, 10; A III, 7; P_1 15; LLp 34–36. Body relatively deep and then, becoming slender with growth. Usually 2 ½ scale rows between 5th dorsal-fin spine base and lateral line; usually 4 ½ scales above lateral line, 7 ½–9 ½ scales below; 2nd dorsal-fin spine slightly shorter than 3rd dorsal-fin spine; 2nd anal-fin spine more robust than 3rd. **Color:** body silvery with 4 or 5 diffuse, dark saddle patches mainly along back in life, extending down sides to midline. Pelvic and anal fins pale yellow. **Size:** maximum length about 12 cm SL; commonly less than 10 cm. **Distribution:** eastern Indian Ocean and West Central Pacific. **Remarks:** found in estuaries, lower reaches of coastal rivers.

(S.Tafzilmeriam)

Gerres limbatus, UMTF 1527 (KAUM–I. 16732), 8.0 cm SL
Setiu, 28 Oct. 2008

Gerres limbatus, UMTF 1175 (KAUM–I. 16801), 3.7 cm SL
Merang, 2 Nov. 2008

Gerres macracanthus Bleeker, 1854

Longspined Silverybiddy

D IX, 10; A III, 7; P_1 15; LLp 41–44. Body relatively slender and compressed. Usually 4 ½ scale rows between 5th dorsal-fin spine base and lateral line; 5 ½ or 6 ½ scales above lateral line, 9 ½ or 10 ½ scales below. Second dorsal-fin spine elongated and filament; 2nd and 3rd anal-fin spines short. Caudal fin deeply forked. **Color:** body silvery with usually 6–10 (rarely up to 14 as faint bands in larger specimens) indistinct vertical dark bands on body; pectoral, pelvic, and anal fins yellowish. **Size:** maximum total length 20 cm. **Distribution:** Indo-West Pacific. **Remarks:** found in coastal waters to depths of at least 30 m. (S. Tafzilmeriam)

Gerres macracanthus, KAUM–I. 16963, 11.5 cm SL
off Terengganu (KT), 11 Dec. 2008

Gerres oyena (Forsskål, 1775)

Common Silverbiddy

D IX, 10; A III, 7; P_1 15–17; LL 35–40; GR 3–6 + 8–9 (usually 8). Body oblong, compressed, anterodorsal profile convex. Posterior tip of maxilla extending beyond anterior margin of eye. Second dorsal-fin spine not elongated; pectoral fins short, not reaching to anal-fin origin. Scales mostly absent on premaxillary groove; scale rows above lateral line 4. **Color:** body silvery, sometime with faint dark vertical bands laterally; tip of dorsal and caudal fins with black margins; a row of small dusky spots on dorsal-fin membrane near base; anal and pelvic fins yellowish. **Size:** maximum length about 25 cm. **Distribution:** Indo-Pacific. **Remarks:** inhabits inshore, especially soft bottom area at depths shallower than 30 m.

(S. Kimura & S. Tafzilmeriam)

Gerres oyena, KAUM–I. 16509, 6.4 cm SL
Cendering, 6 Oct. 2008

Pentaprion longimanus (Cantor, 1850)

Longfin Silverbiddy

D IX–X, 12–15; A V–VI, 12–14; P_1 17; LLp 44–48. Body compressed, ovoid, moderately deep, its depth 2.5–2.8 times in standard length. Anal-fin base longer than base of soft-rayed portion of dorsal fin; pectoral fins long; caudal fin deeply forked with pointed lobes. **Color:** body silvery with a mirror-like stripe from snout to caudal peduncle; fins dusky yellow. **Size:** maximum length 20 cm. **Distribution:** Indo-West Pacific. **Remarks:** inhabits inshore areas on muddy-sand bottoms to depths of 70 m. Marketed fresh; commonly used for fishmeal.

(S. Tafzilmeriam)

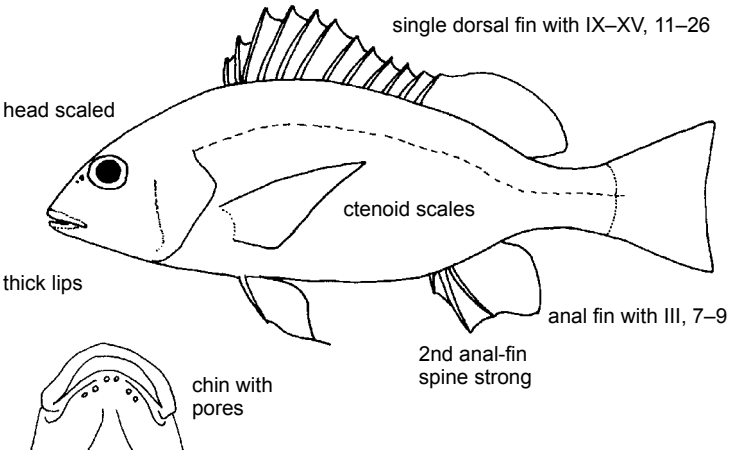
Pentaprion longimanus, KAUM–I. 17087, 9.1 cm SL
off Terengganu (KT), 28 Dec. 2008

HAEMULIDAE

Sweetlips (Grunts)

By Hiroyuki Motomura, Koichi Shibukawa and Mizuki Matsunuma

Medium-sized (up to 120 cm), oblong and compressed fishes. Lateral line continuous. Head almost entirely scaled, exclusive of lips, chin and tip of snout; mouth small or moderate in size, subterminal; lips thick in *Plectorhinchus*; chin with distinct pores; hind margin of lacrimal not exposed; opercle with a single spine; teeth conical, forming narrow band in each jaw; teeth on outermost row of jaws enlarged, but not canine-like; palatine toothless; branchiostegals 7. A single dorsal fin with IX–XV strong spines (second spine usually very strong) and 11–26 soft rays; anal fin with III spines and 6–18 soft rays; pelvic fin below base of pectoral fin, with I spine and 5 soft rays; caudal fin truncate or emarginated in adults, rounded in juveniles. Scales small and ctenoid. Vertebrae 26–27. **Color:** highly variable, appearing characteristic pattern (e.g., banded and spotted) in each species; in many species, juveniles strikingly differ from adult in color.



Remarks: inhabit coastal waters including reefs, bays, and estuaries, down to about 80 m. Carnivorous, feed on small benthic invertebrates or fishes. Esteemed as food fish, caught by spear, line, and various nets; marketed fresh or salted.

Similar families occurring in the area: Lutjanidae – suborbital area naked; palatine usually toothed. Lethrinidae – no scales on preopercle; dorsal fin with 9–10 soft rays. Nemipteridae – no pores on chin; hind margin of lacrimal exposed. Sparidae – suborbital area naked; preopercular margin not serrated.

Diagramma picta picta (Thunberg, 1792)

Yellow-spotted Slatey

D IX–X, 20–26; A III, 7; P_1 16–18; LLp 55–74; GR 17–23. Body deep and compressed. Profile of snout steep; lips fleshy; chin with six pores; lower jaw without longitudinal groove at midline. **Color:** varying much by size; large adult silvery gray, with or without dusky spots; subadult pale gray with numerous bright yellow or dusky spots or lines on head, body and fins; juvenile with broad longitudinal black bands on body. **Size:** commonly 45 cm, maximum 100 cm. **Distribution:** Indo-West Pacific. **Remarks:** inhabits rocky and coral reefs and sandy bottoms. Nocturnal, forming small aggregations by day and dispersing at night for feeding; feeds on small benthic invertebrates. Johnson et al. (2001) regarded it as a valid subspecies. (K. Shibukawa)

Diagramma picta picta, KAUM–I. 16901, 12.3 cm SL off Terengganu (KT), 6 Dec. 2008

Plectorhinchus gibbosus (Lacepède, 1802)

Harlequin Sweetlip

D XIII–XIV, 15–17; A III, 7–8; P_1 16–18; P_2 I, 5; LLp 46–55; GR 8–10 + 18–20. Body deep, compressed. Lip fleshy, greatly swollen with age. Chin with 6 pores; no median pit; not covering barbels or papillae. Caudal fin rounded in juveniles, rounded to truncate in adults. **Color:** body dark gray. Centers of scales paler than edges. No distinct spots or blotches on fins. **Size:** maximum about 75 cm. **Distribution:** widely distributed in the Indo-West Pacific, from South Africa east to the Samoa Islands, and southern Japan south to New South Wales, Australia. **Remarks:** generally found in silty reef areas, young penetrating estuarine habitats. (H. Motomura)

Plectorhinchus gibbosus, KAUM–I. 17058, 38.7 cm SL
off Terengganu (KT), 24 Dec. 2008

Plectorhinchus gibbosus, UMTF 1011 (KAUM–I. 16672), 10.5 cm SL
Kemaman, 21 Oct. 2008

Pomadasys argenteus (Forsskål, 1775)

Silver Grunt

D XII, 13–14; A III, 7; P_1 16–18; P_2 I, 5; LLp 47–49. Body deep, compressed; head blunt. Lip fleshy, greatly swollen with age. Chin with 2 pores and a median pit. Circumpeduncular scales 21 or 22; 5 scales between lateral line and dorsal-fin origin. Caudal fin emarginate. **Color:** in adults, body silvery with dark blotches on dorsal fin and numerous scattered dark brown to blackish spots on body side. Juveniles with body pale brownish, lighter below, back with irregular longitudinal streaks on alternate scale rows; dorsal fin with dusky membranes; a dark spot on gill cover. **Size:** commonly 40 cm, maximum 60 cm. **Distribution:** Indo-West Pacific from the Red Sea to Melanesia, northern Australia north to southern Japan. **Remarks:** found in coastal inshore waters in open bays and estuaries. Marketed fresh. (M. Matsunuma)

Pomadasys argenteus, KAUM–I. 17252, 13.1 cm SL
off Terengganu (KT), 17 Jan. 2009

Pomadasys kaakan (Cuvier, 1830)

Javelin Grunt

D XII, 13–15; A III, 7–8; P_1 17–18; P_2 I, 5; LLp 43–50; GR 5–6 + 13–14. Body moderately elongate, compressed. Chin with two pores and a median pit. Caudal fin emarginate. **Color:** body silver with six to ten vertical series of blackish spots or double spots in four rows, third row along lateral line; spots less distinct with growth. No blotches or spots on fins. **Size:** maximum length about 80 cm. **Distribution:** Indo-West Pacific. **Remarks:** inhabits turbid inshore waters with sandy to muddy bottoms to depths of 75 m. (H. Motomura)

Pomadasys kaakan, KAUM–I. 17000, 11.2 cm SL
off Terengganu (KT), 14 Dec. 2008

Pomadasys maculatus (Bloch, 1793)

Saddle Grunt

D XII, 13–14; A III, 7; P_1 17; P_2 I, 5; LLp 50–52; GR 5–6 + 13–15. Body moderately elongate, compressed. Chin with two pores and a median pit. Posterior portion of maxilla slightly covered or not covered by lacrimal laterally in western Pacific population; largely covered by lacrimal in Indian Ocean population. Caudal fin slightly emarginate. **Color:** body silver with a large black blotch across nape, extending downward to below lateral line; three broken black blotches on upper half of trunk. A large dark blotch on membrane centrally between second and seventh dorsal-fin spines. **Size:** maximum length 59.3 cm. **Distribution:** Indo-West Pacific. **Remarks:** occurs in coastal inshore waters in open bay and estuaries to depths of less than 110 m. (H. Motomura)

Pomadasys maculatus, KAUM–I. 16835, 15.7 cm SL
off Terengganu (KT), 5 Dec. 2008

Pomadasys unimaculatus Tian, 1982

Red Patched Grunter

D XII, 13–14; A III, 7; P_1 16–17; P_2 I, 5; LLp 47–50; GR 3–4 + 12–13. Body moderately elongate, compressed. Chin with two pores and a median pit. Middle and posterior portion of maxilla largely covered by lacrimal laterally. Caudal fin slightly emarginate. **Color:** body silver with a large dark brown blotch across nape, extending downward to lateral line; four small faintly dark semicircular patches on upper half of trunk. A large dark red blotch on membrane distally between third and sixth to seventh dorsal-fin spines. **Size:** maximum length about 25 cm. **Distribution:** the South China Sea and Andaman Sea. **Remarks:** occurs in coastal inshore waters on sandy and muddy bottoms. (H. Motomura)

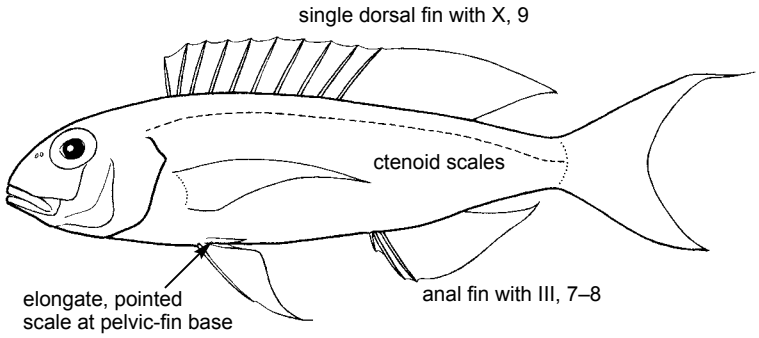
Pomadasys unimaculatus, KAUM–I. 17085, 16.1 cm SL
off Terengganu (KT), 28 Dec. 2008

NEMIPTERIDAE

Threadfin Breams and Monocle Bream

By Koichi Shibukawa, Hiroyuki Motomura and Mizuki Matsunuma

Medium sized (up to 35 cm), moderately elongate fishes. Head compressed; eyes moderately large; jaws subequal, or upper jaw slightly beyond lower jaw; hind margin of suborbital bone exposed; branchiostegal rays 6. Single dorsal fin with X spines and 9 soft rays; anal fin with III spines and 7–8soft rays; pectoral fin more or less falcate, with 14–19 soft rays (uppermost 2 rays unbranched); pelvic fin with I spine and 5 soft rays; caudal fin emarginated, lunate or forked, with filamentous tip on each or both lobes in many species. Scales ctenoid; cheek and operculum scaled; a pair of elongate, pointed scales at base of pelvic fin. **Color:** pinkish, yellowish, grayish, or brownish dorsally, turned to silvery ventrally, with various-colored vertical bands or longitudinal stripes on head and body in many species.



Remarks: found in coral reefs and coastal to offshore shelf waters with sandy or muddy bottoms, down to about 300 m depth. Carnivorous, feed on small fishes, crustaceans, cephalopods, and polychaetes. Esteemed as food fish in many species; marketed fresh, dried and salted, or minced for fish balls or fish cakes.

Similar families occurring in the area: Caesionidae – dorsal fin with X–XV spines and 8–22 soft rays; anal fin with III spines and 9–13 soft rays; no elongated, pointed scales at base of pelvic fin. Haemulidae – dorsal fin with IX–XIV spines and 11–26 soft rays. Lethrinidae – anal fin with III spines and 8–10 soft rays; no scales on preopercle in *Lethrinus* (scaly in other genera). Lutjanidae – no elongate and pointed scales at base of pelvic fin.

Nemipterus bathybius Snyder, 1911

Yellowbelly Threadfin Bream

D X, 9; A III, 7; P_1 15–17; P_2 I, 5; GR 13–16. Body moderately elongate, compressed; body depth 2.9–3.6 in SL. Posterior margin of suborbital and lower preopercular margin not serrated; suborbital spine absent. Ventral margin of orbit just reaching or not reaching a horizontal line through snout tip and upper base of pectoral fin. First 2 dorsal-fin spine separated by a membrane; membranes between dorsal-fin spines not strongly incised. Upper lobe of caudal fin falcate or ribbon-like extension (broken in the photo specimen). Pectoral fin not reaching a vertical through anal fin origin. Three transverse scale rows on preopercle. **Color:** body pinkish dorsally, silvery ventrally; belly yellow. Two yellow stripes, first below lateral line from behind opercle to upper caudal-fin base; second from behind upper of pectoral fin base to middle of caudal-fin base. Caudal fin pink, upper lobe and filament yellow. **Size:** maximum 20 cm SL. **Distribution:** western Pacific, including southern Japan, South China Sea, Southeast Asian countries and northwestern Australia. **Remarks:** usually occurs on sandy or muddy bottoms at depths of 35 to 300 m, but most common between 45 and 90 m. Feeds mainly on crustaceans, small fishes, and cephalopods in adults and copepods, ostracods, and amphipods in young.

(H. Motomura)

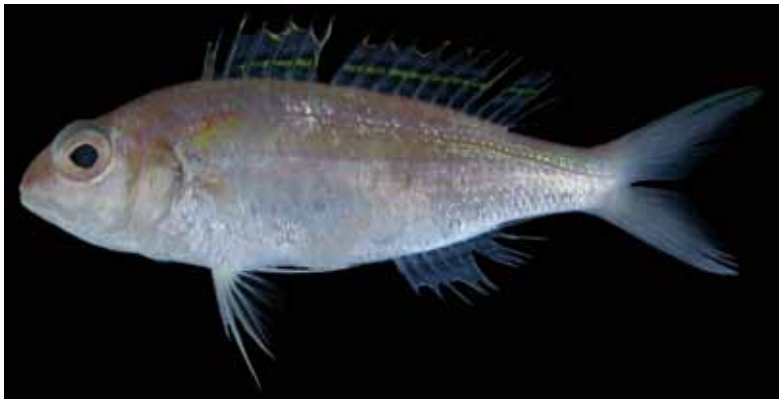
Nemipterus bathybius, KAUM–I. 17133, 11.4 cm SL
off Terengganu (KT), 1 Jan. 2009

Nemipterus furcosus (Valenciennes, 1830)

Forktailed Threadfin Bream

D X, 9; A III, 7; P_1 16–18; P_2 I, 5; GR 7–10. Body moderately elongate, compressed; body depth 3–3.9 in SL. Snout length equal to or greater than eye diameter. Suborbital spine absent; 4–6 transverse scale rows on preopercle. Ventral margin of orbit tangent to or above just reaching or not reaching a horizontal line through snout tip and upper base of pectoral fin. Pectoral fin reaching to or just short of a vertical through anus; pelvic fins short, reaching to or short of a vertical through anus; caudal fin deeply forked; upper lobe of the fin pointed, not produced. **Color:** body pinkish dorsally, silvery ventrally. Nine indistinct reddish saddle bars on back; forming a reddish spot behind origin of lateral line. Dorsal fin pale rosy, sometimes with yellowish tinge, outer margin darker pink; a yellow stripe submarginally. Anal fin bluish white, with row of transparent or faint yellowish spots near base. Caudal fin pale rosy, with yellow tinge; lower margin of fin white; posterior tip of upper lobe red. **Size:** maximum length 20 cm SL. **Distribution**: eastern Indian Ocean and West Pacific. **Remarks:** occurs on sand and mud bottoms in depths of 8–110 m. (M. Matsunuma)

Nemipterus furcosus, UMTF 1080 (KAUM–I. 16573), 13.0 cm SL
Bidong Island, 13 Oct. 2008



Nemipterus hexodon, KAUM–I. 17017, 8.6 cm SL
off Terengganu (KT), 16 Dec. 2008

Nemipterus marginatus, KAUM–I. 16821, 8.7 cm SL
off Terengganu (KT), 5 Dec. 2008

Nemipterus hexodon (Quoy & Gaimard, 1824)

Ornate Threadfin Bream

D X, 9; A III, 7; P_1 15–18; P_2 I, 5; GR 11–17. Body moderately elongate, compressed. Posterior margin of suborbital and lower preopercular margin not serrated; suborbital spine absent. Ventral margin of orbit not reaching a horizontal line through snout tip and upper base of pectoral fin. Enlarged canines anteriorly in upper and lower jaws. First 2 dorsal-fin spines separated by a membrane. Upper lobe of caudal fin slightly rounded. Pectoral fin not extending beyond a vertical through anal fin origin. Three transverse scale rows on preopercle. **Color:** body pinkish dorsally, silvery ventrally, with 6–8 pale yellow stripes below lateral line. A red, ovoid spot below lateral line origin, bordered below by bright yellow. **Size:** maximum length 21 cm SL. **Distribution:** the Andaman Sea and West Pacific. **Remarks:** usually occurs on sandy or muddy bottoms at depths of 10 to 80 m. (H. Motomura)

Nemipterus marginatus (Valenciennes, 1830)

Red Filament Threadfin Bream

D X, 9; A III, 7; P_1 16; P_2 I, 5; GR 12. Body moderately elongate, compressed. Posterior margin of suborbital and lower preopercular margin not serrated; suborbital spine absent. Ventral margin of orbit above a horizontal line through snout tip and upper base of pectoral fin. Pectoral and pelvic fins long; caudal fin forked, upper lobe produced into a short filament. Three transverse scale rows on preopercle. **Color:** body pinkish dorsally, silvery ventrally; with a broad yellow stripe, divided above pectoral fin, from below lateral line origin to upper part of caudal peduncle; a second yellowish-orange stripe from above base of pectoral fin to lower part of caudal peduncle; a reddish spot below and just behind lateral line origin; caudal fin including filament, reddish, its median rays yellowish. **Size:** maximum length 15 cm SL. **Distribution:** West Pacific. **Remarks:** found on sand or mud bottoms in depths of 12 to 70 m.

(M. Matsunuma)

Nemipterus tambuloides (Bleeker, 1853)

Fivelined Threadfin Bream

D X, 9; A III, 7; P_1 16; P_2 I, 5; GR 6–8. Body moderately elongate, compressed; body depth 3.2 to 3.6 in SL. Posterior margin of suborbital and lower preopercular margin not serrated; suborbital spine absent. Ventral margin of orbit tangent to or just above a horizontal line through snout tip and upper base of pectoral fin. Pectoral and pelvic fins long; caudal fin deeply forked, tip of upper lobe pointed. Three transverse scale rows on preopercle. **Color:** body pinkish dorsally, silvery ventrally, 5 well-defined yellow stripes along body. Dorsal fin translucent pink, with yellow margin; a narrow yellow stripe just above base fin. Anal fin translucent bluish white with pale yellow stripe near base of fin. Caudal fin bright rosy, upper tip yellow. **Size:** maximum length 23 cm SL. **Distribution:** the Andaman Sea and West Central Pacific. **Remarks:** usually occurs on sand or mud bottoms in depths of 50 to 70 m.

(M. Matsunuma)

Nemipterus tambuloides, KAUM–I. 17132, 11.0 cm SL
off Terengganu (KT), 1 Jan. 2009

Nemipterus zysron, KAUM–I. 17134, 12.0 cm SL
off Terengganu (KT), 1 Jan. 2009

Nemipterus zysron (Bleeker, 1857)

Slender Threadfin Bream

D X, 9; A III, 7; P_1 15–17; P_2 I, 5; GR 10. Body moderately elongate, compressed; body depth 3.8–4.6 in SL. Posterior margin of suborbital and lower preopercular margin not serrated; suborbital spine absent. Ventral margin of orbit just reaching or not reaching a horizontal line through snout tip and upper base of pectoral fin. First two dorsal-fin spine separated by a membrane; membranes between dorsal-fin spines not strongly incised. Upper lobe of caudal fin falcate or ribbon-like extension. Pectoral and pelvic fins short, not reaching to a vertical through anal fin origin. **Color:** body pinkish dorsally, silvery ventrally; belly white. Two yellow stripe on snout, upper extending onto eye posteriorly. Dorsal fin bluish translucent, with yellow margin, broad pale yellow stripe on center of fin; anal fin bluish translucent with pale yellow stripe near base of fin ; caudal fin pink, with reddish posterior margin; upper margin and filament yellow. **Size:** maximum length 18 cm SL. **Distribution:** Indo-West Pacific. **Remarks:** found on sand bottoms near rocks in depths between 10 to 125 m. (K. Shibukawa)

Pentapodus setosus, KAUM–I. 16819, 10.1 cm SL
off Terengganu (KT), 5 Dec. 2008

Pentapodus setosus (Valenciennes, 1830)

Butterfly Whiptail

D X, 9; A III, 7; P_1 15; P_2 I, 5; LL 46–48; GR 16–17. Body moderately elongate, fusiform; snout length greater than eye diameter. Scales on top of head reaching forward to or in front of middle of eyes; six transverse scale rows on preopercle; lower limb of preopercle naked. Pelvic fins short, not reaching level of anus; caudal fin forked, upper lobe produced into a very long trailing filament. **Color:** body whitish, pale brownish dorsally; a yellow stripe from behind eye, gradually arching on back and terminating in a black spot on upper caudal peduncle; a narrow blue line running through yellow stripe, this line convergent with a blue line from origin of anal fin, both lines meeting at an acute angle behind black spot on caudal peduncle; 2 bluish stripes across snout, first from middle of eye to tip of snout, second from upper lip to lower margin of eye. Dorsal fin pale blue, with yellow margin; caudal fin pinkish, filament pinkish brown. **Size:** maximum length 17.5 cm SL. **Distribution:** West Central Pacific. **Remarks:** found in offshore waters. (M. Matsunuma)

Scolopsis margaritifera (Cuvier, 1830)

Pearly Monocle Bream

D X, 9; A III, 7; P_1 16–17; P_2 I, 5; LL 36–39. Body relatively deep, compressed; body depth 2.4–3.8 in SL. Posterior margin of suborbital with a large backwardly pointing spine and a series of smaller spines or serrations; a small forward pointing spine below eye absent. Preopercular margin serrated. Caudal fin forked, upper lobe not produced into a filament. Scales on dorsal head reaching forward to or in front of level of anterior margin of eye; temporal region covered with scales. **Color:** body olive dorsally, whitish ventrally. Center of scales with pearly or yellowish spots, forming longitudinal and transverse lines. In juveniles, upper half of body white, lower yellow, with two dark stripes; a large dark blotch on dorsal fin anterioly. **Size:** maximum length 19.5 cm SL. **Distribution:** the Andaman Sea and the western central Pacific. **Remarks:** occurs in shallow waters on sandy or muddy bottoms close to reefs, to depths of 20 m. (H. Motomura)

Scolopsis margaritifera, UMTF 1318 (KAUM–I. 16595), 4.6 cm SL
Bidong Island, 12 Oct. 2008

Scolopsis monogramma (Cuvier, 1830)

Monogrammed Monocle Bream

D X, 9; A III, 7; P_1 16–17; P_2 I, 5; LL 36–39. Body relatively deep, compressed; body depth 2.4–3.8 in SL. Suborbital margin with a large backwardly pointing spine; no antrorse spine just below eye; lower limb of preopercle scaled. Pelvic fin reaching to anus when deppressed; caudal fin forked or lunate, upper lobe a little longer than lower lobe or produced into a short filament. **Color:** head and body grayish dorsally, silvery ventrally; dusky midlateral stripe on body; some sky blue streaks on head. **Size:** commonly 18 cm SL. **Distribution:** the Andaman Sea and West Pacific. **Remarks:** found in coastal waters with sandy or muddy bottom around coral reefs in depths to 50 m. (K. Shibukawa)

Scolopsis monogramma, KAUM–I. 16848, 18.9 cm SL
off Terengganu (KT), 5 Dec. 2008

Scolopsis monogramma, UMTF 1358 (KAUM–I. 16576), 17.0 cm SL
Bidong Island, 13 Oct. 2008

Scolopsis taenioptera (Cuvier, 1830)

Lattice Monocle Bream

D X, 9; A III, 7; P_1 17–18; P_2 I, 5; LL 45–48. Body relatively deep, compressed; body depth 2.7–3.1 in SL. Suborbital with a large backwardly pointing spine; no antrorse spine just below eye; exterminal edge of maxilla smooth; lower limb of preopercular naked. Pelvic fin reaching to anus when deprresed; caudal fin forked or lunate, upper lobe not produced into a filament. **Color:** head and body grayish dorsally, silvery ventrally; orange or red spot at upper part of pectoral fin base. **Size:** commonly 15 cm, maximum 20 cm SL. **Distribution:** the Andaman Sea and West Pacific. **Remarks:** found in offshore waters with sandy or muddy bottom in depths to 50 m. (K. Shibukawa)

Scolopsis taenioptera, KAUM–I. 16970, 19.8 cm SL
off Terengganu (KT), 11 Dec. 2008

Scolopsis vosmeri (Bloch, 1792)

Whitecheek Monocle Bream

D X, 8–9; A III, 7; P_1 18–19; P_2 I, 5; LL 41–44; GR 11–12. Body deep, compressed; depth 2–2.6 in SL. Suborbital with a large backwardly-pointed spine; no antrorse spine just below eye; external edge of maxilla smooth. Pectoral fin short, not reaching to level of anus; pelvic fin reaching to or beyond anus when depressed; caudal fin forked. Scales on top of head extending forward to between level of snout and anterior nostril; lower limb of preopercle scaled. **Color:** head and body brownish, paler ventrally; distinct, broad white vertical bar on head. **Size:** 16 cm SL, commonly 15 cm SL. **Distribution:** Indo-West Pacific. **Remarks:** found in offshore or coastal waters with sandy or muddy bottom around coral reefs. Caught by traps and trawls; marketed fresh. (K. Shibukawa)

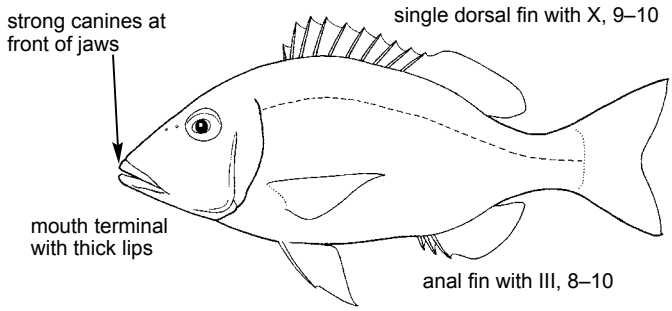
Scolopsis vosmeri, KAUM–I. 16853, 16.7 cm SL
off Terengganu (KT), 5 Dec. 2008

LETHRINIDAE

Emperors

By Koichi Shibukawa, Mizuki Matsunuma and Hiroyuki Motomura

Medium to large sized (up to 100 cm), oblong and compressed fishes. Body compressed, covered with ctenoid scales; lateral line continuous. Cheek scales absent in *Lethrinus*, whereas present in the other genera; mouth terminal with relatively thick lips; strong canines at front of jaws; either conical or molariform teeth on sides of jaws; no teeth on roof of mouth; branchiostegals 6. A single dorsal fin with X spines and 9–10 soft rays; anal fin with III spines and 8–10 soft rays; pectoral fin with 13–15 soft rays; pelvic fin below base of pectoral fin, with I spine and 5 soft rays; caudal fin emarginated or forked. Scales ctenoid, moderate in size. Vertebrae 24. **Color:** head and body silvery, gray, and light or reddish brown, frequently mottled, spotted or striped with dusky, blue, yellow or red.



Remarks: commonly found in coastal waters around coral and rocky reefs, seagrass beds and mangroves. Carnivorous, feeds on various organisms, e.g., fishes, mollusks, crustaceans, polychaetes, and sea urchins. Esteemed as food fish, caught by handline, traps and trawls.

Similar families occurring in the area: Haemulidae – chin with distinct pores; scales on cheek. Lutjanidae – teeth on roof of mouth; scales on cheek. Sparidae – usually more spines in dorsal fin; scales on cheek.

Gymnocranius elongatus Senta, 1973

Forktail Large-eye Bream

D X, 10; A III, 10; P_1 14; P_2 I, 5; LLp 47–48. Body oblong, compressed; its depth 2.2–2.4 in SL. Outer surface of maxilla smooth. Ventral margin of orbit intersected by line from tip of snout to middle of caudal-fin fork. Sides of jaws with canines and villiform teeth. Cheek with 4–6 transverse scale rows; inner surface of pectoral fin axil not covered with scales. Caudal fin strongly forked, with pointed tips; median rays distinctly shorter than eye diameter. **Color:** body silvery, sometimes slightly brownish dorsally; about 8 transverse brown bars on sides; first bar through eye and across cheek. Fins mainly clear to yellow-orange; a narrow brown bar often across pectoral-fin base; caudal fin margins and tips often deep red. **Size:** maximum length about 35 cm. **Distribution:** eastern Indian Ocean and western Pacific Ocean. **Remarks:** occurs in coastal and shelf waters at depths between about 50 and 100 m. Caught mostly with bottom trawls.

(M. Matsunuma)

Gymnocranius elongatus, KAUM–I. 17069, 13.9 cm SL
off Terengganu (KT), 27 Dec. 2008

Gymnocranius elongatus, KAUM–I. 17109, 13.5 cm SL
off Terengganu (KT), 31 Dec. 2008

Gymnocranius griseus (Temminck & Schlegel, 1843)

Gray Large-eye Bream

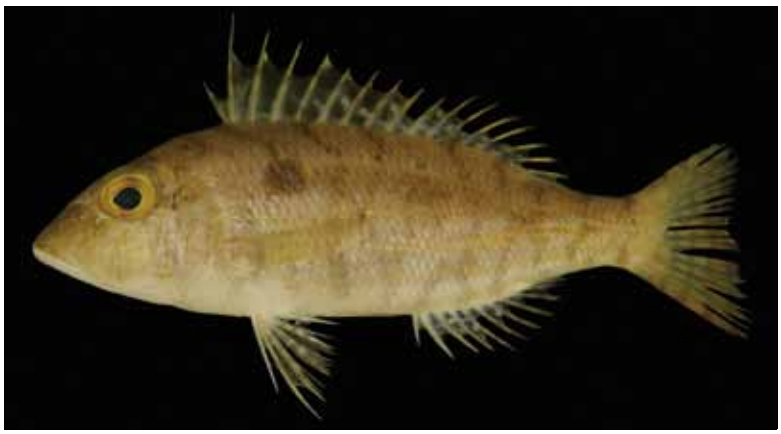
D X, 10; A III, 10; P_1 14; P_2 I, 5; LLp 46–48. Body oblong, compressed; its depth comparatively deep, about 1.9–2.2 in SL. Outer surface of maxilla smooth. Ventral margin of orbit above horizontal line through snout tip and middle of caudal fin fork. Sides of jaws with canines and villiform teeth. Cheek with 4 transverse scale rows; inner surface of pectoral fin axil not covered with scales. Caudal fin moderately forked, with pointed tips; median rays slightly greater than eye diameter. **Color:** body silvery; frequently with a diffuse to vivid pattern of 5 to 8 narrow dark bars on side; first bar through eye and across cheek. Fins mainly clear to yellowish; a narrow brown bar often across pectoral-fin base. **Size:** maximum length about 35 cm. **Distribution:** distributed in the eastern Indian Ocean and the western Pacific from southern Japan to western Australia. **Remarks:** occurs in continental shelf and coastal inshore waters at depths between about 20 and 80 m. Caught mostly with bottom trawls. (H. Motomura)

Gymnocranius griseus, KAUM–I. 17316, 16.5 cm SL
off Terengganu (KT), 21 Jan. 2009

Lethrinus genivittatus Valenciennes, 1830

Longspine Emperor

D X, 9; A III, 8; P_1 13; P_2 I, 5; LLp 46–47. Body moderately elongate and slender; its depth 2.9–3.5 in SL. Head profile near eye slightly convex. Outer surface of maxilla with a distinct knob. Second dorsal-fin spine the longest, much longer than other dorsal-fin spines. First or second anal-fin soft ray longest. Cheek not covered with scales; inner surface of pectoral fin axil covered with small scales; 4 ½ scale rows between lateral line and base of middle dorsal fin spines; 15 or 16 scale rows in lower series around caudal peduncle. **Color:** body tan or brown on upper sides, lower sides white with 3 brown or tan stripes, sides often with scattered irregular black oblique bars and a square black blotch above pectoral fins and bordering below lateral line; head brown or tan sometimes with several broad, somewhat indistinct vertical and oblique bands; fins pale, speckled with small white blotches. **Size:** maximum length about 25 cm. **Distribution:** eastern Indian Ocean and West Pacific. **Remarks:** found in shallow coastal waters. Marketed fresh. (M. Matsunuma)



Lethrinus genivittatus, KAUM–I. 16980, 12.4 cm SL
off Terengganu (KT), 12 Dec. 2008

Lethrinus genivittatus, KAUM–I. 17240, 11.6 cm SL
off Terengganu (KT), 15 Jan. 2009

Lethrinus lentjan (Lacepède, 1802)

Pink Ear Emperor

D X, 9; A III, 8; P_1 13; P_2 I, 5; LLp 46–47. Body moderately deep; its depth 2.5–2.8 in SL. Dorsal profile of snout around straight. No scales on cheek; inner surface of pectoral-fin base scaled or naked; 6 longitudinal scale rows (including small scales beneath dorsal-fin base) between lateral line and base of middle dorsal-fin spine. **Color:** body grayish dorsally, silvery ventrally; whitish spot at center of each scale on body; posterior margin of opercle red; base of pectoral fin sometimes with red marking; caudal fin mottled. **Size:** 52 cm. **Distribution:** Indo-West Pacific **Remarks:** found in lagoons, coral reefs and seagrass beds; juveniles enter estuaries and mangrove swamps. Carnivorous, feeds on crustaceans, mollusks, polychaetes and fishes. Esteemed as food fish. (K.Shibukawa)

Lethrinus lentjan, KAUM–I. 16923, 16.1 cm SL
off Terengganu (KT), 10 Dec. 2008

Lethrinus ornatus Valenciennes, 1830

Ornate Emperor

D X, 9; A III, 8; P_1 13; P_2 I, 5; LLp 46–47. Body moderately deep; its depth 2.3–2.6 in SL. Dorsal profile of snout around eye convex. No scales on cheek; inner surface of pectoral fin base scaled; 6 longitudinal scale rows (including small scale beneath dorsal fin base) between lateral line and base of middle spine of dorsal fin. **Color:** body grayish dorsally, silvery ventrally, with 5–6 longitudinal yellow stripes; posterior margin of preopercle and opercle red. **Size:** 45 cm. **Distribution:** Indo-West Pacific. **Remarks:** found in coastal waters, e.g., lagoons, seagrass beds, and areas adjacent to reef. Carnivorous, feeds on crustaceans, mollusks, polychaetes and fishes. Utilized as food fish, caught by traps, hand-lines, trawls, and seines. (K. Shibukawa)

Lethrinus ornatus, UMTF 1061 (KAUM–I. 16334), 7.4 cm SL
Cendering, 16 Sept. 2008

Lethrinus variegatus, KAUM–I. 17048, 12.8 cm SL
off Terengganu (KT), 18 Dec. 2008

Lethrinus variegatus Valenciennes, 1830

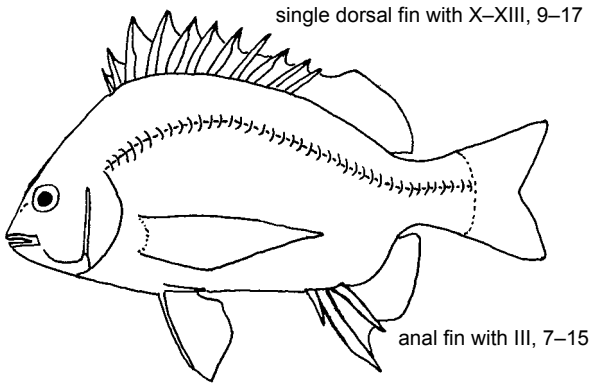
Slender Emperor

D X, 9; A III, 8; P_1 13; P_2 I, 5; LLp 46–48. Body slender, its depth 3.2–3.9 in SL. Head profile near eye convex or nearly straight; posterior nostril closer to anterior nostril than orbit. Outer surface of maxilla smooth. Fourth dorsal-fin spine usually longest. Cheek naked; inner surface of pectoral fin axil not covered with scales; 4 ½ scale rows between lateral line and base of middle dorsal fin spines; 13 or 14 scale rows in lower series around caudal peduncle. **Color:** body brown and gray, lighter ventrally, with scattered irregular dark spots; often 2 dark bands below eye; a dark band across interorbital space; dorsal, anal, pectoral, and pelvic fins light or translucent; caudal fin light and dark striped. **Size:** 20 cm. **Distribution:** Indo-West Pacific. **Remarks:** inhabits sandy bottoms near coral reefs. (M. Matsunuma)

SPARIDAE

Seabreams or Porgies

By Mizuki Matsunuma



Medium to large sized (up to 100 cm) fishes, with body oblong, moderately deep and compressed. Head large, often with a steep upper profile; mouth subhorizontal and slightly protrusible, upper jaw never reaching reaching a vertical line through middle of eye; hind tip of premaxilla overlapping maxilla; jaw teeth well developed, differentiated into either conical, or flattened, and often rounded; vomer and palatines toothless. Gill rakers variable, 7–20 on lower limb of first gill arch. Dorsal fin single, with X–XIII spines and 9–17 soft rays, the spiny and soft portions not separated by a notch; anal fin with III spines and 7–15 soft rays; pectoral fins usually long and pointed; pelvic fin with I spine and 5 soft rays, and an axillary scale at base; caudal fin moderately deeply emarginate or forked. Scales cycloid or weakly ctenoid. **Color:** overall color highly variable, from pinkish or reddish to yellowish or grayish, often with silvery or golden reflections, often with dark or colored spots, stripes, or bars.

Remarks: inhabits tropical and temperate coastal waters; occasionally found in estuaries. Most seabreams are excellent food fish and are of notable commercial importance.

Similar families occurring in the area: Haemulidae – edge of preopercle serrate; suborbital space scaled; no molar teeth. Lutjanidae – edge of preopercle usually serrated, and often excavated to accommodate a bony knob; no molar or incisor-like teeth. Lobotidae – edge of preopercle strongly toothed; no molar teeth; dorsal, anal and caudal fins rounded. Lethrinidae – posterior tip of maxilla overlapping premaxilla; 8–11 soft dorsal-fin rays (9–17 in Sparidae); incisor-like teeth never present.

Acanthopagrus pacificus Iwatsuki, Kume & Yoshino, 2010

Pacific Seabream

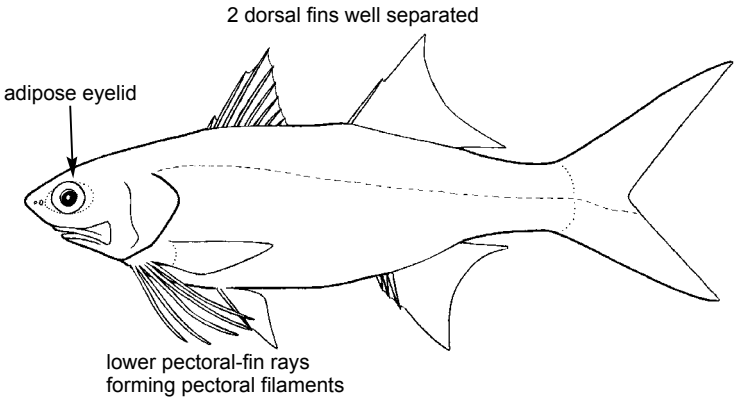
D XI, 11; A III, 8; P_1 15; LLp 42–46. Body deep and moderately compressed; mouth slightly oblique; lips thick; 6 canines anteriorly in upper jaw, 6 in lower jaw; ventral edge of anterior two infraorbitals straight in juveniles, but a moderately curved concavity in adults. Second anal-fin spine robust, clearly longer than 3rd; caudal fin slightly forked, with rounded lobes. Scale rows between 5th dorsal fin spine base and lateral line 3½; front edge of predorsal fin scaly area on head slightly convex, without small scales. **Color:** head and body slivery gray, whitish ventrally; pectoral fin hyaline or somewhat dusky dorsally; other fins dusky. **Size:** 45 cm SL. **Distribution:** West Central Pacific, from the Ryukyu Islands south to northern Australia. **Remarks:** found in shallow coastal waters; juvenile entering lower reaches of rivers.

Acanthopagrus pacificus, KAUM–I. 17141, 18.0 cm SL off Terengganu (KT), 1 Jan. 2009

POLYNEMIDAE

Threadfins

By Hiroyuki Motomura



Body elongate to moderately deep, compressed; size from about 10 to 200 cm. Snout obtusely conical, overhanging. Adipose eyelid covering eye. Mouth ventral, near-horizontal and large; lip on upper jaw absent or poorly-developed; maxilla extending beyond level of posterior margin of eye; supramaxilla absent. Teeth villiform in broad bands on jaws, vomer, palatines and ectopterygoids (vomerine teeth absent in some species); canine, molariform or incisiform teeth absent. 7 branchiostegal rays, one ray present on epihyal. Two well-separated dorsal fins; first dorsal fin with 7 or 8 spines; second dorsal fin with a spine and 11 to 18 soft rays. Anal fin with 2 or 3 spines and 10 to 18 soft rays. Pectoral fins divided into an upper part with 12 to 19 rays joined by membrane and a lower part with 3 to 16 separate soft rays (pectoral filaments). Pelvic fins with a spine and 5 soft rays. Caudal fin deeply forked. Scales weakly ctenoid, extending onto head; scales covering most of dorsal, pectoral, anal and caudal fins; lateral line extending onto posterior margin of caudal fin; trisegmental pterygiophores absent. Vertebrae 10 precaudal and 14 or 15 caudal; supraneural bones 0 to 3. **Color:** silvery, golden or brown. A large black spot at anterior lateral line or several longitudinal dark stripes in some species.

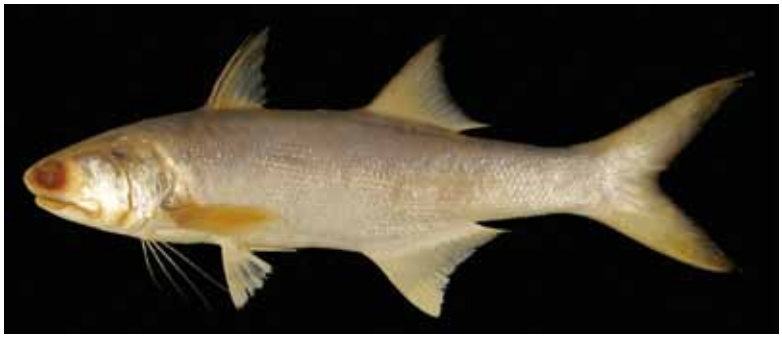
Remarks: taken over sandy or muddy bottoms in tropical and subtropical coastal, brackish and frshwaters. Feeds mainly on crustaceans and small fishes. Some species hermaphrodites.

Similar families occurring in the area: pectoral fin and filament characters (see above description) distinguish Polynemidae from all other families.

Eleutheronema tetradactylum (Shaw, 1804)

Fourfinger Threadfin

D VIII + I, 13–15; A III, 14–16; P_1 15–19 + 4 filaments; P_2 I, 5; LLp 71–80; GR 6–18. Body elongate, moderately compressed. Posterior margin of maxilla extending well beyond a vertical through posterior margin of adipose eyelid. Upper jaw length 5.9–7.1 in standard length. Anterior parts of lower jaw with small teeth extending onto lateral surface, adjacent portion of lip absent; tooth plate extension onto lateral surface of lower jaw 11.1–14.3 in standard length; vomer with deciduous tooth plates on both sides, except in juveniles. Longest pectoral filament not reaching origin of anal fin. Swimbladder absent. **Color:** upper sides of head and trunk with slight darkish silver tinge, becoming lighter on lower sides. Anterior margins of first and second dorsal fins blackish, remaining parts translucent and slightly blackish, respectively; pectoral fin vivid yellow (dusky yellow in large specimens over ca. 350 mm standard length). **Size:** maximum total length about 200 cm. **Distribution:** distributed in the Indo-West Pacific, from the Persian Gulf east to Papua New Guinea and northern Australia. **Remarks:** generally occurs on continental shelves on muddy and sandy substrata, and frequently enters brackish waters, especially as juveniles. Sex changing from male to female with growth.



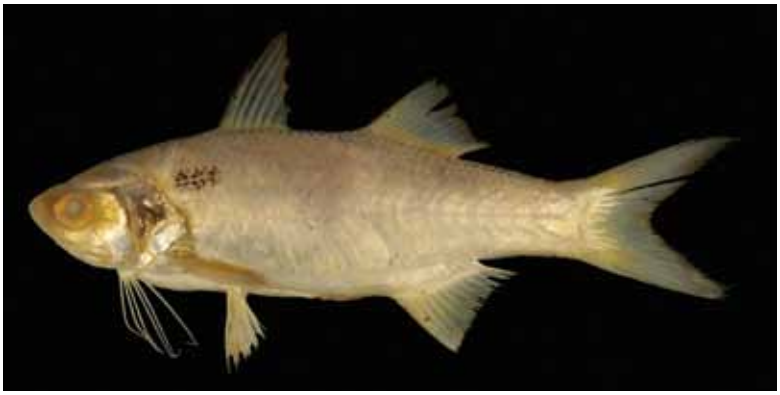
Eleutheronema tetradactylum, KAUM–I. 17039, 23.8 cm SL off Terengganu (KT), 17 Dec. 2008

Leptomelanosoma indicum (Shaw, 1804)

Indian Threadfin

D VIII + I, 12–13; A III, 10–11; P_1 12–14 + 5 filaments; P_2 I, 5; LLp 69–72; GR 18–21. Body elongate, moderately compressed. Posterior margin of maxilla extending well beyond a vertical through posterior margin of adipose eyelid. Anterior one-third of lower jaw with small teeth extending onto lateral surface, adjacent portion of lip poorly developed; vomer with teeth. Longest pectoral filament not reaching origin of anal fin. Swimbladder with many appendages inserted into lateral walls of abdominal cavity. **Color:** head and upper sides of trunk tinged slightly blackish brown, becoming deep black on lower sides; snout and abdominal regions blackish. Origin of pectoral filaments dusky yellowish, grading to blackish posteriorly; pectoral fin membrane deep black. **Size:** maximum total length 1.4 m. **Distribution:** distributed in the Indo-West Pacific, from Pakistan to Papua New Guinea. **Remarks:** mainly occurs near estuaries, sometimes entering rivers, and is occasionally taken from depths to 100 m.

Leptomelanosoma indicum, KAUM–I. 17104, 20.9 cm SL
off Terengganu (KT), 28 Dec. 2008



Polydactylus sextarius, KAUM–I. 16905, 12.3 cm SL
off Terengganu (KT), 6 Dec. 2008

Polydactylus sextarius (Bloch & Schneider, 1801)

Blackspot Threadfin

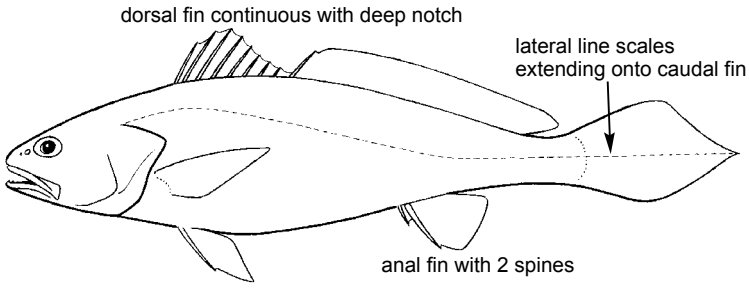
D VIII + I, 12–13; A III, 11–13; P_1 13–15 + 6 filaments; P_2 I, 5; LLp 45–51; GR 25–30. Body moderately deep, compressed. Posterior margin of maxilla reaching to or slightly short of a vertical through posterior margin of adipose eyelid. Lip on lower jaw well-developed, dentary teeth restricted to dorsal surface; teeth villiform in broad bands on palatines and ectopterygoids; vomerine tooth plate covered with skin and teeth absent. All pectoral fin rays, except uppermost 1 or 2, unbranched. Longest pectoral filament not reaching to posterior tip of pectoral fin. Swimbladder atrophied, like a fine string. **Color:** head and body silver. A large black spot anteriorly on lateral line. Posterior margins of first and second dorsal fins and caudal fin slightly blackish, remaining parts translucent white. Pectoral fin membrane dark yellow; pectoral filaments faintly white. **Size:** maximum standard length 17 cm. **Distribution:** distributed in the eastern Indian and western Pacific Oceans, from India east to Japan and Indonesia. Not occur in Australian waters. **Remarks:** occurs on sandy and muddy bottoms, being taken from depths of 16 to 73 m.

SCIAENIDAE

Croakers

By Aziz Arshad and Hiroyuki Motomura

Small to large fishes, reaching 200 cm standard length. Body moderately elongate, compressed. Body, except snout tip, completely covered with scales. Enlarged teeth always form outer series in upper jaw, inner series in lower jaw; vomer and palatines without teeth. Dorsal fin continuous, with deep notch between anterior and posterior portions; with VIII to X spines anteriorly and I spines and 21 to 44 soft rays posteriorly; base of posterior portion much longer than anal fin base. Anal fin with II spines and 6 to 12 soft rays. Caudal fin emarginate to pointed, never deeply forked. Pelvic fins with I spine and 5 soft rays. Lateral line scales extending to posterior margin of caudal fin. Swimbladder well developed with thick wall, with horn-like, tube-like, or arborescent appendages. **Color:** variable from silvery to black; with spots and dark bands in some species.



Remarks: occurs in coastal waters, estuaries and rivers. No records from oceanic island groups distantly separated from a continental shelf. Usually found over muddy or sandy bottoms.

Similar families occurring in the area: the following combination of characters distinguish Sciaenidae from all other families: anal fin with II spines and lateral line scales extending to posterior margin of caudal fin.

Chrysochir aureus (Richardson, 1846)

Reeve's Croaker

D XI, 25–28; A II, 6–7; P_2 I, 5; LGR 8–9. Body slender. Mouth nearly horizontal; posterior margin of maxilla extending beyond a vertical through posterior margin of orbit. No barbel on chin; upper rostral pores 3, marginal rostral pores 5; mental pores in 3 pairs, the first slit-like on either side of symphysis. Swimbladder carrot-shaped, with 27–30 pairs of fan-like appendages along its sides, none entering head. **Color:** body metallic blue dorsally, shading to silvery laterally; oblique streaks along scale rows on back; pectoral fins yellow, other fins gray suffused with orange. **Size:** maximum standard length about 30 cm, commonly to 25 cm. **Distribution:** Indo-West Pacific, from the Bay of Bengal east to southern China and Indonesia. **Remarks:** inhabits shallow coastal waters. (A. Arshad)

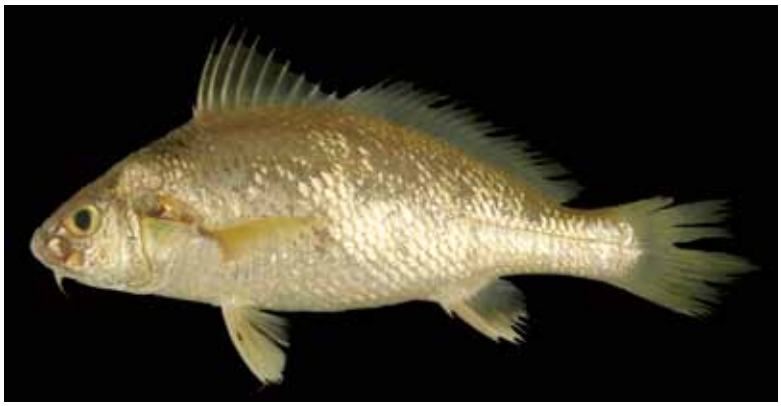
Chrysochir aureus, KAUM–I. 17063, 19.7 cm SL
off Terengganu (KT), 26 Dec. 2008

Dendrophysa russelli (Cuvier, 1829)

Goatee Croaker

D XI, 25–28; A II, 7; P_2 I, 5; LGR 8–10. Body relatively deep. Mouth inferior; posterior margin of maxilla not extending beyond a vertical through posterior margin of orbit. A pointed barbel on chin. Swimbladder carrot-shaped, with about 14–17 pairs of fan-like appendages along its sides; first pair entering head beyond transverse septum. **Color:** body gray dorsally, white ventrally. A dark brown broad band on nape. Opercle with a deep blue blotch. Spinous portion of dorsal fin faintly edged with black. **Size:** maximum standard length 25 cm. **Distribution:** distributed in the eastern Indian Ocean and the western central Pacific Ocean, from the Bay of Bengal east to southern China, the Philippines and eastern Indonesia. **Remarks:** occurs in coastal waters and estuaries.

(H. Motomura)



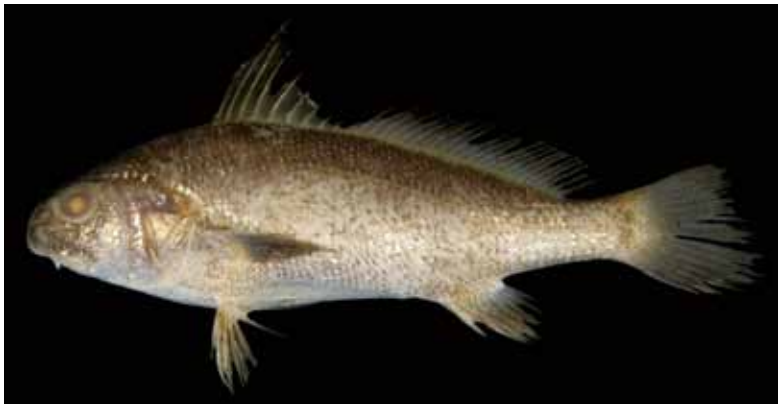
Dendrophysa russelli, KAUM–I. 16997, 11.9 cm SL
off Terengganu (KT), 14 Dec. 2008

Johnius amblycephalus (Bleeker, 1855)

Bearded Croaker

D XI, 23–26; A II, 7; P_2 I, 5; LGR 6–9. Body moderately elongate. A stiff, blunt barbel on chin. Teeth differentiated into large and small in upper jaw, villiform teeth only in lower jaw. Second to fifth dorsal fin spines prolonged. Scales on head and body cycloid; small scales covering soft-rayed portions of dorsal and anal fins. Swimbladder hammershaped, with 14 or 15 pairs of arborescent appendages along its sides, first pair entering head beyond transverse septum and sending a palmate branch to the front of pectoral arch. **Color:** body black or dark brown dorsally, whitish or cream yellow ventrally; prolonged spinous portion of dorsal fin black distally. **Size:** maximum standard length about 25 cm. **Distribution:** Indo-West Pacific, from Pakistan east to southern China and northeastern Australia. **Remarks:** occurs in shallow coastal waters and estuaries.

(H. Motomura)



Johnius amblycephalus, KAUM–I. 17255, 8.6 cm SL
off Terengganu (KT), 17 Jan. 2009

Johnius macrorhynus (Lal Mohan, 1976)

Bigsnout Croaker

D XI, 27–30; A II, 7; P_2 I, 5; LGR 5–9. Body elongate and relatively deep. Mouth inferior; posterior margin of maxilla extending beyond below middle of eye, but not reaching below posterior margin of orbit. No barbel on chin; upper rostral pores 5, marginal rostral pores 5; mental pores in 3 pairs, the first open close behind symphysis in a common pit. Swimbladder hammer-shaped, with 13 or 14 pairs of arborescent appendages along its sides, the first pair entering head beyond transverse septum and sending a palmate branch to the front of pectoral arch. **Color:** head and body silver, lower part of body with a golden tinge; pectoral, pelvic, and anal fins yellow; a faint steel blue blotch on gill cover. **Size:** maximum length about 30 cm. **Distribution:** the South China Sea west to India and Pakistan. **Remarks:** inhabits shallow coastal waters.

(A. Arshad)

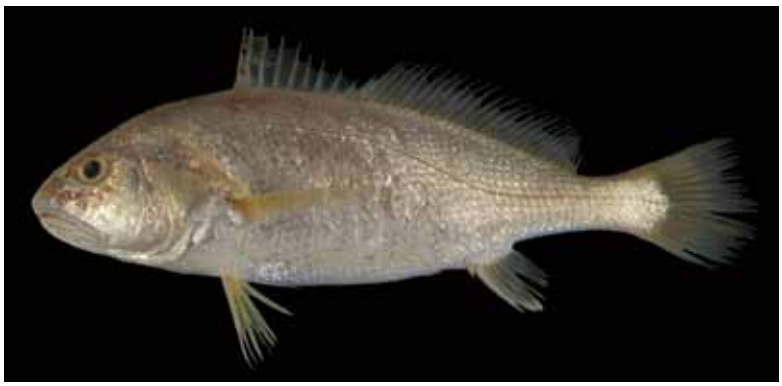
Johnius macrorhynus, KAUM–I. 16873, 15.6 cm SL
off Terengganu (KT), 5 Dec. 2008

Larimichthys crocea (Richardson, 1846)

Large Yellow Croaker

D X, 31–33; A II, 8; P_2 I, 5; LGR 18–20. Body elongate. Mouth terminal; posterior margin of maxilla extending beyond a vertical through posterior margin of orbit. No barbel on chin. Small cycloid scales covering soft-rayed portions of dorsal and anal fins. Swimbladder carrot-shaped, with 31–33 pairs of arborescent appendages along its sides, each appendage with a well-developed dorsal and ventral limb, the first pair entering head beyond transverse septum. **Color:** body slivery, darker dorsally, yellowish laterally; fins yellowish. **Size:** maximum length about 60 cm. **Distribution:** the South China Sea and East China Sea. **Remarks:** Generic assignment follows Nakabo (2002). Inhabits shallow coastal waters. (A. Arshad)

Larimichthys crocea, KAUM–I. 16977, 20.0 cm SL
off Terengganu (KT), 12 Dec. 2008

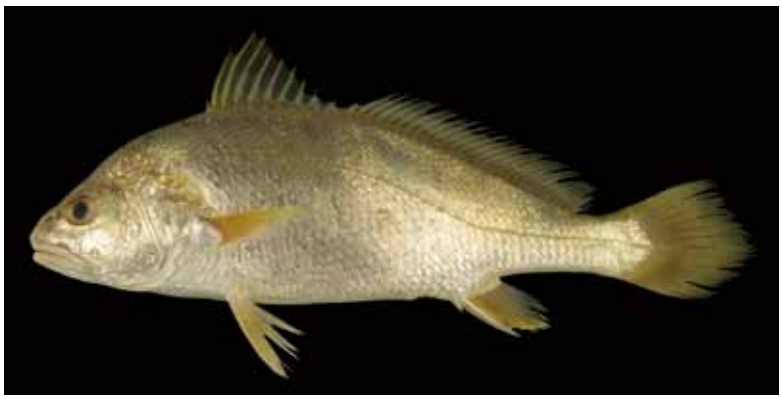


Nibea semifasciata, KAUM–I. 16876, 15.9 cm SL
off Terengganu (KT), 5 Dec. 2008

Nibea semifasciata Chu, Lo & Wu, 1963

Sharpnose Croaker

D XI, 26–29; A II, 7; P_2 I, 5; LLp 50–52; LGR 9–10. Body deep; nape highly arched. Snout acutely pointed, projecting in front of upper jaw. Mouth large, slightly inferior; posterior margin of maxilla slightly extending beyond a vertical through posterior margin of orbit. No barbel on chin; upper rostral pores 3, marginal rostral pores 5; mental pores in 3 pairs, the first close together, united by a crescent-shaped groove just behind symphysis. Scales on head cycloid, those on body ctenoid; small scales covering soft-rayed portions of dorsal and anal fins. Swimbladder carrot-shaped, with 17–20 pairs of aborescent appendages along its sides, the first pair entering head beyond transverse septum. **Color:** body brownish gray, dark oblique lines on dorsally; margin of spinous portion of dorsal fin darker; pectoral and pelvic fins yellowish. **Size:** maximum standard length 24 cm. **Distribution:** the East China Sea and the Gulf of Thailand. **Remarks:** inhabits coastal waters. (A. Arshad)



Nibea soldado, KAUM–I. 16998, 17.2 cm SL
off Terengganu (KT), 14 Dec. 2008

Nibea soldado (Lacepède, 1802)

Soldier Croaker

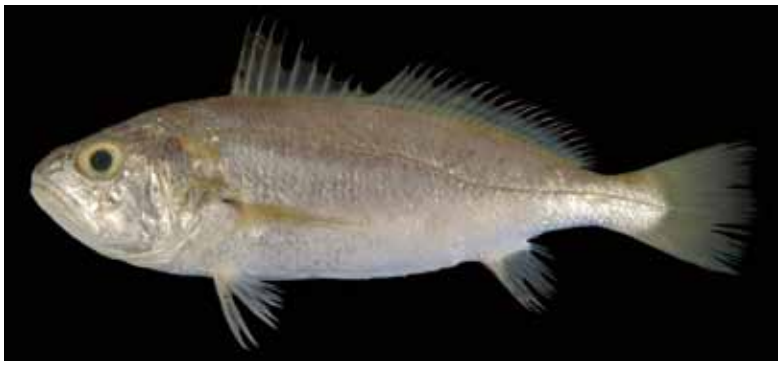
D X–XI, 27–33; A II, 7; P_2 I, 5; LLp 48–51; LGR 7–12. Body relatively deep; nape highly arched. Snout not swollen or projecting. Posterior margin of maxilla reaching a vertical through posterior margin of orbit; upper jaw length 2.3–2.6 in head length, lower jaw length 1.8–2.3 in head length. No barbel on chin. Scales on head cycloid, those on body ctenoid; small scales covering soft-rayed portions of dorsal and anal fins. Swimbladder carrot-shaped, with 18 to 22 pairs of aborescent appendages along its sides, first pair entering head beyond transverse septum. **Color:** body silvery with faint series of oblique stripes along scale rows. Soft-rayed portion of dorsal fin dark distally. Pectoral and pelvic fins yellowish. **Size:** maximum standard length 60 cm. **Distribution:** Indo-West Pacific, from India east to Queensland, Australia. **Remarks:** occurs in shallow coastal waters. (H. Motomura)

Otolithes ruber (Bloch & Schneider, 1801)

Tigertooth Croaker

D X–XI, 26–30; A II, 7; P_2 I, 5; LGR 8–11. Body slender, cylindrical. Snout not swollen or projecting, its dorsal profile rising evenly to dorsal fin origin. Posterior margin of maxilla reaching a vertical through posterior margin of orbit. No barbels on chin. Teeth differentiated into large and small in both jaws, with 1 or 2 pairs of strong canines at front of one or both jaws. Scales cycloid, but a few ctenoid on lower part of caudal peduncle. Swimbladder carrot-shaped with 32–36 pairs of fan-like appendages along sides, each appendage lodged beside bladder and none widely lapping dorsal surface of bladder wall, first pair not entering head. **Color:** body brownish dorsally, silvery with a golden sheen on middle and ventrally, often with oblique dark streaks dorsally. Pectoral, pelvic, and anal fins reddish or light brown. **Size:** maximum standard length 70 cm. **Distribution:** widely distributed in the Indo-West Pacific, from South Africa east to southern China and northeastern Australia. **Remarks:** occurs in shallow coastal waters to depths of 40 m. Feeds mainly on prawns and fishes. (H. Motomura)

Otolithes ruber, KAUM–I. 16874, 17.7 cm SL
off Terengganu (KT), 5 Dec. 2008



Pennahia anea, KAUM–I. 16875, 13.3 cm SL
off Terengganu (KT), 5 Dec. 2008

Pennahia anea (Bloch, 1793)

Donkey Croaker

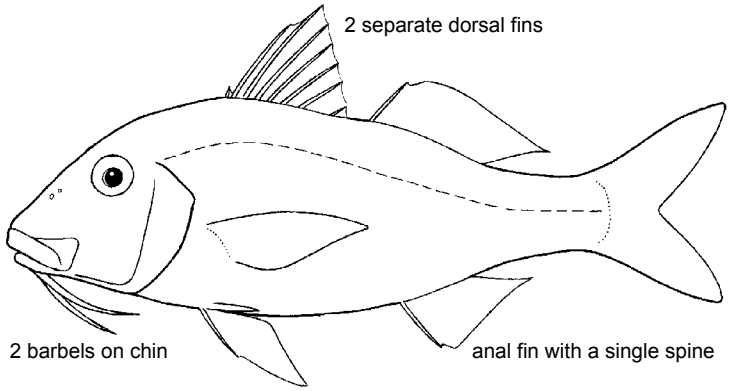
D X–XI, 22–24; A II, 7; P_2 I, 5; LGR 9–12. Body moderately deep. Snout pointed, but not swollen or projecting. Posterior margin of maxilla reaching a vertical through posterior margin of orbit. No barbels on chin. Teeth well differentiated into large and small in both jaws, but none canine-like. Gill rakers slender, as long as gill filaments at angle of arch. Caudal fin truncate. Scales cycloid on head and flanks, elsewhere ctenoid. Swimbladder carrot-shaped, with 17–22 pairs of fan-like appendages along its sides, first not entering head. **Color:** body grayish light brown dorsally, becoming paler ventrally, with increasing silvery reflection to whitish abdomen. Gill cover with a diffused dark blotch. Upper two-thirds of spinous portion of dorsal fin dusky. **Size:** maximum standard length 30 cm. **Distribution:** widely distributed in the Indo-West Pacific, from the Persian Gulf east to western Indonesia. **Remarks:** occurs in shallow coastal waters to depths of 60 m. (H. Motomura)

MULLIDAE

Goatfishes

By Siti Tafzilmeriam S. A. K., Hisashi Imamura and Seishi Kimura

Body moderately elongate and somewhat compressed (size to 50 cm). Mouth low on head; lower jaw inferior; two long unbranched barbels on chin; a single flat spine posteriorly on opercle; margin of preopercle smooth. Two well-separated dorsal fins, the first with VII–VIII slender spines; the second fin with 9 soft rays (first unbranched); anal fin with I spine and 6–7 soft rays; caudal fin deeply forked; pectoral fins with 13–18 soft rays; pelvic fins with I spine and 5 soft rays. Scales finely ctenoid; lateral line complete, following the contour of back, with 27–38 pored scales. **Color:** ground color often whitish to light red; most species with distinctive black, brown, red, or yellow markings; median fins often with stripes or oblique bands.



Remarks: inhabit shallow seas, on open sand or mud bottoms. They are carnivorous, feeding on a wide variety of small animals, especially crustaceans and worms. The barbels, with chemosensory receptors, are actively moved over or into the sediment to find food organisms.

Similar families occurring in the area: Polymixiidae is the only other family with a pair of long barbels on chin; the species occur in deep water, about 200–400 m. They are distinguished from the Mullidae by the following combination of characters: a single, unnotched dorsal fin with IV– VI spines; anal fin with III–IV spines; barbels inserted well behind tip of lower jaw.

Mulloidichthys flavolineatus (Lacepède, 1801)

Yellowstripe Goatfish

D VIII + 9; A I, 7; P_1 15–19; P2 I, 5; LLp 33–36; GR 8–9 + 18–22. Body elongate and moderately compressed. Chin with 2 slender barbels, usually not reaching a vertical through posterior margin of preopercle when depressed. No teeth on vomer and palatine; 2 rows of small villiform teeth on jaws. Spinous and soft-rayed portions of dorsal fin separated by 5 rows of scales. Caudal fin forked. **Color:** body silvery white with a yellow mid lateral stripe, usually containing a blackish spot below first dorsal fin; pectoral, anal and pelvic fins whitish to pale yellowish; barbels yellow; peritoneum blackish. **Size:** maximum total length 40 cm, commonly to 28 cm. **Distribution:** Indo-Pacific. **Remarks:** found in lagoons and bays; feeds on small invertebrates and small fishes. Marketed fresh or dried. (S. Tafzilmeriam)

Mulloidichthys flavolineatus, KAUM–I. 16855, 13.4 cm SL
off Terengganu (KT), 5 Dec. 2008

Parupeneus heptacanthus (Lacepède, 1802)

Cinnabar Goatfish

D VIII + 9; A I, 6; P_1 15–17; LLp 27–28; GR 6–7 + 20–23. Body slightly elongate and moderately compressed. Chin with 2 moderately long barbels, extending beyond a vertical through posterior margin of preopercle when depressed. Anterodorsal profile of head convex. No teeth on vomer and palatines. Spinous and soft-rayed portions of dorsal fin separated by 3 rows of scales. Caudal fin forked. **Color:** body brownish yellow to light red, silvery white ventrally; a small reddish brown spot beneath the lateral line under the rear of the first dorsal fin; faint iridescent blue lines extending dorsoposteriorly and ventroanteriorly from eye. **Size:** maximum total length about 37 cm. **Distribution:** Indo-Pacific. **Remarks:** occurs over muddy, sandy, rubble, or seagrass bottoms of lagoon and seaward reefs.

(S.Tafzilmeriam)

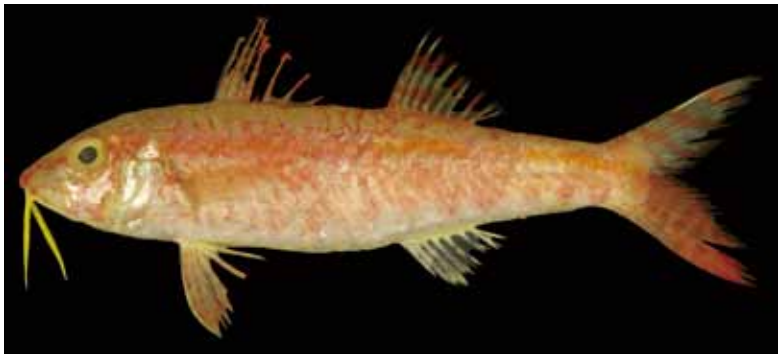
Parupeneus heptacanthus, KAUM–I. 16856, 14.5 cm SL
off Terengganu (KT), 5 Dec. 2008

Upeneus guttatus (Day, 1868)

Two-tone Goatfish

D VII, 9; A I, 7; P_1 13–14 (usually 13); GR 5–8 + 15–18 = 21–25; V 10 + 14. Body elongate, cylindrical. Chin with 2 slender barbels, usually just reaching to posterior margin of preopercle. Mouth small; small conical blunt teeth in a narrow band on jaws, palatines, ectopterigoids, and in 2 small patches on vomer. Scales present on side of snout; 6 scales between dorsal fins; 10–11 scales along dorsal edge of caudal peduncle. **Color:** body silvery pink with bright vermilion spots or blotches; barbels yellow; bright red bars on both dorsal fins; faint reddish bars on pelvic fins; upper lobe of caudal fin with 5 red oblique bars, the lower lobe with a red wide band from center of caudal fin base to inner hind margin and 5 red oblique bars. **Size:** 11 cm SL. **Distribution:** Indo-West Pacific. **Remarks:** similar to *Upeneus japonicus* Houttuyn, 1782, but distinguished from it by having red oblique bars on lower lobe of caudal fin.

(S. Kimura)



Upeneus guttatus, KAUM–I. 16964, 11.0 cm SL
off Terengganu (KT), 11 Dec. 2008

Upeneus sulphureus, KAUM–I. 17097, 13.0 cm SL
off Terengganu (KT), 29 Dec. 2008

Upeneus sulphureus Cuvier, 1829

Sulpher Goatfish

D VIII + 9; A I, 7–8; P_1 14–17; LL 33–36; GR 8–9 + 19–21. Body moderately elongate. Chin with 2 short barbels, 1.4–1.9 in head length. Lacrimal region lacking preorbital scales. Both jaws, vomer and palatines with teeth. Second dorsal and anal fins with scaled area basally. **Color:** body silvery greenish or pink dorsally, shading to silver on side and ventrally, with 2 narrow, brassy yellow stripes on side of body; 1st dorsal fin broadly tipped with black; caudal fin lacking dark cross bands. **Size:** reaching to ca. 20 cm. **Distribution:** Indo-West Pacific, including east coast of Africa, Indo-Malayan region, Japan, Australia and Fiji. **Remarks:** generally found on mud substrata at depths of 20–60 m.

(H. Imamura)

Upeneus sundaicus (Bleeker, 1855)

Ochreband Goatfish

D VIII + 8; A I, 6; P_1 14; LLp 31–32; GR 4–6 + 19–22. Body moderately elongate and slender, its depth 3.6–4.0 in standard length. Chin with 2 barbels, reaching to a vertical through posterior margin of preopercle. Mouth small; small conical blunt teeth in a narrow band on jaws, palatines, and in 2 small patches on vomer. No scales on side of snout; 4 ½ scales between dorsal fins; 10–11 scales along dorsal edge of caudal peduncle. Caudal fin forked. **Color:** body light reddish-brown dorsally, silvery white ventrally; a yellow stripe on body side from eye to caudal peduncle; caudal fin brownish-yellow with dusky lower lobe; pectoral fin pale yellow; pelvic and anal fins yellowish; barbels yellow; peritoneum pale. **Size:** commonly to 13 cm. **Distribution:** Indo-West Pacific. **Remarks:** found in mud or salty sand substrata at depth of 3–20 m. (S. Tafzilmeriam)

Upeneus sundaicus, KAUM–I. 17098, 12.2 cm SL
off Terengganu (KT), 29 Dec. 2008

Upeneus tragula, KAUM–I. 17150, 18.0 cm SL
off Terengganu (KR), 4 Jan. 2009

Upeneus tragula Richardson, 1846

Freckled Goatfish

D VIII + 9; A I, 7; P_1 13–14; LLp 28–30; GR 5–7 + 15–18. Body elongate; its depth 3.9–4.3 in standard length. Chin with 2 slender barbels, usually not reaching a vertical through posterior margin of preopercle when depressed. Mouth small with villiform teeth in a narrow band in jaws, on palatines, and in 2 small patches on vomer. Second dorsal and anal fins with scaled area basally. Caudal fin forked. **Color:** highly variable in color, from red, to irregular dots and blotches on body; a dark reddish brown to blackish stripe from front of snout to base of caudal fin; head and body above stripe brownish to greenish gray, flecked with small dark reddish brown or blackish spots; upper lobe of caudal fin with 4–6 blackish cross bands, and lower lobe with 5–7; outer third to half of first dorsal fin with a large dark red to black blotch containing 2 to several small yellow spots; second dorsal fin with 3 dark reddish or blackish bands; barbels usually yellow. **Size:** maximum total length about 33 cm, commonly to 25 cm. **Distribution:** Indo-West Pacific **Remarks:** found over sand and mud bottoms near coral reefs, to the depth of 40 m.

(S. Tafzilmeriam)

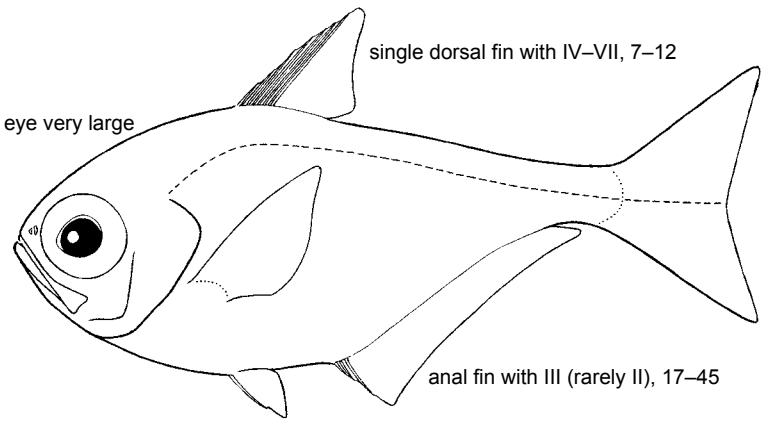
Upeneus tragula, UMTF 1062 (KAUM–I. 16513), 7.8 cm SL
Cendering, 6 Oct. 2008

PEMPHERIDAE

Sweepers

By Hisashi Imamura and Mizuki Matsunuma

Small to moderate sized (to 30 cm) marine fishes. Body compressed, very deep (*Pempheris*) or slender (*Parapriacanthus*). Eye very large. Snout short. Maxilla broad, reaching to below pupil. Teeth small, in band in jaws, on palatine, and in V-shaped patch on vomer. Gill rakers long, usually 25–31. Dorsal fin single, with IV–VII graduated spines and 7–12 soft rays. Anal fin with III (rarely II) spines and 17–45 soft rays. Pelvic fin with I spine and 5 soft rays. Lateral line scales usually 40–82. Scales vary from ctenoid and adherent to cycloid and deciduous. **Color:** variable (e.g., silvery, pinkish, yellowish and brownish).



Remarks. usually seen by day in aggregations in caves or beneath ledges, dispersing at night to feed independently on zooplankton.

Similar family occurring in the area. Berycidae – pelvic fin with 7–13 soft rays.

Pempheris oualensis Cuvier, 1831

Copper Sweeper

D VI, 9–10 (usually 9); A III, 36–45; P_1 16–18 (usually 17); LL 54–79; GR 7–10 + 19–26. Body very deep at origin of dorsal fin, strongly tapering to narrow caudal peduncle; body depth about 1.9–2.4 in standard length; prepelvic area narrow and keeled. Base of anal fin very long; caudal fin slightly forked. Body covered by ctenoid scales except for chest with cycloid; 5–6 scale rows between lateral line and dorsal fin base. **Color:** body bronze, darker dorsally; dorsal fin with a dark leading edge that expands distally to produce dark tips on the first 2 or 3 soft rays; base and axil of pectoral fin dark to black. **Size:** maximum length 18 cm. **Distribution:** eastern Indian Ocean and western Pacific, from northern Australia to the Philippines, east to Micronesia. **Remarks:** found in coastal rocky reefs.

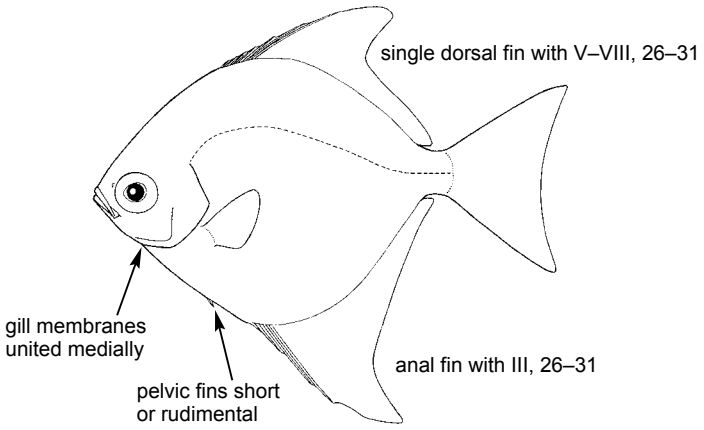
(M. Matsunuma)

Pempheris oualensis, KAUM–I. 17178, 11.6 cm SL off Terengganu (KR), 5 Jan. 2009

MONODACTYLIDAE

Moonyfishes (Fingerfishes)

By Mizuki Matsunuma



Small compressed fishes (up to 25 cm). Body oval, deep, strongly compressed. Eye moderately large, its diameter longer than snout length. Mouth small and oblique. Jaws with bands of small conical teeth; vomer, palatines, and tongue with granular teeth. Dorsal fin single, with V–VIII slender spines and 26–31 soft rays; anterior soft dorsal-fin rays elongated. Anal fin with III spines and 26–31 soft rays; anterior soft anal fin rays elongated. Pelvic fin short or rudimental. Caudal fin truncate to forked. Body, head, and unpaired fins covered by small, deciduous scales. **Color:** head and body silvery, mostly with 1 or more black vertical bar through eye, in front of pectoral-fin base (usually continuous with black margin along anterior edge of anal fin) and on body; tip of dorsal and anal fins usually black.

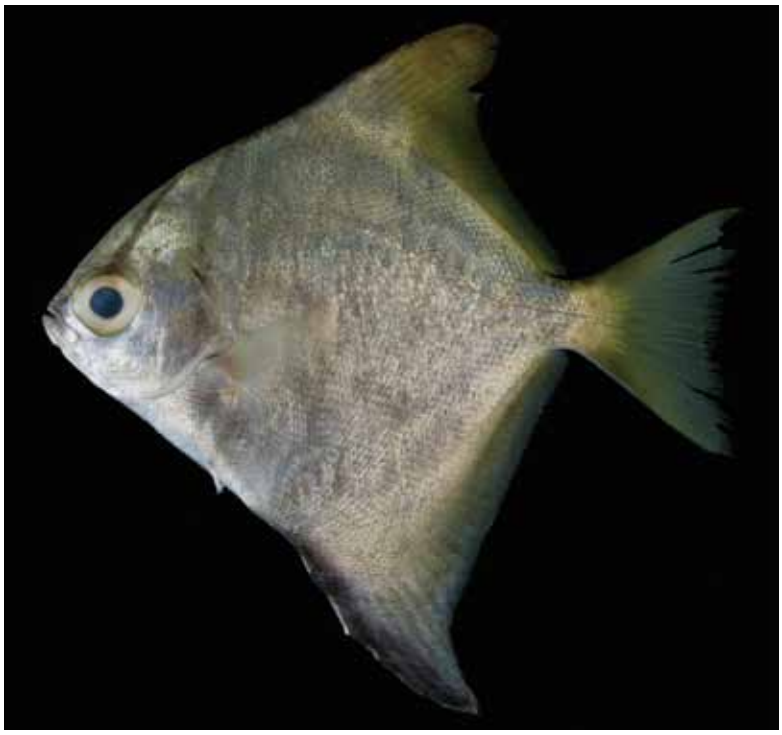
Remarks: occurs in shoals in estuaries and over shallow coral reefs, occasionally entering freshwater. Minor commercial importance; but some are caught for the aquarium fish trade.

Similar families occurring in the area: Drepaneidae and Ephippidae – pelvic fins well developed; gill membranes attached to isthmus. Chaetodonti-dae and Scatophagidae – pelvic fins well-developed; dorsal fin with X–XVII spines; spinous portion of dorsal fin well separated from soft-rayed portion. Carangidae – caudal fin forked; anal fin with II spines. Menidae – ventral profile conspicuously more convex than dorsal profile; first 2 pelvic fin rays elongated.

Monodactylus argenteus (Linnaeus, 1758)

Silver Moony

D VII–VIII, 26–31; A III, 26–31. Body oval, deep and strongly compressed; its depth 1.2–1.6 in SL; distance between tips of dorsal and anal fins 0.8–0.9 in SL. Eye moderately large; mouth small and oblique. Anterior soft fin rays of both dorsal and anal fins elongated; posterior edge of dorsal and anal fins distinctly concave; caudal fin slightly emarginate; pelvic fin rudimentary or absent in adults. **Color:** adults bright silver, tip of dorsal and anal fins dusky; juveniles more colorful with yellow over most of the dorsal fin; tip of dorsal and anal fins black; anterior edge of anal fin with broad black margin; two vertical black bars over the head, one through the eye and the other in front of pectoral-fin base. **Size:** maximum length about 25 cm. **Distribution:** Indo-West Pacific. **Remarks:** commonly found in mangrove estuaries, sometimes found in silty coastal reefs.

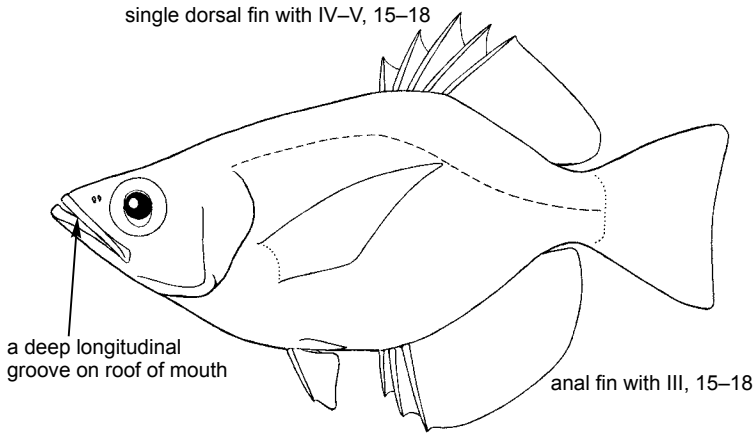


Monodactylus argenteus, UMTF 1525 (KAUM–I. 16725), 8.4 cm SL
Setiu, 28 Oct. 2008

TOXOTIDAE

Archerfishes

By Mazlan Abdul Ghaffar



Small to medium sized fishes (to about 50 cm). Body oval or rhomboidal-shaped and moderately compressed. Eye large, diameter nearly equal to snout length. Mouth moderately large, protractile, with lower jaw protruding; angle of jaw oblique, maxilla slender, scaly and without a supplemental bone. Fine villiform teeth on jaws, vomer, and palatines; a deep longitudinal groove on roof of mouth, which is converted to a tube when tongue is pressed against it. First gill arch with 2–8 gill rakers on lower limb. Dorsal fin single with IV–VI spines and 11–14 soft rays; anal fin with III spines and 15–18 soft rays; pelvic fins with I spine and 5 soft rays; pectoral fins with 11–15 rays; caudal fin truncate to slightly emarginate. Scales moderate to relatively large and ctenoid, covered head and median fins. **Color:** most species silvery white with a pattern of dark bars, large spots, or irregular stripes on sides.

Remarks: inhabit mangrove shores, estuaries, and fresh waters, always in shallow depths. Exhibit impressive hunting techniques in which they use jets of water to knock aerial insects into the water where they can be eaten.

Similar families occurring in the area: Pempheridae – snout blunt, dorsal-fin base short, positioned above pectoral fins; anal fin long, usually with more than 30 soft rays; occur in marine rather than estuarine and fresh-water habitats.

Toxotes jaculatrix (Pallas, 1767)

Banded Archerfish

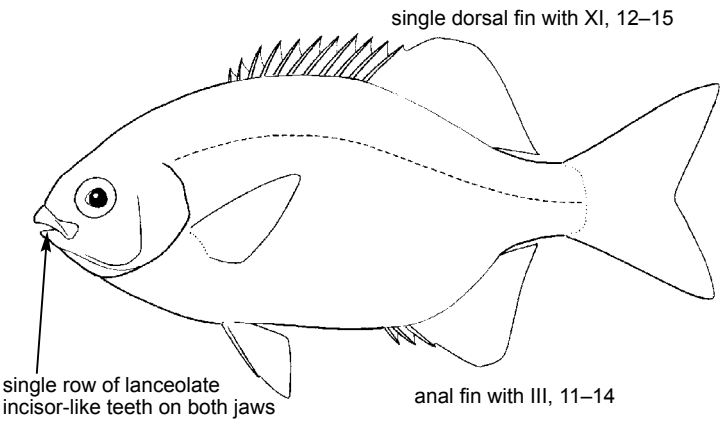
D IV–V, 11–13; A III, 15–17; P_1 13; LGR 5–7. Body shape rhomboid, moderately compressed. Eye large. Mouth moderately large, protractile, with lower jaw protruding; longitudinal axis from tip of snout to caudal fin passing through center of eye. Dorsal-fin spines usually IV, third spine longest. Scales in lateral line usually 26–30; horizontal scale rows above lateral line 3 or 4, below lateral line 8 or 9. **Color:** body silvery white, brownish green dorsally, with 4 or 5 black blotches or bars along the sides of body; caudal fin pale yellowish; anal fin pale basally, outer half of the fin blackish. **Size:** maximum total length about 30 cm, commonly to about 20 cm. **Distribution:** eastern Indian Ocean and western Pacific. **Remarks:** inhabits mangrove shores and brackish estuaries, always in shallow depths. Feeds on terrestrial insects. Marketed mostly fresh.

Toxotes jaculatrix, UMTF 1008 (KAUM–I. 16787), 7.5 cm SL
Merang, 2 Nov. 2008

KYPHOSIDAE

Sea Chubs (Rudder Fishes)

By Mizuki Matsunuma



Medium-sized fishes (to 75 cm); body oblong or elliptical, moderately compressed. Head small. Snout short. Posteroventral corner of preopercle serrate. Opercle with 2 small, weak retrorse spines. Eye moderately small, its diameter shorter than snout length. Mouth small and terminal, single row of lanceolate incisor-like teeth on both jaws; minute canine-like teeth in 2 or 3 rows medial to incisor-like teeth; palatines, vomer, and tongue with a band of villiform teeth. Preorbital narrow, covering little of maxilla; maxilla barely reaching eye. Dorsal fin continuous, beginning above origin of pelvic fins, with XI spines and 12 to 15 soft rays; anal fin beginning slightly behind middle of body, with III spines and 11 to 14 soft rays; pectoral fins bluntly pointed posteriorly, with 16 to 20 rays, slightly longer than pelvic fins; pelvic fins beginning a little behind pectoral-fin base; caudal fin more or less forked, with pointed lobes. Scales ctenoid and not deciduous, extending onto most of soft portions of dorsal and anal fins and proximal part of caudal fin. **Color:** dull olive or silvery black, lighter below; distinct longitudinal lines on sides.

Remarks: occurs on rocky and coral reefs in tropical and temperate waters. Herbivorous, feeding primarily on benthic algae. Schooling, sometimes in a group of mixed species of other kyphosids.

Similar families occurring in the area: Sparidae – molar teeth often present; pectoral fins long. Lethrinidae – head much larger; lateral teeth conical or molar-like; pectoral fins long.

Kyphosus cinerascens (Forsskål, 1775)

Blue Sea Chub

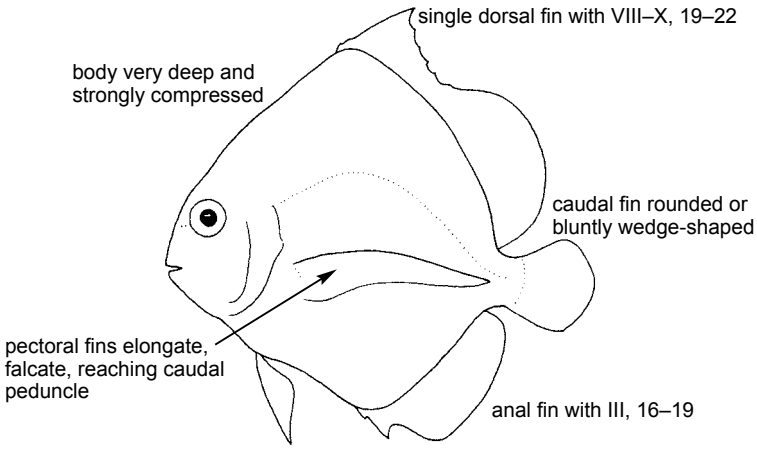
D XI, 11–13 (usually 12); A III, 10–12 (usually 11); P_1 18; LLp 49–52; GR 7–9 + 19–22 = 26–31. Body ovate, compressed. Snout short, subequal to or shorter than eye diameter; dorsal contour of snout slightly steep. Mouth terminal; teeth incisor-like. Base of spinous portion of dorsal fin longer than base of soft rayed portion; soft rayed portion of fin well elevated, anterior soft rays clearly longer than longest dorsal fin spine; anterior soft rayed portion of anal fin well elevated, similar to soft rayed portion of dorsal fin; caudal fin slightly forked with pointed lobes. Nine to twelve (usually 10 or 11) scales between lateral line and dorsal fin origin; 17–21 (usually 18–20) scales between lateral line to anal fin origin. **Color:** body bluish dorsally, dusky grayish ventrally, with several bluish brown longitudinal lines on flank, large specimens (about 40 cm SL) uniformly dusky or dark blue dorsally; head with 2 oblique brown or bluish brown bands; one through eye, the other one below eye; dorsal and anal fins dark blue, margin of soft portion with darker band; pectoral fins silver blue near base, distal half slightly darker. **Size:** commonly 40 cm; maximum 50 cm TL. **Distribution:** widespread in the Indo-West Pacific, including the Red Sea, from South Africa east to Australia; north to southern Japan. **Remarks:** inhabits coastal areas, primarily coral and rocky reefs, often occurring on inner reefs. Herbivorous.

Kyphosus cinerascens, KAUM–I. 17044, 31.0 cm SL
off Terengganu (KT), 17 Dec. 2008

DREPANEIDAE

Sicklefishes

By Mizuki Matsunuma



Body oval and strongly compressed (up to 50 cm). Interorbital, preorbital, and broad preopercular flange naked; opercle scaly dorsally; ventral edge of preopercle serrate in juveniles. Mouth highly protrusible, forming a downward-pointing tube when protruded; jaws with bands of setiform teeth; no teeth on roof of mouth; maxilla exposed posteriorly, no supramaxilla. Branchiostegal membranes joined to isthmus; branchiostegal rays 6. A single dorsal fin, with VIII–X spines and 19–22 soft rays; anal fin with III spines and 16–19 soft rays; caudal fin rounded or bluntly wedge-shaped (almost truncate in large adults); pectoral fins elongate, falciform, reaching caudal peduncle, with 16–18 rays; pelvic fins with I spine, 5 soft rays, and a fleshy axillary process. Scales small, finely ctenoid, extending onto top of head and base of median fins; lateral line complete, strongly curved over pectoral fin; lateral-line scales 48–55. Vertebrae 10 + 14 = 24. **Color:** silvery gray above, silverywhite below, with dusky spots or gray vertical bars.

Remarks: inhabits a variety of habitats including sand or mud bottoms, coral reefs, estuaries and harbours. Mostly caught with trawls.

Similar families occurring in the area: Chaetodontidae and Pentacerotidae – mouth not highly protrusible; no notch between spinous and soft-rayed portions of dorsal fin. Ephippidae – pectoral fins short, not reaching past anal-fin base; mouth not protrusible. Scatophagidae – IV anal-fin spines; head profile concave. Monodactylidae – mouth not highly protrusible; pectoral fins shorter than head; eye centered on horizontal axis through mouth.

Drepane longimana (Bloch & Schneider, 1801)

Sicklefish

D VIII–IX, 19–23; A III, 17–19; P_1 16–18; LLp 46–55; GR 6–8 + 10–12. Body oval and strongly compressed, its depth 1.2–1.3 in SL. Mouth highly protrusible, forming a downward-pointing tube when protruded. Caudal fin rounded or bluntly wedgeshaped (almost truncate in large adults); pectoral fins elongate, falciform, reaching caudal peduncle. Large adults with a bump or bony knob on interorbital region, a result of hyperostosis of the frontal bones. **Color:** head and body silvery with 4–10 vertical dark bars usually visible on dorsal part of body from head to caudal-fin base. **Size:** maximum length about 50 cm. **Distribution:** temperate and tropical Indo-West Pacific, from South Africa and Red Sea to New Guinea and northern Australia, north to southern Japan. **Remarks:** occurs in inshore waters with sand or mud bottoms.

Drepane longimana, KAUM–I. 16903, 12.2 cm SL
off Terengganu (KT), 6 Dec. 2008

Drepane punctata (Linnaeus, 1758)

Spotted Sicklefish

D VIII–X, 20–22; A III, 16–19; P_1 16–18; LLp 46–50; GR 5 + 10–11. Body oval and strongly compressed, its depth 1.2–1.3 in SL. Mouth highly protrusible, forming a downward-pointing tube when protruded. Caudal fin rounded or bluntly wedgeshaped (almost truncate in large adults); pectoral fins elongate, falciform, reaching caudal peduncle. Large adults with a bump or bony knob on interorbital region, a result of hyperostosis of frontal bones. **Color:** generally silvery with a greenish tinge on upper half of body; 5–10 series of black spots arranged in vertical lines on dorsal part of body from below dorsal fin to caudal peduncle. **Size:** maximum length about 40 cm. **Distribution:** temperate and tropical Indo-West Pacific, from Red Sea and east coast of Africa to New Guinea, Samoa, and northern Australia, north to southern Japan. **Remarks:** occurs in inshore habitats, such as sand or mud bottoms, reefs and estuaries. Feeds on benthic invertebrates.

Drepane punctata, KAUM–I. 17067, 25.7 cm SL
off Terengganu (KT), 26 Dec. 2008

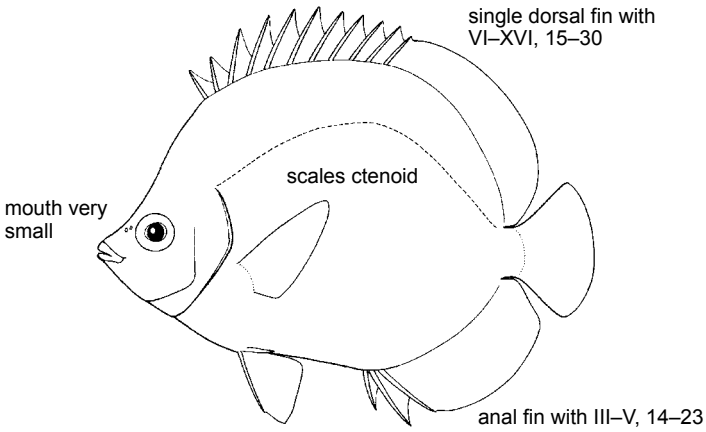
Drepane punctata, KAUM–I. 17118, 2.2 cm SL
off Terengganu (KT), 31 Dec. 2008

CHAETODONTIDAE

Butterflyfishes

By Yusri Yusuf

Small sized (up to 30 cm) marine fishes, with body deep and highly compressed. Head short; preopercle smooth. Eye moderately small, near located on longitudinal axis from tip of snout to middle of caudal fin. Snout highly variable, very short to extremely elongate. Mouth small, terminal, protractile; teeth bristle-like, curved, arranged in rows or bands across jaws; vomer and palatines without teeth. Branchiostegal rays 6 or 7. Gill rakers short. A single dorsal fin, usually with X–XIV strong, stout spines and 15–30 soft rays; no notch between spinous and soft rayed portions of dorsal fin. Anal fin with III–V strong, stout spines and 14–23 soft rays: interspinous membranes deeply incised; margin usually rounded but sometimes angular. Pectoral fin with 13–15 rays. Pelvic fin with I stout spine and 5 soft rays. Caudal fin rounded to slightly emarginate. Scales ctenoid, covering head, body, and median fins; scaly axillary process at upper base of pelvic fins; number of lateral line scales variable, 20–90. Vertebrae 11 + 13.



Color: most species very brightly colored with complex and varied color patterns; many species with a dark occellate "false-eye" spot on posterior portion of body.

Remarks: generally found on coral reefs, usually in shallow water above depths of 20–30 m. Feed on coral polyps, colonial sea anemones, tentacles of tubeworms, small crustaceans, zooplankton, and algae. No importance in commercial fisheries; but commonly treated as an aquarium fish.

Similar families occurring in the area: Pomacanthidae – a strong spine at angle of preopercle; most of conspicuous species larger and more colorful. Scatophagidae – dorsal fin with a deep notch; IV anal fin spines; mouth not protractile. Zanclidae – strongly produced snout, bony supraocular projections, and only VII dorsal fin spines.

Chaetodon octofasciatus Bloch, 1787

Eightbanded Butterflyfish

D X–XII, 17–20; A III, 14–17; P_1 12–14; LLp 27–38; LR 36–42. Body rounded, almost circular; snout short, blunt; predorsal contour straight. Lateral line incomplete. Dorsal and anal fins strongly rounded, caudal fin truncate to slightly rounded. **Color:** overall creamy yellow with eight black vertical stripes, including an eye band, 5 central body stripes, and the other 2 stripes crossing dorsal and anal fins; pelvic fins yellow. **Size:** maximum length about 10 cm. **Distribution:** eastern Indian Ocean and western Pacific, from Maldives and Sri Lanka to New Guinea and Great Barrier Reef. **Remarks:** inhabits coral reefs at depths of 3–20 m. Forms pairs or small groups. The most common butterflyfish found in coral reef of Malay Peninsula; juvenile usually found hiding in branching coral.

Chaetodon octofasciatus, UMTF 1235 (KAUM–I. 16601), 4.1 cm SL
Bidong Island, 12 Oct. 2008

Coradion chrysozonus (Cuvier, 1831)

Orangebanded Coralfish

D IX, 28–30; A III, 19–21; P_1 15–16; LR 48–52. Body rounded, almost circular; its depth 1.3–1.5 in SL; snout short and blunt. Dorsal and anal fins strongly rounded and elevated; caudal fin truncate to slightly rounded. Lateral line complete. **Color:** overall whitish, with 2 dark yellow-orange bars at the level of pelvic fin; dark brown bars through eye, and caudal fin base; pelvic fin dark brown to black. Juveniles with a white-edged ocellus in dorsal fin that reduces to a black spot in adults. **Size:** maximum length about 15 cm. **Distribution:** eastern Indian Ocean and western Pacific: from the Andaman Sea eastward throughout Indo-Malayan region, and the Great Barrier Reef northward to southern Japan. **Remarks:** found in coastal to outer reef drop-offs; depth range 3–60 m. Feeds on sponges.

Coradion chrysozonus, UMTF 1361 (KAUM–I. 16640), 11.2 cm SL
Bidong Island, 12 Oct. 2008

Parachaetodon ocellatus (Cuvier, 1831)

Ocellate Coralfish

D VI–VII, 28–30; A III, 18–20; P_1 14–15; LR 39–46. Body rounded, almost circular; its depth 1.3–1.4 in SL. Dorsal fin triangular in shape and first soft ray at apex. **Color:** head and body pearly white, with five dusky to orange bands; the first band through the eye orange, with black edges; an ocellated black spot in forth body band; band on caudal peduncle with a silver anterior margin; upper portion of dorsal fin mostly yellow. **Size:** maximum length about 17 cm. **Distribution:** eastern Indian Ocean and western Pacific, from Sri Lanka eastward throughout the Indo-Malayan region, and the Great Barrier Reef northward to the Ryukyu Islands, Japan. **Remarks:** inhabits lagoons and coral reefs at depths of 3 to 50 m. Occurs in pairs on flat sand or silty bottoms on coastal reefs. Adults school over open muddy substrates in deep water; juveniles sometimes in large lagoons with seagrasses in depths of about 5 m or more. Rare in coral reefs area of Malay Peninsula.

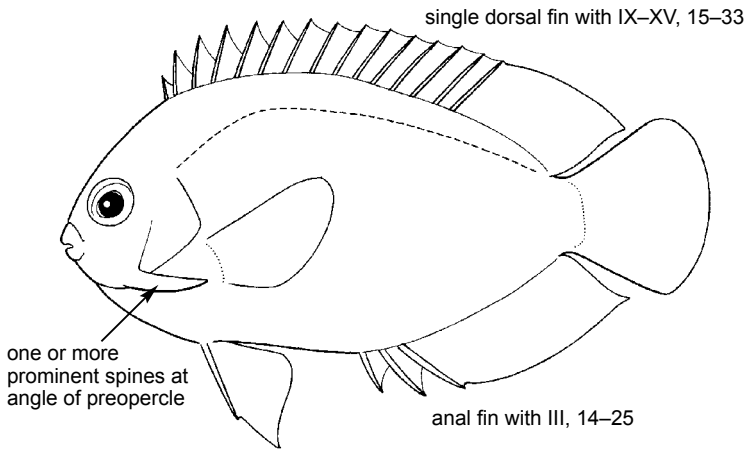
Parachaetodon ocellatus, KAUM–I. 17217, 10.5 cm SL
off Terengganu (KT), 11 Jan. 2009

POMACANTHIDAE

Angelfishes

By Yusri Yusuf

Small to medium sized (up to 50 cm) marine fishes, with deep body oblong to oval-shaped, highly compressed. Head short; 1 or more prominent spines at angle of preopercle. Mouth small, terminal, protractile; teeth bristlelike, usually tricuspid, arranged in rows or bands across jaws; vomer and palatines without teeth. A single dorsal fin with IX–XV strong, stout spines and 15–33 soft rays; no notch between spinous and soft-rayed portions. Anal fin with III strong, stout spines and 14–25 soft rays. Caudal fin variable, rounded to slightly emarginate, or forked with long filamentous extensions. Pectoral fin with 16–21 rays. Pelvic fin with a single stout spine and 5 soft rays. Scales ctenoid, covering head, body, and median fins; number of lateral line scales variable, 30–90. Vertebrae 10 + 14. **Color:** almost all very brightly colored with complex and varied color patterns. Juveniles are often strikingly different in color from adults. Color patterns are most diagnostic for species identification.



Remarks: generally found on coral reefs at depths of 5–40 m. Frequently utilized as aquarium fish.

Similar families occurring in the area: Chaetodontidae – lack a strong spine at angle of preopercle; an axillary scaly process present at bases of pelvic fins. Ephippidae – lack a strong spine at angle of preopercle; generally less colorful as adults; dorsal and anal fins often very elongate. Scatophagidae – dorsal fin with a deep notch, lacking spines at angle of preopercle, and having IV anal-fin spines.

Pomacanthus annularis (Bloch, 1787)

Blueringed Angelfish

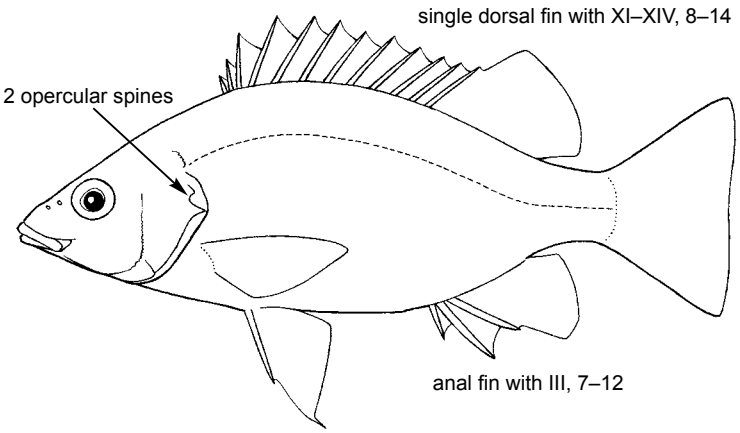
XIII, 20–22; A III, 20–21; P_1 19; GR 4–5 + 12. Body oblong, very deep and compressed; a long spine at corner of preopercle. Soft portions of dorsal and anal fins round; caudal fin rounded. **Color:** body yellowish brown, with 5–8 diagonal brilliant blue stripes on sides; a blue ring above upper edge of gill opening, at the origin of lateral line; 2 horizontal blue stripes on head across nape before eye onto edge of opercle, the upper stripe at the level of mid eye, the lower at the level just beneath lower edge of eye; base of pectoral fins with blue band; caudal fin white. Juveniles bluish-black with a series of white and blue narrow bars on sides, anterior bars slightly curved; no white ring before caudal peduncle; no marking on caudal fin. **Size:** maximum length about 30 cm. **Distribution:** Indo-Pacific, from East Africa to New Caledonia. **Remarks:** inhabits lagoons and coral reefs, frequently in turbid water, around caves and wrecks at depths of 10–30 m. Found solitary or in pairs. Feeds on sponges and tunicates. The most common anglefish in coral reef areas of Malay Peninsula.

Pomacanthus annularis, KAUM–I. 17159, 25.0 cm SL
Redang Island, 4 Jan. 2009

TERAPONTIDAE

Grunters (Tigerperches)

By Mizuki Matsunuma



Small to medium-sized (to 35 cm) perch-like fishes. Body oblong and slightly to moderately compressed. Mouth moderate, protractile, upper jaw not extending beyond center of orbit; jaw teeth usually in villiform bands, shape of teeth conical, flattened, or tricuspidate; vomer and palatines toothless in adults of most species. Opercle bearing 2 spines, the lower one larger and stronger; posttemporal bone exposed and expanded posteriorly, with posterior margin serrate in some species. Dorsal fin single, notched, with XI–XIV spines and 8–14 soft rays; anal fin with III and 7–12 soft rays; pelvic fins inserted behind base of pectorals, with I spine and 5 soft rays; caudal fin usually emarginate. Scales adherent, finely ctenoid; lateral line single and complete, reaching on caudal fin. **Color:** body tan or light gray, often silvery in life with various dark markings; most marine species with 3 or more dark, straight or downwardly curved longitudinal stripes on body; some with dark transverse bands on lobes of caudal fin.

Remarks: marine terapontids inhabiting inshore marine and brackish waters, with some species also entering hypersaline and fresh waters.

Similar families occurring in the area: Serranidae – mouth large, with upper jaw typically reaching to below vertical through posterior margin of eye; caudal fin typically rounded; 3 strong spines on opercle. Kuhliidae – dorsal fin with X spines.

Pelates quadrilineatus (Bloch, 1790)

Fourlined Terapon

D XII–XIII, 9–11; A III, 9–10; LLp 66–75; GR 16–18 + 22–27. Body oblong and compressed laterally. Preopercle serrate; lower opercular spine stronger and longer, but not extending beyond margin of opercular lobe; posttemporal bone not expanded or exposed posteriorly, covered with skin and scales. **Color:** body silvery white, grayish dorsally; 4–6 narrow dark brown or black horizontal stripes on body; spinous portion of dorsal fin with a black blotch dorsally on membranes between third to seventh dorsal-fin spines; a large black blotch on side of body posterior to nape; lobes of caudal fin without prominent transverse black stripes. **Size:** maximum length about 30 cm, commonly to 20 cm. **Distribution:** Indo-West Pacific: Red Sea and East Africa to New Guinea, northern Australia north to Japan. **Remarks:** often found in brackish waters. Feeds on small fishes and invertebrates.

Pelates quadrilineatus, KAUM–I. 17033, 13.8 cm SL
off Terengganu (KT), 17 Dec. 2008

Terapon jarbua (Forsskål, 1775)

Jarbus Terapon

D XI–XII, 9–11; A III, 7–10; LLp 75–100; GR 6–8 + 12–15. Body oblong and moderately compressed. Preopercle strongly serrate, particularly at angle; lower opercular spine very long and strong, extending distinctly beyond margin of opercular lobe; posttemporal bone expanded, exposed and serrate posteriorly. Caudal fin emarginate. **Color:** body silvery white, grayish dorsally; 3 or 4 dark brown or black downwardly curved longitudinal stripes on body; spinous portion of dorsal fin with a blackish blotch dorsally on membranes between third and sixth spines; both caudal-fin lobes with dark tips and a transverse band. **Size:** maximum length about 35 cm. **Distribution:** Indo-Pacific: East Africa to Samoa, north to southern Japan, south to Australia. **Remarks:** found over shallow sandy bottoms, in the vicinity of river mouths; enters estuaries and rivers.

Terapon jarbua, KAUM–I. 16986, 19.5 cm SL
off Terengganu (KT), 13 Dec. 2008

Terapon jarbua, UMTF 1068 (KAUM–I. 16484), 7.0 cm SL
estuary near UMT, 30 Sept. 2008

Terapon theraps Cuvier, 1829

Largescaled Terapon

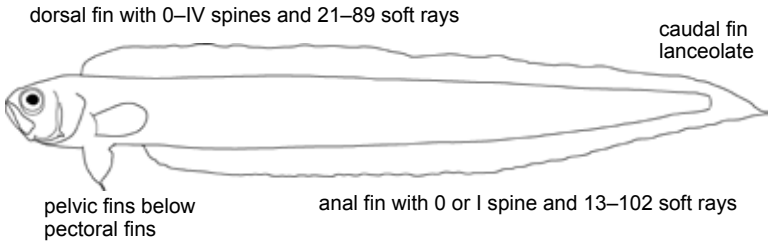
D XI–XII, 9–11; A III, 7–9; P_I 14–15; LLp 46–56; GR 6–8 + 14–17. Body oblong, moderately compressed. Preopercle serrate, the serrations largest at angle; lower opercular spine very long and strong, extending distinctly beyond margin of opercular lobe; posttemporal bone expanded, exposed and serrate posteriorly. Spinous part of dorsal fin strongly arched and deeply notched; penultimate spine about half length of ultimate spine. Caudal fin emarginate with rounded lobes. **Color:** body dusky dorsally, silvery white ventrally; 4 dark brown horizontal stripes on body; spinous part of dorsal fin with a black blotch dorsally on fin membranes between third and seventh spine; caudal fin with medial rays pigmented; upper lobe of caudal fin with dark tip; both lobes of caudal fin with a dark, transverse band. **Size:** maximum length about 30 cm. **Distribution:** Indo-Pacific, from East Africa and Red Sea to Solomon Islands, northern Australia north to Japan. **Remarks:** found in inshore waters, sometimes entering brackish waters.

Terapon theraps, KAUM–I. 16892, 11.7 cm SL
off Terengganu (KT), 6 Dec. 2008

CEPOLIDAE

Bandfishes

By Mizuki Matsunuma



Small to medium (up to 40 cm) elongate marine fishes. Body moderately to noticeably elongate fishes with compressed, tapering body and lanceolate caudal fin. Head short, with blunt snout. Eyes relatively large and high on head. Mouth large, oblique; upper jaw broad at end, without supramaxilla, and extending to below posterior margin of eye; a single row of slender, slightly curved teeth in jaws with an inner cluster of teeth at symphysis in some species. Dorsal fin continuous, with 0 to IV flexible spines and 21 to 89 segmented rays; anal fin with 0 or I spine and 13 to 102 segmented rays; caudal fin lanceolate, middle 9 to 15 rays branched; pelvic fins positioned below or slightly anterior to pectoral fins, with I spine and 5 segmented rays; outermost segmented pelvic-fin ray unbranched or weakly branched, 4 inner rays distinctly branched. Lateral line high on body, close to dorsal-fin base, terminating posteriorly near end of fin; lateral-line tubes or canals on scales not embedded in skin. Scales cycloid (smooth) or with crenulate margins, relatively large to minute. **Color:** in life red or pink; most species have a distinctive dark stripe on the membrane (usually hidden) connecting the premaxillary and maxillary bones of the upper jaw.

Remarks: relatively uncommon fishes taken by trawls in shallow to deep depths (to at least 475 m). Occurring on level bottom, sand or mud substrates.

Similar families occurring in the area: the combination of a lanceolate tail, large oblique mouth, and the arrangement of the pelvic-fin rays, consisting of I spine and 5 segmented rays (the outermost ray unbranched or weakly branched and the inner 4 branched), distinguishes the bandfishes from all other families.

Acanthocepola abbreviata (Valenciennes, 1835)

Yellowspotted Bandfish

D 64–75; A 63–76; P_1 16; P_2 I, 5; V 12 + 44–48. Body well elongate and compressed. Head short, with blunt snout; eyes large and high on head; mouth large, oblique; preopercular margin with spines; cheeks scaly. Pelvic fin origin situated slightly anterior to pectoral fin; caudal fin pointed, joined to dorsal and anal fins; 8–10 rays branched. **Color:** head and body pale pink, reddish dorsally; body with about 4–5 orange spots (same as pupil size) on dorsoanteriorly and about 11–13 indistinct orange vertical bars posteriorly, from mid-point of body to caudal fin base. Dorsal and anal fins reddish yellow, whitish basally; no black markings on dorsal fin; pectoral fin translucent tinged with reddish; pelvic fin white; posterior tip of caudal fin dark red to black. **Size:** maximum length about 30 cm. **Distribution:** eastern Indian Ocean and West Pacific from the Gulf of Oman to northwestern Australia, north to the Philippines. **Remarks:** inhabits mud or sand bottoms of coastal waters. Caught mostly with bottom trawls.

Acanthocepola abbreviata, KAUM–I. 17135, 28.4 cm SL
off Terengganu (KT), 1 Jan. 2009

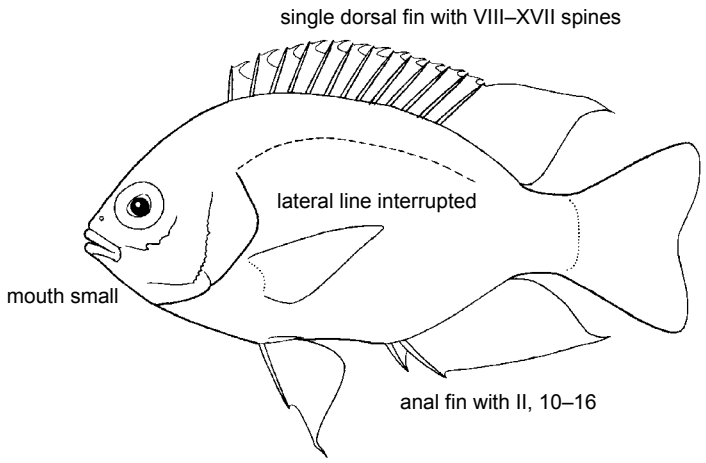
Acanthocepola abbreviata, KAUM–I. 17136, 21.2 cm SL
off Terengganu (KT), 1 Jan. 2009

POMACENTRIDAE

Damselfishes and Anemonefishes

By Yusri Yusuf and Koichi Shibukawa

Small to medium-sized fishes, usually less than 20 cm. Body compressed, ovate to almost circular, covered with ctenoid scales usually extending onto fins; dorsal fin continuous with VIII–XVII spines and no notch; anal fin with II spines and 10–16 soft rays; caudal fin emarginated to forked or lunate. Lateral line interrupted; anterior part of pored scales more or less parallel with dorsal profile and usually ending below soft portion of dorsal fin; posterior part comprising several pits or obscure pores along mid-lateral caudal peduncle; snout usually short and blunt; mouth small, slightly protractile; teeth conical or compressed, uniserial or in 2 or more rows; no teeth on palatine. **Color:** highly variable; mainly from pale through yellowish, orange, reddish or bluish to blackish; sometimes with blotches, bands, spots, or other patterns.



Remarks: found in coastal waters such as bays, coral reefs and rocky shores, and often enter brackish estuaries or freshwater streams. Frequently utilized as aquarium fish.

Similar families occurring in the area: Pomacanthidae – a long, strong spine at the corner of preopercle. Chaetodontidae – elongate, somewhat tube-like snout.

Abudefduf bengalensis (Bloch, 1787)

Bengal Sergeant

D XIII, 13–15; A II, 13–14; P_1 16–20; LLp 19–23. Body deep and compressed. Posterior margin of preopercle smooth. Suborbital scaled, with entire ventral margin. Teeth on jaws uniserial, incisor-like. Caudal fin forked with rounded tail lobes; no conspicuous projecting spine-like rays at upper and lower edges of caudal-fin base. **Color:** ground color pale or light gray, gradually darkened dorsally; 7 narrow blackish bars (narrower than paler interspaces) from nape to caudal fin base; dorsal end of pectoral-fin base with a distinct black spot. **Size:** 14 cm SL. **Distribution:** Indo-West Pacific: from Pakistan to Great Barrier Reef, north to southern Japan. **Remarks:** found in shallow coral reefs and lagoons to depths of 6 m.

(K. Shibukawa & Y. Yusuf)

Abudefduf bengalensis, UMTF 1053 (KAUM–I. 16401), 6.2 cm SL
Dungun, 24 Sept. 2008

Abudefduf sexfasciatus (Lacepède, 1801)

Scissortail Sergeant

D XIII, 11–14; A II, 11–13; P_1 17–20; LLp 18–22; GR 23–30. Body ovate, compressed; margins of suborbital and preopercle smooth; teeth on anterior part of jaws flattened, uniserial; suborbital scaled. Caudal fin forked; no conspicuous projecting spine-like rays at upper and lower edges of caudal-fin base. **Color:** body white with 5 black bars on side; a black stripe on each caudal fin lobe; fins whitish but a short black stripe on soft dorsal and anal fins. **Size:** 17 cm SL. **Distribution:** Indo-West Pacific. **Remarks:** inhabits inshore and offshore coral or rocky reefs; depth range 1–20 m. One of the most common damselfish in coral reef areas of Malay Peninsula. (Y. Yusuf)

Abudefduf sexfasciatus, KAUM–I. 17047, 9.7 cm SL
off Terengganu (KT), 18 Dec. 2008

Abudefduf sordidus (Forsskål, 1775)

Black-spot Sergeant

D XIII, 14–16; A II, 13–15; P_1 18–20; LLp 21–23. Body deep and compressed. Posterior margin of preopercle smooth. Suborbital scaled, with entire ventral margin. Teeth on jaws uniserial, incisor-like. Caudal fin forked; no conspicuous projecting spine-like rays at upper and lower edges of caudal-fin base. **Color:** ground color gray; 6 dark brown bars (broader than pale interspaces) from nape to caudal-fin base; axil and dorsal end of pectoral-fin base black; a distinct, small saddle-like black blotch on anterior part of caudal peduncle. **Size:** 17 cm SL. **Distribution:** Indo-West Pacific. **Remarks:** found in shallow rocky shore, reef flat and piers exposed to waves; depth range 0.2–3 m. Feed on algae, crustaceans and other invertebrates. (K. Shibukawa & Y. Yusuf)

Abudefduf sordidus, UMTF 1486 (KAUM–I. 16335), 2.2 cm SL
Cendering, 16 Sept. 2008

Amblypomacentrus breviceps (Schlegel & Müller, 1839)

Black-banded Demoiselle

D XIII, 11–12; A II, 12–13; P_1 16–17; LLp 16–17. Body slender, its depth 2.1–2.3 in SL; caudal fin forked, with lobes filamentous in adults. **Color:** pearly white, with 3 black bars, the first running across the head through the eye, and other 2 from the back to about mid portion of the side; usually with longitudinal rows of blue spots on sides. **Size:** 8.5 cm TL. **Distribution:** Western Central Pacific. **Remarks:** inhabits lagoon and coastal areas in sandy or silty areas around outcrops of rubble on sand, mud, sponge or rocks; depth range 2–35 m. (Y. Yusuf)

Amblypomacentrus breviceps, UMTF 1254 (KAUM–I. 16585), 3.8 cm SL
Bidong Island, 13 Oct. 2008

Amphiprion clarkii (Bennett, 1830)

Clark's Anemonefish

D X–XI, 14–17; A II, 12–15; P_1 18–21; LLp 34–45. Body moderately deep and compressed. Opercle, subopercle, preopercle and interopercle serrate. Teeth on jaws uniserial. Caudal fin weakly emarginate; no conspicuous projecting spine-like rays at upper and lower edges of caudal-fin base. **Color:** ground color variable from reddish yellow to blackish; three white bars on head and body. Tail white or yellow; other fins variable black to yellow-orange. **Size:** 8.5 cm SL. **Distribution:** Indo-West Pacific: Persian Gulf east to Vanuatu and Marshall Islands, northern Australia north to southern Japan. **Remarks:** found in coral reefs to depth of 55 m; symbiotically associated with anemones *Heteractis magnifica* and *Stichodactyla mertensii*.

(K. Shibukawa & Y. Yusuf)

Amphiprion clarkii, UMTF 1238 (KAUM–I. 16578), 8.8 cm SL
Bidong Island, 13 Oct. 2008

Amphiprion frenatus Brevoort, 1856

Tomato Anemonefish

D IX–X, 16–18; A II, 13–15; P1 18–21; LL 31–44. Body moderately deep and compressed; its depth 1.7–2.0 in SL; posterior margins of opercle, interopercle and subopercle strongly serrated. Caudal fin weakly emarginate. **Color:** adults with a single white bar on head; females mainly blackish on sides with red or orange snout, breast, belly, and fins; males red or orange overall and lacking blackish coloration, considerably smaller than females. Juveniles with two or three white bars. **Size:** 14.0 cm TL. **Distribution:** western Pacific: Gulf of Thailand, South China Sea to southwestern Palau, north to southern Japan, south to Java, Indonesia. **Remarks:** found in lagoon reefs and embayment; depth range 1–12 m. Monogamous and protandrous hermaphrodite. Associated with the anemone *Entacmaea quadricolor*. Feeds on algae, fish eggs, and pelagic copepods. Similar to *A. melanopus*, but with a broader white head bar and black pelvic and anal fins.

(Y. Yusuf)

Amphiprion frenatus, KAUM–I. 16579, 6.7 cm SL
Bidong Island, 13 Oct. 2008

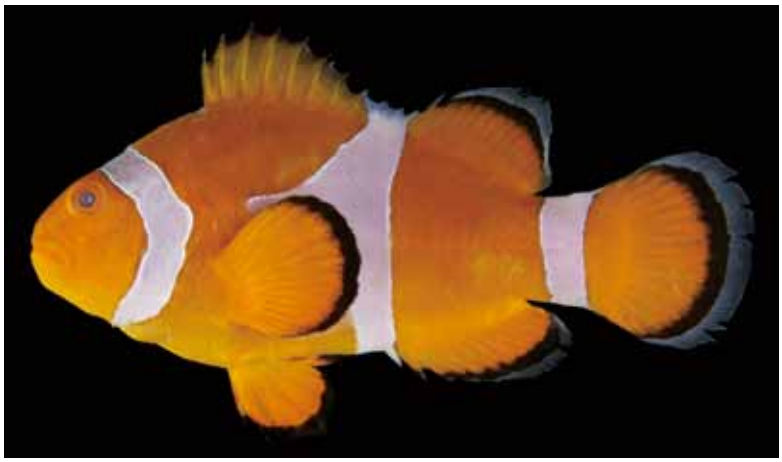
Amphiprion frenatus, UMTF 1319 (KAUM–I. 16580), 5.6 cm SL
Bidong Island, 13 Oct. 2008

Amphiprion ocellaris Cuvier, 1830

False Crown Anemonefish

D X–XI, 14–17; A II, 12–15; P_1 18–21; LLp 34–45. Body moderately deep and compressed. Opercle, subopercle, preopercle and interopercle serrate. Teeth on jaws uniserial. Caudal fin weakly emarginate; no conspicuous projecting spine-like rays at upper and lower edges of caudal-fin base. **Color:** ground color of head, body and fins orange, with three broad white bars; fins with marginal or submarginal narrow black areas. **Size:** 8 cm SL. **Distribution:** east part of Indian Ocean, Andaman Sea and West Pacific. **Remarks:** found in coral reefs to depths of 15 m; symbiotically associated with anemones *Heteractis magnifica*, *Stichodactyla gigantea* and *Stichodactyla mertensii*. The most common anemonefish found in coral reef of Malay Peninsula.

(K. Shibukawa & Y. Yusuf)



Amphiprion ocellaris, UMTF 1236 (KAUM–I. 16582), 5.9 cm SL
Bidong Island, 13 Oct. 2008

Amphiprion perideraion Bleeker, 1855

Pink Anemonefish

D IX–X, 16–17; A II, 12–13; P1 16–18; LL 32–43. Body depth 1.9–2.2 in SL; posterior margins of opercle, interopercle and subopercle strongly serrated; caudal fin rounded. **Color:** pink to pinkish orange; fins transparent; narrow white head bar and white stripe on top of head beginning between the eyes and extending along base of dorsal fin; adult males have narrow orange margin on soft dorsal fin and upper and lower edges of tail. **Size:** 10 cm. **Distribution:** eastern Indian Ocean and western Pacific, from the Andaman Sea east to Cocos Islands and Tonga, northern Australia north to southern Japan. **Remarks:** inhabits lagoon and seaward reefs to depth of 38 m. Associated with the anemones *Heteractis magnifica* (usually), *H. crispa*, *Macrodactyla doreensis*, and *Stichodactyla gigantea*. Similar to *A. akallopisos* and *A. sandaracinos* but lack the white head bar.

(Y. Yusuf)

Amphiprion ocellaris, UMTF 1406 (KAUM–I. 16559), 2.4 cm SL
Bidong Island, 13 Oct. 2008

Amphiprion perideraion, UMTF 1233 (KAUM–I. 16581), 6.2 cm SL
Bidong Island, 13 Oct. 2008

Chromis atripectoralis Welander & Schultz, 1951

Black-axil Chromis

D XII, 9–10; A II, 9–10; P_1 18–20; LLp 15–16. Body deep and compressed. Posterior margin of preopercle smooth. Suborbital scaled, without visible ventral free edge. Teeth on jaws conical, multiserial; teeth of outermost row larger than those of inner rows. Caudal fin forked; three conspicuous projecting spine-like rays at upper and lower edges of caudal-fin base. **Color:** head, body and most part of fins bright greenish blue; single or some minute blue dots or short irregular lines on each scales; axil of pectoral black. **Size:** 8.5cm SL. **Distribution:** Indo-Pacific. **Remarks:** found around branching corals on coral reefs in depths of 2–15 m; forms aggregations; feeds on zooplankton and fish eggs. (K. Shibukawa & Y. Yusuf)

Chromis atripectoralis, UMTF 1391 (KAUM–I. 16591), 6.5 cm SL (preserved specimen)
Bidong Island, 12 Oct. 2008

Chrysiptera unimaculata (Cuvier, 1830)

Onespot Demoiselle

D XIII, 13–14; A II, 12–14; P_1 18–19; LLp 16–18. Body moderate to slender, its depth 2.1–2.4 in SL. Posterior margin of preopercle smooth. No scales on infraorbitals; cheek with 2 rows of scales. No conspicuous projecting spine-like rays at upper and lower edges of caudal-fin base. **Color:** adults usually uniformly dark brown, with a black spot at the end of the dorsal fin base; a small orange spot on gill-plate; pectoral fin yellowish. Juvenile yellowish with blue stripe on upper head, blue-ring black spot below mid dorsal fin, and dark spot at rear dorsal fin. **Size:** 10.0 cm TL. **Distribution:** Indo-West Pacific: Red Sea and East Africa to Fiji, north to Ryukyu Islands, south to southern Great Barrier Reef; Palau in Micronesia. **Remarks:** found solitarily or in small groups in shallow water among coastal algal reefs, rubble or over open beach-rock of reef flats exposed to moderate surge; to depth of 3 m. Feeds mainly on benthic algae. (Y. Yusuf)

Chrysiptera unimaculata, UMTF 1837 (KAUM–I. 16397), 4.5 cm SL
Dungun, 24 Sept. 2008

Chrysiptera unimaculata, KAUM–I. 16404, 1.7 cm SL
Dungun, 24 Sept. 2008

Dascyllus reticulatus (Richardson, 1846)

Reticulate Dascyllus

D XII, 14–16; A II, 12–14; P_1 19–21; LLp 20; GR 7 + 19–21. Body deep, compressed. Margins of preorbital, suborbital, and preoperculum finely serrated. Caudal fin emarginate, with rounded lobes; two conspicuous projecting spinelike rays at upper and lower edges of caudal-fin base. **Color:** various; influenced by ecological and behavioral conditions. Basically body whitish with snout, interorbital and forehead greenish; black bar on anterior through pectoral base and a fainter one on posterior part of the body; blackish scale margins; spinous dorsal fin same as body color on basal half with broad black margin on outer half; soft dorsal fin transparent to slightly bluish pelvic fins mostly black; pectorals transparent with a spot on its base. **Size:** 9.0 cm TL. **Distribution:** eastern Indian Ocean and western Pacific. **Remarks:** occurs in reef outer lagoon and seaward reefs to depths of 50 m. Inhabits branching coral heads, particularly *Pocillopora* sp. and *Acropora* spp. Forms schools. Feeds on plants, benthic and planktonic invertebrates. Common reef-associated fish in the area; replaced by *D. carneus* in the Indian Ocean. (Y. Yusuf)

Dascyllus reticulatus, UMTF 1418 (KAUM–I. 16600), 2.5 cm SL
Bidong Island, 12 Oct. 2008

Dascyllus trimaculatus (Rüppell, 1829)

Three-spot Dascyllus

D XII, 14–16; A II, 14–15; P_1 19–21; LLp 17–19. Body deep, compressed. Posterior margin of preopercle serrate. Suborbital scaled, with serrate ventral free margin. Teeth on jaws conical, multiserial; teeth of outermost row larger than those of inner rows. Caudal fin emarginate, with rounded lobes; two conspicuous projecting spinelike rays at upper and lower edges of caudal-fin base. **Color:** head, body and fins black or gray, with a white spot on dorsal part of side of body, as well as a similar-colored spot on forehead (these white spots may obscure in large adult); body of large individual light gray, with dark-margined scale pockets forming reticulated pattern; juveniles overall black with lighter scale centers, prominent white blotch present on forehead and upper sides. **Size:** 11.0 cm SL. **Distribution:** Indo-West Pacific. **Remarks:** found in coral and rocky reefs; inhabits lagoons, passes, and outer reed to depths of 55 m; juveniles frequently symbiotically associated with various sea anemones; common reef-associated fish in the area. (K. Shibukawa & Y. Yusuf)

Dascyllus trimaculatus, UMTF 1302 (KAUM–I. 16587), 3.5 cm SL
Bidong Island, 13 Oct. 2008

Dischistodus fasciatus (Cuvier, 1830)

Banded Damsel

D XIII, 13–14; A II, 13–14; P_1 17–18; LLp 16–17. Body depth 2.0–2.1 in SL. Upper and lower accessory caudal rays not spinous. Posterior margin of preopercle serrated. Both jaws with biserial teeth. Predorsal scales reaching above anterior part of orbit. **Color:** head and body pale, with a dark bar through eye; 3 dark bars on body bars, widest in the middle. **Size:** 11.5 cm SL. **Distribution:** western Pacific, including Indonesia, Philippines, Taiwan and northern Australia. **Remarks:** inhabits lagoon and coastal reefs with silt and sandy bottom, around coral outcrops and seagrass beds; depth range 1–8 m. Can be aggressive toward SCUBA diver, defending its territory. (Y. Yusuf)

Dischistodus fasciatus, UMTF 1337 (KAUM–I. 16621), 4.5 cm SL
Bidong Island, 12 Oct. 2008

Dischistodus prosopotaenia (Bleeker, 1852)

Honey-head Damsel

D XIII, 14–16; A II, 14–15; P_1 17; LLp 16–17. Body depth 2.1–2.2 in SL. Upper and lower accessory caudal rays not spinous. Posterior margin of preopercle serrated. Both jaws with biserial teeth. Predorsal scales reaching above anterior part of orbit. **Color:** adults with body golden brown anteriorly, white posteriorly; three indistinct brown saddles or bars below soft portion of dorsal fin; axil of pectoral fin black; light blue dots and vertical lines on scales. Juveniles brown, with two white bars on sides; an ocellated spot on dorsal fin base. **Size:** 17.0 cm TL. **Distribution:** widely distributed in the Indo-West Pacific from Nicobar Islands to Vanuatu, north to the Ryukyu Islands, south to northwest Australia and the Great Barrier Reef. **Remarks:** inhabits lagoons and coastal reefs, usually in sand and silty bottoms; depth range 1–12 m. (Y. Yusuf)

Dischistodus prosopotaenia, UMTF 1207 (KAUM–I. 16611), 9.4 cm SL
Bidong Island, 12 Oct. 2008

Dischistodus prosopotaenia, KAUM–I. 16614, 3.5 cm SL
Bidong Island, 12 Oct. 2008

Neoglyphidodon melas (Cuvier, 1830)

Bowtie Damselfish

D XIII, 14–15; A II, 13–15; P_1 18–19; LLp 16–17. Body deep; its depth 1.7–2.0 in SL. Posterior margin of preopercle and suborbital smooth. Suborbital scaled. Teeth on jaws flattened distally with biserial teeth. No conspicuous projecting spine-like rays at upper and lower edges of caudal fin base. **Color:** adult bluish-black uniformly, without marking. Juveniles white to light gray, dorsum part of head and body yellow; dorsal fin, and upper and lower margins of caudal fin yellow; frontal margins of pelvic and anal fins black. **Size:** 18.0 cm TL. **Distribution:** Indo-West Pacific. **Remarks:** found in coral-rich areas usually with abundant soft corals; depth range 1–12 m. Juveniles are encountered around staghorn corals, *Acropora* spp. (Y. Yusuf)

Neoglyphidodon melas, UMTF 1334 (KAUM–I. 16622), 4.3 cm SL
Bidong Island, 13 Oct. 2008

Neopomacentrus anabatoides (Bleeker, 1847)

Silver Demoiselle

D XIII, 10–11; A II, 10–11; P_1 17–18; LLp 16–18. Body relatively slender, compressed. Posterior margin of preopercle weakly serrate. Ventral margin of suborbital concealed by scales. Teeth on jaws biserial, incisor like. Caudal fin forked; no conspicuous projecting spine-like rays at upper and lower edges of fin base. **Color:** head and body metallic green, whitish ventrally; scales dark marginally; small black blotches (subequal pupil sized) on upper end of gill opening, and upper pectoral fin base. **Size:** 10.5 cm TL. **Distribution:** western Pacific. **Remarks:** schooling fish inhabiting soft bottoms around coral or rock outcrops; depth range 2–15 m. (Y. Yusuf)

Neopomacentrus anabatoides, UMTF 1239 (KAUM–I. 16565), 5.5 cm SL
Bidong Island, 14 Oct. 2008

Neopomacentrus cyanomos (Bleeker, 1856)

Regal Damoiselle

D XIII, 11–12; A II, 11–12; P_1 17–18; LLp 17–18. Body relatively slender, compressed. Posterior margin of preopercle weakly serrate. Ventral margin of suborbital with scales. Teeth on jaws biserial, incisor-like. Caudal fin forked, with filamentous upper and lower lobes; no conspicuous projecting spine-like rays at upper and lower edges of caudal-fin base. **Color:** head and body dark brownish gray; a small black blotch (subequal pupil sized) on upper end of gill opening; a small black spot on upper origin of pectoral fin; posterior part of dorsal fin pale to yellow; caudal fin pale to yellow, with black upper and lower margins. **Size:** 7.0 cm SL. **Distribution:** Indo-West Pacific. **Remarks:** found around patch reefs in protected bays with sandy muddy bottoms in depth of 5–18 m. Feeds on plankton in aggregation. (K. Shibukawa & Y. Yusuf)

Neopomacentrus cyanomos, UMTF 1021 (KAUM–I. 16648), 6.6 cm SL
Bidong Island, 13 Oct. 2008

Neopomacentrus taeniurus (Bleeker, 1856)

Freshwater Demoiselle

D XII–XIII, 11–12; A II, 10–11; P1 17–18; LL 16–17. Body depth 2.2–2.6 in SL. Posterior margin of preopercle serrated. Both jaws with biserial teeth. Predorsal scales reaching above anterior nostril. Caudal fin with filamentous lobes; no conspicuous projecting rays on base. **Color:** body brown, with scales dark marginally; a small black spot on upper edge of opercle near origin of lateral line; a large black spot on upper pectoral fin base; posterior part of dorsal and anal fins pale white to yellow; caudal fin pale white to yellow, with base and both lobes dark brown. **Size:** 10 cm TL. **Distribution:** Indo-West Pacific. **Remarks:** inhabits mangroves, estuaries, lower reaches of freshwater streams, and harbors with freshwater discharge; to depths of 3 m. (Y. Yusuf)

Neopomacentrus taeniurus, UMTF 1028 (KAUM–I. 16762), 5.2 cm SL
Setiu, 31 Oct. 2008

Pomacentrus alexanderae Evermann & Seale, 1907

Alexander's Damsel

D XIII, 14–15; A II, 14–15; P1 16–17; LLp 15–17. Body ovate, compressed. Posterior margin of preopercle serrate. Suborbital naked, with serrate ventral margin. Teeth on jaws biserial, incisor-like. Caudal fin emarginate; no conspicuous projecting spine-like rays at upper and lower edges of caudal-fin base. **Color:** head and body pale gray, with a large blotch on pectoral fin base; tips of dorsal spines black. **Size:** 9.0 cm TL. **Distribution:** western Pacific. **Remarks:** occurs in lagoon, inshore, and offshore reefs; depth range 5–60 m. Feed on algae, barnacle nauplii, copepods, fish eggs, and small gastropods. (Y. Yusuf)

Pomacentrus alexanderae, UMTF 1339 (KAUM–I. 16556), 3.0 cm SL
Bidong Island, 13 Oct. 2008

Pomacentrus chrysurus Cuvier, 1830

Whitetail Damsel

D XIII, 14–16; A II, 15–16; P_1 18; LLp 18–19. Body ovate, compressed. Posterior margin of preopercle serrate. Suborbital naked, with serrate ventral margin. Teeth on jaws biserial, incisor-like. Caudal fin emarginate; no conspicuous projecting spine-like rays at upper and lower edges of caudal-fin base. **Color:** head and body dusky, darkened posteriorly and abruptly turn to white in caudal fin; a small black spot at dorsalmost part of pectoral fin base; juvenile tinged with blue and with orange over back and pale-edged black ocellus at posterior part of dorsal fin (ocellus may persisting in adult). **Size:** 7.0 cm SL. **Distribution:** Indo-West Pacific. **Remarks:** found in sandy areas of shallow inshore coral reefs to depths of 3 m. (K. Shibukawa & Y. Yusuf)

Pomacentrus chrysurus, UMTF 1227 (KAUM–I. 16613), 4.2 cm SL
Bidong Island, 12 Oct. 2008

Pomacentrus coelestis Jordan & Starks, 1901

Neon Damselfish

D XIII, 13–15; A II, 14–15; P_1 17–18; LL 17–18. Body depth 2.5–2.6 in SL. Posterior margin of preopercle serrated; ventral margin of infraorbital smooth. Both jaws with biserial teeth. Predorsal scales reaching above anterior nostril; no scales on infraorbitals. Caudal fin emarginate; no conspicuous projecting spine-like rays at upper and lower edges of caudal fin base. **Color:** body blue, often with iridescent glow; yellow-orange on ventral part of body, posterior parts of dorsal, anal and on caudal fins. **Size:** 10 cm SL. **Distribution:** eastern Indian Ocean and western Pacific. **Remarks:** inhabits lagoon and seaward reefs, close to bottom among rubble beds; depth range 1–20 m. (Y. Yusuf)

Pomacentrus coelestis, KAUM–I. 16594, 3.3 cm SL
Bidong Island, 12 Oct. 2008

Pomacentrus cuneatus Allen, 1991

Wedgespot Damsel

D XIII, 14–15; A II, 14–15; P_1 16–18; LLp 17. Body ovate, compressed. Body depth 2.0–2.1 in SL; posterior margin of preopercle serrate. Pre and suborbital naked, with serrate ventral margin. Teeth on jaws biserial. No conspicuous projecting spine-like rays at upper and lower edges of caudal-fin base. **Color:** adults gray-brown uniformly, with dark scale margin; a black wedge-shaped spot on dorsal edge of opercle; a small black spot on upper pectoral fin base; tips of dorsal fin spines bluish. Juvenile yellowish, with several blue stripes from snout to posterior part of body; blue-edged black ocellus at posterior part of dorsal fin. **Size:** 7.5 cm SL. **Distribution:** Western Central Pacific. **Remarks:** inhabits sheltered inshore coral reefs, usually in turbid silty, degraded reef area; depth range 1–15 m. Solitary or in small group. (Y. Yusuf)

Pomacentrus cuneatus, UMTF 1341 (KAUM–I. 16567), 4.1 cm SL
Bidong Island, 14 Oct. 2008

Pomacentrus milleri, UMTF 1226 (KAUM–I. 16566), 3.7 cm SL
Bidong Island, 14 Oct. 2008

Pomacentrus milleri Taylor, 1964

Miller's Damselfish

D XIII–XIV, 13–14; A II, 13–14; P_1 17–18; LLp 18–19. Body ovate, compressed. Posterior margin of preopercle serrate. Suborbital naked, with serrate ventral margin. Teeth on jaws biserial, incisor-like. Caudal fin emarginate; no conspicuous projecting spine-like rays at upper and lower edges of caudal fin-base. **Color:** adults gray, with scales dark marginally; fins with blue margins. Juvenile blue, yellow dorsally; neon-blue lines on dorsal part of head; black spot edged with blue on rear dorsal fin. **Size:** 7.5 cm SL. **Distribution:** distributed in western and northern Australia, and the Gulf of Thailand. **Remarks:** inhabits inshore reef areas mainly on dead coral, rubble or algal area; depth range 1–6 m. (Y. Yusuf)

Pomacentrus moluccensis Bleeker, 1853

Lemon Damsel

D XIII, 14–15; A II, 14–15; P_1 17; LLp 17–18. Body ovate, compressed. Posterior margin of preopercle serrate. Suborbital naked, with serrate ventral margin. Teeth on jaws biserial, incisor-like. Caudal fin emarginate; no conspicuous projecting spine-like rays at upper and lower edges of caudal-fin base. **Color**: head, body and fins yellow, darker dorsally; dosal and anal fin with narrow black margins; a minute black spot on upper end of gill opening; subequal or slightly larger black spot at upper pectoral fin origin; no ocellus on dorsal fin. **Size:** 5.5 cm SL. **Distribution:** eastern Indian Ocean and western Pacific. **Remarks:** found in coral reefs areas; forming group around live coral; to depths of 14 m. Feeds mainly on zooplankton, small benthic invertebrates, and algae.

(K. Shibukawa & Y. Yusuf)

Pomacentrus moluccensis, UMTF 1007 (KAUM–I. 16568), 3.5 cm SL
Bidong Island, 14 Oct. 2008

Pomacentrus taeniometopon Bleeker, 1852

Brackish Damsel

D XIII, 13–14; A II,13–14; P_1 17–18; LLp 17–19. Body ovate, compressed; both jaws with biserial teeth; distinct notch between lacrimal and suborbital; preopercular margin serrated; predorsal scales reaching above anterior nostril; no scales on infraorbitals and suborbital. No conspicuous projecting spine-like rays at upper and lower edges of caudal-fin base. **Color:** adults light to dark gray or dark brown, often with vertical blue streaks or spots on scales. Juvenile dark brown, with neon-blue lines and dot rows on sides; a small black spot with blue margin on rear part of dorsal fin; posterior portions of dorsal and anal fins, caudal peduncle, and caudal fin yellow. **Size:** 12.0 cm TL. **Distribution:** western Pacific. **Remarks:** occurs solitarily or in small groups in lagoons, harbors, coastal reefs and outer reef slopes; also found in mangrove creeks (sometimes in freshwater), brackish lagoons and shallow reefs exposed to freshwater runoff; depth range 0–8 m. Feeds primarily on benthic algae. (Y. Yusuf)

Pomacentrus taeniometopon, UMTF 1027 (KAUM–I. 16677), 7.6 cm SL
Kemaman, 21 Oct. 2008

Pomacentrus taeniometopon, UMTF 1384 (KAUM–I. 16341), 2.1 cm SL
Cendering, 16 Oct. 2008

Pomacentrus tripunctatus Cuvier, 1830

Threespot Damsel

D XIII, 14–15; A II, 14–15; P_1 17–18; LLp 17–18. Body ovate, compressed; its depth 1.8–2.0 in SL. Posterior margin of preopercle serrated; vertral margin of infraorbital finely serrated. Both jaws with biserial teeth. Predorsal scales reaching above anterior nostril; no scales on infraorbitals. No conspicuous projecting spine-like rays at upper and lower edges of caudal-fin base. **Color:** dark gray-brown, with a small blue margined black saddle-spot on upper caudal peduncle. Juveniles with a blue-edged ocellus on dorsal fin. **Size:** 7.5 cm SL. **Distribution:** Indo-West Pacific, from Sri Lanka, Andaman Sea, and Indo-Australian Archipelago eastward to New Britain, Solomon Islands, Santa Cruz Islands, and Vanuatu, north to southern Japan. **Remarks:** inhabits shallow bays, silty coastal reefs and harbors with sparse coral and algal growth; depth range 0–3 m. Solitary species; feeds mainly on benthic algae. (Y. Yusuf)

Pomacentrus tripunctatus, UMTF 1402 (KAUM–I. 16328), 6.4 cm SL
Cendering, 16 Sept. 2008

Pomacentrus tripunctatus, UMTF 1393 (KAUM–I. 16281), 4.3 cm SL
Cendering, 14 Sept. 2008

Pristotis obtusirostris (Günther, 1862)

Gulf Damselfish

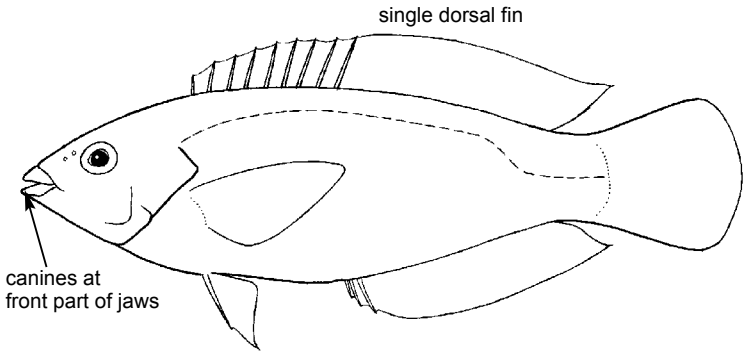
D XIII, 12–13; A II, 12–14; P_1 17–18; LLp 19–20. Body depth 2.5–2.8 in SL. Posterior margin of preopercle and subopercle serrated. Both jaws with uniserial teeth. Caudal fin forked without filamentous lobes; no conspicuous projecting spine-like rays at upper and lower edges of caudal-fin base. **Color:** body pale gray to bluish with blue spots on each scale; a small black spot at base of upper pectoral rays. **Size:** 14.0 cm TL. **Distribution:** Indo-West Pacific: Red Sea and Persian Gulf to New Guinea, northern Australia north to Ryukyu Islands, Japan. **Remarks:** inhabits flat sandy or rubble bottoms around patch reefs of lagoons and trawling grounds; depth range 2–80 m. Adults often forming small groups out in the open on sandy substrate, swimming well-above bottom; juveniles often entering shallow estuaries; rare in the area. (Y. Yusuf)

Pristotis obtusirostris, KAUM–I. 16981, 6.6 cm SL
off Terengganu (KT), 12 Dec. 2008

LABRIDAE

Wrasses

By Mizuki Matsunuma



A diverse group of fishes varying in body shape and size (usually 20 cm); body slightly to extremely compressed. Mouth terminal, slightly to extremely protrusible, usually with prominent lips; maxilla not exposed on cheek; teeth in jaws usually separate and caniniform, the anteriormost 1 or 2 pairs typically enlarged and often directed forward; pharyngeal jaws strong with pharyngeal teeth either sharp, conical, or broad and molariform. A single, long-base dorsal fin in most species, with VIII–XXI spines (usually less than XV) and 6–21 soft rays; anal fin with II–VI spines (often III) and 7–18 soft rays. Scales cycloid and highly variable in size among species; head never fully scaly; lateral line interrupted or continuous. **Color:** most species with bright and intricate color patterns, including stripes, bars, spots, blotches, and ocelli. Most species change color and sex with growth, from an initial phase (IP) of females, the latter able to change sex into an often brilliantly colored terminal male phase (TP).

Remarks: most common in shallow waters in a variety of habitats such as coral reefs, rocky reefs, sand, seagrass, and algae, but rarely found in muddy areas. Wrasses are diurnal with diverse feeding habits, including benthic invertebrates, fishes, coral mucus, zooplankton, ectoparasites, and algae.

Similar families occurring in the area: Scaridae – mouth not protrusible; teeth in jaws coalesced at base or fused into a bony, parrot-like beak, except a few species; lips continuous with facial skin, without an indentation.

Cheilinus chlorourus (Bloch, 1791)

Floral Wrasse

Cheilinus chlorourus, KAUM–I. 17154, 11.1 cm SL
off Terengganu (KR), 4 Jan. 2009

D X, 9; A III, 8; P_1 12; LLp 14–16 + 7–9. Body moderately deep; dorsal profile of head convex in front of dorsal fin, then straight to tip of snout. Jaws prominent, anterior tip of lower jaw even with anterior tip of upper jaw; 2 strong canines situated anteriorly in each jaw. Lateral line interrupted below posterior portion of dorsal-fin base. Scales reaching well onto bases of dorsal and anal fins; predorsal scales extending forward to above center of eye; cheek and operculum with 2 rows of scales. Caudal fin rounded in small fishes, in large individuals the upper and lower rays form elongate lobes. **Color:** variable from greenish brown to deep reddish brown, usually flecked with white; reddish brown fins; each scale on sides usually with a blue or brown spot, spots extending onto dorsal and anal fins; a blackish spot basally on first 1 or 2 membranes of dorsal fin; head with red spots, some joining to form lines radiating from eye; dark brown blotches on sides, sometimes forming a diffuse barred pattern. Small individuals with about 4 more prominent vertical brown bands on sides. **Size:** maximum length about 36 cm. **Distribution:** Indo-Pacific from the east coast of Africa to French Polynesia, north to southern Japan. **Remarks:** feeds primarily on benthic, hard-shelled invertebrates.

Cheilinus fasciatus (Bloch, 1791)

Redbreasted Wrasse

D IX, 10; A III, 8; P_1 12; LLp 14–16 + 7–9. Body moderately deep; dorsal profile of head convex; anterior tip of snout forming an acute angle. Jaws prominent; 2 strong canines situated anteriorly in both jaws. Lateral line interrupted. Predorsal scales extending forward to above anterior portion of eye; cheek and operculum with 2 rows of scales. Caudal fin rounded in juveniles; in adult with elongate upper and lower lobes. **Color:** body reddish brown to blackish with 6–7 narrow white bars; chest to posterior part of head orange to reddish; narrow orange-red lines extending anteriorly and posteriorly to eye; caudal fin white with a broad black middle bar and black margin. **Size:** maximum length about 40 cm. **Distribution:** Indo-Pacific. **Remarks:** feeds primarily on benthic, hard-shelled invertebrates.

Cheilinus fasciatus, KAUM–I. 17051, 13.2 cm SL
off Terengganu (KT), 18 Dec. 2008

Cheilinus trilobatus Lacepède, 1801

Tripletail Wrasse

D IX, 10; A III, 8; P_1 12; LLp 15–17 + 7–9. Body moderately deep; dorsal profile of head convex; anterior tip of snout forming an acute angle. Jaws prominent; 2 strong canines situated anteriorly in both jaws. Lateral line interrupted. Predorsal scales extending forward to above anterior portion of eye; cheek and operculum scaled. Caudal fin rounded, upper and lower corners prolonged and middle part of fin protruding in large male. **Color:** variably pigmented from green to brown with mottled purple and red markings; 4 vertical dark bars on body side; head with numerous small red spots; red lines radiating from anterior and posterior of eye; dorsal, anal, and pectoral fins yellow or green with distal red streaks; caudal fin green with a red posterior margin. **Size:** maximum length about 40 cm. **Distribution:** Indo-West Pacific. **Remarks:** found on coral reefs at depths of 1 to 20 m.

Cheilinus trilobatus, KAUM–I. 17158, 20.2 cm SL
off Terengganu (KR), 4 Jan. 2009

Epibulus insidiator (Pallas, 1770)

Slingjaw Wrasse

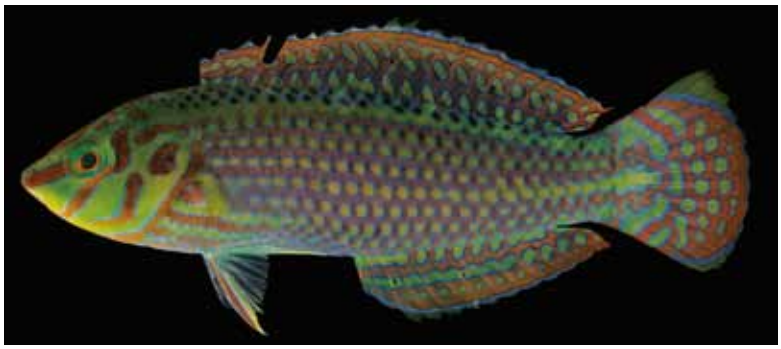
D IX, 10–11; A III, 8–9; P_1 12; LLp 22–23. Body moderately deep. Dorsal profile of head convex in front of dorsal fin, a slight concavity above and before eye. Jaws highly protrusible, lower jaw extending posteriorly all the way to gill membrane when mouth closed. Lateral line interrupted. Predorsal scales extending forward above eye; cheek and operculum scaled; lower jaw naked. Pectoral fin comparatively short (20.5–23.3% SL); caudal slightly rounded in juveniles, upper and lower rays forming elongate lobes in large males. **Color:** overall brown to occasionally yellow; dorsal fin with several horizontal dark stripes and a black spot between first 2 spines. **Size:** maximum length about 35 cm. **Distribution:** Indo-Pacific. **Remarks:** Found on coral reefs to depths of 5 to 40 m.

Epibulus insidiator, KAUM–I. 17143, 17.5 cm SL
off Terengganu (KT), 1 Jan. 2009

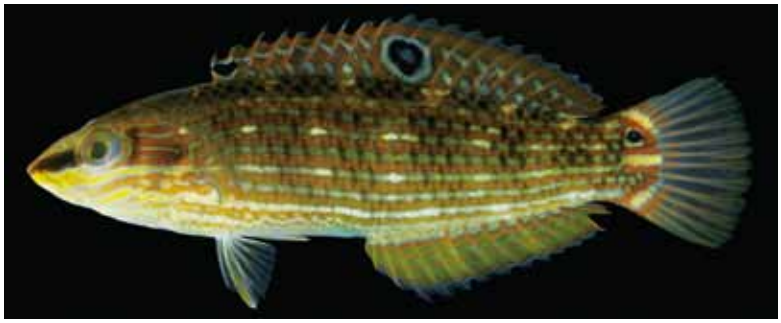
Halichoeres argus (Bloch & Schneider, 1801)

Argus Wrasse

D IX, 11–12; A III, 11–12; P_1 14; LLp 27; GR 17–19. Body slightly elongate, compressed. Mouth terminal and small; 2 pairs of prominent canines situated anteriorly in each jaw; a large curved canine present on each side at rear of upper jaw; pharyngeal teeth well developed, molariform. Dorsal-fin origin above posterior tip of opercular margin. Head naked. Lateral line complete. Pelvic fins relatively short, not reaching to anus; caudal fin moderately rounded. **Color:** initial phase with dusky orange-brown stripes following scale rows alternating with whitish or pale interspaces; most of scales dorsally above lateral line with blackish centers; edges of scales in about 5–6 discrete zones on side dusky to blackish, thus forming diffuse dark bars on body; 2 pale-edged black spots on dorsal fin, the first on membrane between first and second spines, and a second larger spot on soft-rayed portion; a small pale-edged black spot on upper caudal-fin base. Terminal phase rose red with a black-edged green spot on each scale; rows of similar spots on dorsal, anal, and caudal fins; head rose with irregular green bands and large spots. **Size:** maximum length about 11 cm. **Distribution:** eastern Indian Ocean and western Pacific. **Remarks:** found in shallow coastal reefs.



Halichoeres argus, UMTF 1304 (KAUM–I. 16624), TP, 5.3 cm SL
Bidong Island, 13 Oct. 2008



Halichoeres argus, KAUM–I. 16517, IP, 4.8 cm SL
Cendering, 6 Oct. 2008

Halichoeres chloropterus (Bloch, 1791)

Pastel-green Wrasse

D IX, 10–11; A III, 10–11; P_1 13–15; LLp 27; GR 17–20. Body moderately deep. Dorsal profile of head only slightly convex. Mouth terminal and small; a single pair of prominent canines situated anteriorly in each jaw, second pair of teeth moderately enlarged and recurved; a large curved canine present on each side at rear of upper jaw. Dorsal fin origin above posterior tip of opercular margin. Lateral line complete. Small patches of scales present high on opercle, behind eye, and high on cheek. Caudal fin slightly rounded. **Color:** initial phase pale green, whitish ventrally; each scale on upper part of body side with a small black dot; a narrow black bar at pectoral-fin base. Terminal phase pastel green with a faint pink spot in center of each scale in middle and posterior of body; head with irregular bands of green and lavender-pink. **Size:** maximum total length about 19 cm. **Distribution:** the Andaman Sea and Western Central Pacific. **Remarks:** found mostly on coral reefs and surrounding sandy areas at depths of 1–10 m.

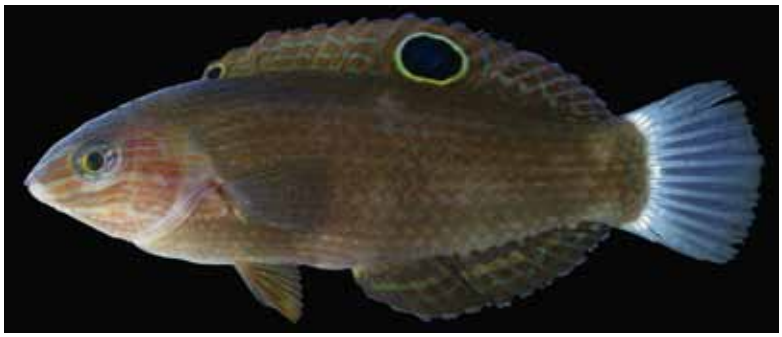
Halichoeres chloropterus, UMTF 1366 (KAUM–I. 16609), 10.4 cm SL
Bidong Island, 12 Oct. 2008

Halichoeres chloropterus, UMTF 1367 (KAUM–I. 16619), 4.4 cm SL
Bidong Island, 12 Oct. 2008

Halichoeres marginatus Rüppell, 1835

Dusky Wrasse

D IX, 13–14; A III, 12–13; P_1 14–15; LLp 27–28; GR 17–20. Body moderately deep. Jaws prominent; 2 pairs of prominent canines situated anteriorly in each jaw; a large curved canine present on each side at rear of upper jaw. Dorsal-fin origin over first to second lateral-line scales. Lateral line complete. Head naked except for nape. Caudal fin rounded; pelvic fins of terminal males long, reaching beyond origin of anal fin. **Color:** initial phase dark brown with faint pale stripes following scale rows; a small yellow-edged deep blue spot at front of dorsal fin and a large one in middle of fin; caudal fin whitish. Terminal males yellowish brown with a dark bluish spot on each scale, narrow oblique blue bands on head; caudal fin with a green crescent at base, followed by a large purple-edged red crescent containing small blue-edged green spots. **Size:** maximum length about 17 cm. **Distribution:** Indo-Pacific. **Remarks:** found in coral reefs to depths of at least 30 m.



Halichoeres marginatus, UMTF 1206 (KAUM–I. 16389), 4.3 cm SL
Dungun, 24 Sept. 2008

Halichoeres melanurus, UMTF 1347 (KAUM–I. 16604), 4.4 cm SL
Bidong Island, 12 Oct. 2008

Halichoeres nigrescens, KAUM–I. 16326, 6.7 cm SL
Cendering, 16 Sept. 2008

Halichoeres melanurus (Bleeker, 1851)

Tailspot Wrasse

D IX, 12; A III, 12; P_1 14; LLp 27. Body moderately deep. Jaws prominent; a single pair of prominent canines situated anteriorly in each jaw; a large curved canine present on each side at rear of upper jaw. Lateral line complete. Head naked except for nape. Pelvic fins of terminal phase reaching to or beyond anus; caudal fin slightly rounded. **Color:** initial phase with alternating narrow orange-yellow and blue stripes; a blue-edged black spot at upper base of caudal fin; a large spot in middle of dorsal fin, and a small spot at front of dorsal fin. Terminal phase with blue-green and orange stripes on body; 3–6 narrow green vertical bars on upper side; head with pink and blue-green bands; caudal fin blue with curved orange-red bands and a large vertically elongate dark spot posteriorly in middle of fin; pectoral-fin base with a large yellow spot with a smaller black spot at upper fin base. **Size:** maximum length about 10.5 cm. **Distribution:** eastern Indian Ocean and West Pacific. **Remarks:** found mostly on shallow coral reefs and rocky shores.

Halichoeres nigrescens (Bloch & Schneider, 1801)

Bubblefin Wrasse

D IX, 12; A III, 11–12; P_1 14–15; LLp 27; GR 18–22. Body slightly elongate, compressed. Dorsal-fin origin slightly posterior to upper end of gill opening. Scales on nape extending to or slightly anterior to a vertical at rear edge of eyes; rest of head naked. Lateral line complete. Caudal fin rounded. **Color:** females with irregular green and pink stripes and 6 groups of 7–10 small black spots in a midlateral row on body which may coalesce into and indistinct dark stripe; a short vertical black line behind eye preceded by a blue line and followed by a dusky pink bar; a small triangular black spot at upper base of pectoral fins. Males light green, white ventrally, with 7 reticulate deep pink blotches, the last 4 interconnected, and a midlateral series of indistinct small white spot; a black and yellow spot in dorsal fin between fifth and sixth spines. **Size:** maximum length about 14 cm. **Distribution:** Indo-West Pacific. **Remarks:** found in shallow areas of reef flats, rocky shorelines as well as seagrass beds.

Hemigymnus melapterus (Bloch, 1792)

Blackeye Thicklip

D IX, 11; A III, 11; P_1 14; LLp 27–28. Body deep. Mouth small; a pair of protruding canine teeth in jaws; lips large and fleshy, the lower lips split on the midline forming 2 lobes; a broad canine present at each side at rear of upper jaw. Lateral line abruptly curved below posterior portion of dorsal fin base; scales barely reaching onto bases of dorsal and anal fins; scales in front of dorsal fin extending forward to above center of eye; cheek with a narrow band of scales below and behind eye; opercle and lower jaw without scales. **Color:** white forward of a line between origins of dorsal and anal fins, dark behind; head light blue above, greenish below with red spots and stripes around eyes; dorsal and anal fins with blue lines and with pink edges; pink edges also on caudal fin. **Size:** maximum length about 50 cm. **Distribution:** Indo-West Pacific. **Remarks:** found mostly on coral reefs and reef flats at depths of 1 to at least 20 m.

Hemigymnus melapterus, KAUM–I. 17142, 22.1 cm SL
off Terengganu (KT), 1 Jan. 2009

Iniistius trivittatus, KAUM–I. 16945, 12.1 cm SL
off Terengganu (KT), 11 Dec. 2008

Iniistius trivittatus (Randall & Cornish, 2000)

Triplebar Razorfish

D IX, 12; A III, 12; P_1 12–13; LLp 19–20 +4–5; GR 14–16. Body deep, very compressed; caudal peduncle short. Snout long; its dorsal profile nearly vertical; remaining head profile strongly convex. Mouth small, horizontal; lips well developed; jaws with a pair of long curved caniniform teeth anteriorly. Lateral line interrupted; head naked, except for 2–3 scales on upper part of opercle; a broad band of small scales below eye. Membrane between 2nd and 3rd dorsal-fin spines incised; gap between bases of 2nd and 3rd spines larger than those of adjacent interspinous spaces; caudal fin rounded. **Color:** body yellowish-dusky gray, whitish ventrally; 3 vertical blackish bars on body side; an indistinct large blackish blotch on center of caudal peduncle; a median pale blue line on forehead. Dorsal, anal and pelvic fins pale yellow; caudal fin pale blue, yellowish basally, blackish distally, red spots forming irregular short bars on uppermost edge. **Size:** maximum length about 13 cm. **Distribution:** Western Central Pacific. **Remarks:** found in coastal waters of sandy bottoms.

Labroides dimidiatus, UMTF 1241 (KAUM–I. 16617), 5.6 cm SL
Bidong Island, 12 Oct. 2008

Labroides dimidiatus (Valenciennes, 1839)

Cleaner Wrasse

D IX, 11; A III, 10; P_1 14–15; LLp 26. Body slender. Dorsal profile of head convex; mouth terminal, small; lips thick, the lower strongly bilobed, the 2 half separated by a u-shaped notch; a single pair of canines anteriorly in jaws, a canine a corner of mouth, and several rows of small teeth on side of jaws. Head scaly except for ventral portion. Caudal fin truncate to slightly rounded. **Color:** juveniles black with a bright blue stripe on back and dorsally on head. Adults light blue shading to pale yellow or white anteriorly, with a black stripe from snout through eye to rear edge of caudal fin, this stripe progressively broader posteriorly. **Size:** maximum length about 11.5 cm. **Distribution:** Indo-Pacific. **Remarks:** inhabits coral reefs. Feeds on crustacean ectoparasites and mucus of fishes.

Leptojulis cyanopleura (Bleeker, 1853)

Shoulderspot Wrasse

D IX, 11; A III, 11–12; P_1 13; LLp 27; GR 19–22. Body slender; head pointed; dorsal profile of head nearly straight, nape slightly convex; snout relatively long; eye small. Mouth terminal, slightly oblique; front of jaws with 2 pairs of large canines; a prominent canine tooth posteriorly on upper jaw. Lateral line complete; body covered with large cycloid scales, head and bases of fins except for caudal fin naked. Caudal fin varying from slightly rounded in initial phase to very slightly double emarginate in large terminal males. **Color:** initial phase whitish with 2 orange-brown stripes on upper half of head and body, the first from upper lip through eye to midbase of caudal fin, the second, narrower, from top of head along base of dorsal fin to tip of caudal peduncle. Terminal males bluish gray with a blue-edged orange-yellow stripe from front of snout through eye to middle of caudal fin; a group of blue-edged black scales forming a spot on stripe above pectoral fins; a blue-edged black spot middorsally on nape; caudal fin blue with 3 or 4 oblique orange-yellow bands in upper and lower half of fin. **Size:** maximum length about 13 cm. **Distribution:** Central Indian Ocean to western Pacific, from the Gulf of Oman to Great Barrier Reef, north to Philippines. **Remarks:** aggregates usually in small group above reefs at depths of 6–45 m.

Leptojulis cyanopleura, KAUM–I. 16584, TP, 9.3 cm SL
Bidong Island, 13 Oct. 2008

Leptojulis cyanopleura, UMTF 1313 (KAUM–I. 16586), IP, 6.6 cm SL
Bidong Island, 13 Oct. 2008

Leptojulis lambdastigma, KAUM–I. 17035, 10.7 cm SL
off Terengganu (KT), 17 Dec. 2008

Leptojulis lambdastigma Randall & Ferraris, 1981

D IX, 12–13; A III, 11–12; P_1 13; LLp 27; GR 16–20. Body slender; head pointed; dorsal profile of head nearly straight, nape slightly convex; snout relatively long; eye small. Mouth terminal, slightly oblique; front of jaws with 2 pairs of large canines; a prominent canine tooth posteriorly on upper jaw. Lateral line complete; body covered with large cycloid scales, head and bases of fins except for caudal fin naked. Caudal fin rounded; first pelvic fin ray elongate, especially in large male. **Color:** Body and head pale pink, whitish ventrally; yellow stripe on body side extending from upper lip to caudal-fin base, via eye; a large V-shaped black marking on nape. Dorsal fin pale orange; upper half of soft-rayed portion of fin pale blue, with a broad pale yellow band submarginally; lower portion of dorsal fin with a row of yellow blotches with a pale blue margin on membranes anteriorly, forming a zigzag stripe posteriorly. Anal fin pale orange, dusky yellow distally, with a thin light blue margin; a row of yellow spots along base. Pectoral and pelvic fins translucent. Caudal fin white, pale blue distally, blackish marginally, numerous scattered yellow spots. **Size:** maximum length about 14 cm. **Distribution:** Western Central Pacific including Taiwan, Philippines, and Gulf of Thailand. **Remarks:** found in coastal waters of sand bottoms.

Oxycheilinus digramma (Lacepède, 1801)

Cheeklined Maori Wrasse

D IX, 10; A III, 8; P_1 12; LLp 14–16 + 7–9. Body moderately slender; dorsal profile of head nearly straight. Jaws prominent; 2 strong canines situated anteriorly in each jaw. Lateral line interrupte; predorsal scales 6, reaching forward to vertical at center of eye; cheek scales reaching just anterior to forward extent of orbit; subopercular scales extending anteriorly to vertical at center of eye. Pelvic fins short, not reaching anus; caudal fin slightly rounded to truncate. **Color:** variably colored; body olive-green to gray-brown fading to orange red on antero-ventral surface, with an orange-red bar or spot on each scale; head with irregular orange lines on upper part parallel to dorsal profile, radiating from eye, and a series of about 8 diagonal purple lines on lower cheek; large central portion of caudal fin mainly green. **Size:** maximum length about 40 cm. **Distribution:** Indo-Pacific. **Remarks:** found on coral reefs at depths of 3–30 m.

Oxycheilinus digramma, KAUM–I. 17055, 16.2 cm SL
off Terengganu (KT), 19 Dec. 2008

Thalassoma lunare, UMTF 1243 (KAUM–I. 16644), 9.9 cm SL
Bidong Island, 12 Oct. 2008

Thalassoma lunare (Linnaeus, 1758)

Moon Wrasse

D VIII, 13; A III, 11; P_1 15; LLp 25; GR 18–20. Body moderately slender; dorsal profile of head slightly convex. Mouth small, 2 prominent canines anteriorly in each jaw. Lateral line complete; head naked except for a patch of scales on upper end of opercle. Caudal fin varying from truncate in young to highly lunate with upper and lower corners produced into filaments in large adults. **Color:** initial phase green with vertical red lines on scales; head green with many irregular rose pink bands; a blue-edged rose pink band in each lobe of caudal fin, the broad central and posterior part of fin yellow; pectoral fins blue with a broad pink band in upper central part. Terminal males similar but more blue overall. Juveniles olive green on upper half of body, blue-white below; a large black spot in middle of dorsal fin and a large diffuse blackish spot at caudal-fin base. **Size:** maximum length about 25 cm. **Distribution:** Indo-Pacific. **Remarks:** found on coral and rocky reefs at depths of 1–20 m.

Xiphocheilus typus, KAUM–I. 16939, 11.8 cm SL
off Terengganu (KT), 11 Dec. 2008

Xiphocheilus typus Bleeker, 1856

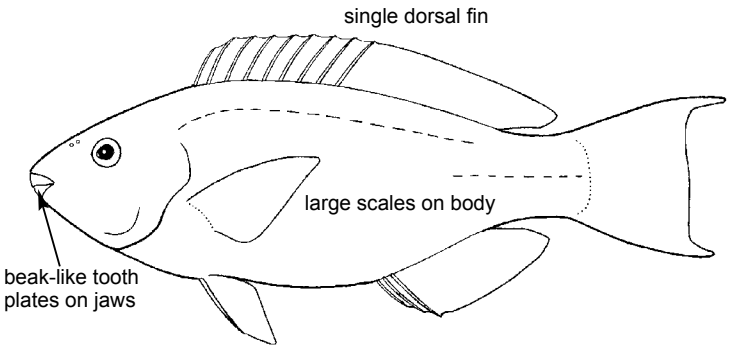
Bluebanded Wrasse

D XII, 8; A III, 10; P_1 15–17; LLp 29. Body slender; dorsal profile of head convex, head and snout blunt. Jaws prominent; upper jaw with 2 widely separated prominent anterior canines; 1 or 2 pair large curved canines on upper jaw posteriorly; lower jaw also with 2 large anterior canines. Pelvic fin short, reaching anus only in large specimens; caudal fin slightly rounded to double emarginate in adults. Lateral line complete; bases of dorsal and anal fins naked; 7–10 large predorsal scales, extending in front of dorsal fin to center of eye; cheek and opercle scaled. **Color:** head and body olive-green dorsally, orange or pinkish laterally; sides with numerous narrow oblique blue bands; head with 4 or 5 narrow blue bands or stripes outlined with yellow-orange; dorsal fin blue with 2 or 3 narrow orange or pink stripes; anal fin yellow-orange with numerous narrow blue bands basally; caudal fin yellow-orange with about 5–8 narrow blue bands; pectoral fins transparent to orangish with a blue band on base. **Size:** maximum length about 12 cm. **Distribution:** eastern Indian Ocean and western Pacific. **Remarks:** inhabits coral reefs at depths of 35 to 85 m. Caught mostly with bottom trawls.

SCARIDAE

Parrotfishes

By Mizuki Matsunuma



Medium to large sized (up to 120 cm) fishes. Body oblong, moderately deep. Head generally bluntly rounded anteriorly. Teeth in jaws usually fused to form a pair of beak-like plates in each jaw, but a few species have free, imbricate, incisor-like teeth; small, isolated, projecting teeth (canines) occur in some species on outer sides of upper jaw; pharyngeal dentition strong consisting of interdigitating paired upper pharyngeals with rows of elongate molariform teeth; these teeth bear against the elongate molariform teeth on the surface of the single lower pharyngeal bone. Dorsal fin with IX slender, flexible spines and 10 soft rays; anal fin with III flexible spines and 9 soft rays; pectoral fins with 2 unbranched rays and 11–14 branched rays; pelvic fins with I spine and 5 soft rays; caudal fin with 11 branched rays, varying from rounded to lunate with produced caudal fin lobes. Scales large, cycloid, usually 22–24 on lateral line; 1–4 rows of scales on cheek; 2–8 median predorsal scales. **Color:** most species very colorful; may exhibit striking sexual dichromatism. Most species are protogynous hermaphrodites (maturing first as females, then sexually transforming into males), this sexual transformation is usually accompanied by change in color phase. In species where 2 adult color phases are known the first is termed "initial phase" (IP), the second "terminal phase" (TP).

Remarks: parrotfishes are most often found on or in vicinity of coral reefs, and usually most abundant in shallow waters to a depth of 30 m. Herbivorous, usually scraping algae from dead coral substrates. Bits of rock eaten with the algae are crushed into sand and ground with the algae to aid in digestion, making parrotfish some of the most important producers of sand on coral reefs.

Similar families occurring in the area: the beak-like plates of most scarids, in addition to features such as large smooth scales and often bright colors, usually preclude parrotfishes being confused with any other fish family.

Hipposcarus longiceps (Valenciennes, 1840)

Pacific Longnose Parrotfish

Hipposcarus longiceps, KAUM–I. 17045, 17.4 cm SL
off Terengganu (KT), 17 Dec. 2008

D IX, 10; A III, 9; P_1 14–16 (usually 15); PDS 4. Head profile pointed with distinctly angular snout; eye near dorsal profile; dental plates relatively narrow with cement; terminal male with 1 or 2 canine teeth on upper dental plate; 3 rows of small scales on cheek, upper row 6–8 scales, middle row 5–7 scales, lower row 3–6 scales, these in small triangular patch on cheek. Caudal fin strongly double emarginate with very short lobes. **Color:** initial phase pale yellowish gray to nearly white, edges of scales darker gray; margin of dorsal and anal fins pale blue; caudal peduncle and fin yellowish. Terminal male pale blue-green, scales edged with orange to pink; edge of upper lip narrowly bright orange to pink; dental plates white; dorsal and anal fins salmon pink with a blue streak on each membrane and a blue margin. Juveniles light gray, with an orange lateral stripe extending from tip of snout to a black spot at caudal-fin base. **Size:** maximum length 40 cm; commonly 20–30 cm. **Distribution:** West Pacific from the Gulf of Thailand east to Tuamotu Archipelago, northern Australia north to southern Japan; northwestern Australia in the Indian Ocean. **Remarks:** relatively common over sand near seaward reefs or in lagoons.

Scarus ghobban Forsskål, 1775

Yellowscale Parrotfish

D IX, 10; A III, 9; P_1 15–16 (usually 15); PDS 5–7 (6). Teeth fused to form dental plates; dental plates relatively smooth; lips covering more than half of dental plates; large adults with 1–3 canine teeth on side at rear of upper dental plate; usually 3 rows of scales on cheek; caudal fin slightly emarginate in small initial-phase fish to lunate in large terminal males. **Color:** initial phase dull orange yellow, centers of scales bluish; 5 irregular blue bars often present on body; fins yellowish. Terminal males green dorsally, scales rimmed with salmon pink, shading to pale green ventrally with pale salmon pink bar on each scale; head green dorsally, shading to pale salmon on cheek and chin, with 2 transverse blue bands on chin and 3 narrow irregular green bands extending posteriorly from eye. **Size:** maximum length about 75 cm. **Distribution:** widespread Indo-Pacific and tropical eastern Pacific. **Remarks:** found on coral reefs to at least 30 m depth.

Scarus ghobban, KAUM–I. 16978, 20.3 cm SL
off Terengganu (KT), 12 Dec. 2008

Scarus psittacus, KAUM–I. 17152, 13.6 cm SL
Redang Island, 4 Jan. 2009

Scarus psittacus Forsskål, 1775

Common Parrotfish

D IX, 10; A III, 9; P1 13–15 (usually 14); PDS 3–5 (4). Teeth fused to form dental plates; dental plates relatively smooth; lips largely covering dental plates; usually1 conical tooth on side of upper dental plate of initial phase, additionally 1 conical tooth on lower plate of terminal males; 2 rows of scales on cheek; caudal fin slightly emarginate in initial phase fish to deeply emarginate terminal males. **Color:** initial phase reddish brown to gray, snout often paler than rest of head, reddish ventrally; a dark spot at base of first membrane of dorsal fin, and a small black and blue spot at upper base of pectoral fin; median fins colored like body. Terminal male green posteriorly, edges of scales pink; abdomen pink with longitudinal series of green spots following scale rows; head with a green band on edge of lips, joining at corner of mouth and continuing below eye; 2 additional green bands extending posterior to eye; snout to a vertical above posterior edge of eye dark purplish to lavender gray; dental plates white. **Size:** maximum length about 26 cm; commonly 16–22 cm. **Distribution:** widespread Indo-Pacific. **Remarks:** commonly found in coral or rocky reefs; often in large mixed species groups.

Scarus psittacus, UMTF 1309 (KAUM–I. 16588), 5.3 cm SL
Bidong Island, 12 Oct. 2008

Scarus quoyi
Valenciennes, 1840

Quoy's Parrotfish

D IX, 10; A III, 9; P_1 14; PDS 6. Teeth fused to form dental plates; dental plates relatively smooth; lips largely covering dental plates; 3 rows of scales on cheek, usually 2 scales in lower row; caudal fin of adults truncate to slightly emarginate. **Color:** initial phase light grayish brown with five or six faint bars from scales with paler centers; three longitudinal whitish stripes on abdomen. Terminal males blue-green dorsally, the scales with narrow pink edges, becoming violet-pink or magenta below; head violet-gray dorsally; a large irregular patch of bright blue green on cheek which extends as a broad band onto upper lip and continues onto chin where invaded by irregular pink bands; operculum orange dorsally, shading to violet-pink ventrally; caudal and pectoral fins largely bright deep blue. **Size:** maximum length about 30 cm, commonly 20–25 cm. **Distribution:** eastern Indian Ocean and West Pacific. **Remark:** inhabits coral-rich areas of outer channels and seaward reefs.

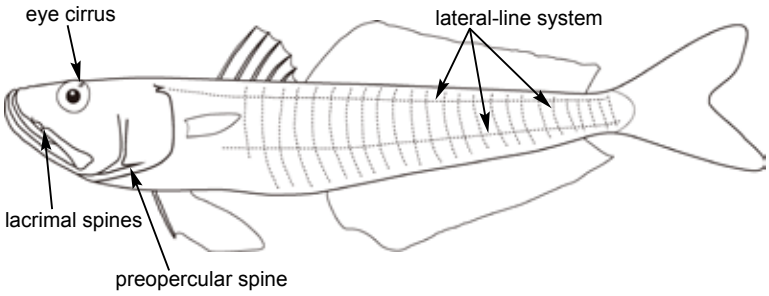
Scarus quoyi, KAUM–I. 17139, 18.5 cm SL
off Terengganu (KT), 1 Jan. 2009

CHAMPSODONTIDAE

Gapers

By Mizuki Matsunuma

Small perciform fishes (up to about 15 cm). Body elongate, slightly compressed. Eyes large, usually with a small posterodorsal cirrus. Mouth large, oblique; maxilla extending posteriorly to below eye or beyond. Premaxilla and dentary with at least 2 rows of teeth; inner row of long, depressible, needle-like teeth; outer row of shorter fixed teeth; teeth on vomer but not on palatines. Lacrimal with 2 spines projecting anteroventrally over maxilla and premaxilla. Preopercle with prominent, posteroventral spine. Gill opening large; first gill arch with 1 or 2 gill rakers on upper limb, 10–14 on lower limb. Branchiostegals 7. Two dorsal fins; first dorsal fin with IV–VI spines; second dorsal fin with 18–23 soft rays. Anal fin spineless, similar in length and shape to second dorsal fin, with 16–21 soft rays. Caudal fin forked, with 15 principal rays and 14–18 procurrent rays. Pectoral fin small, set high on body, with 12–16 rays. Pelvic fin much larger than pectoral fin, with I spine and 5 soft rays. Body covered with small, rough, non-overlapping scales, with 2–9 spinules projecting from posterior margin of broad plate.



Two horizontal lateral lines composed of numerous small papillae, extending from opercular margin onto caudal fin; numerous (20–25) transverse rows of these sensory papillae. Vertebrae 10–12 + 19–21 = 29–33. **Color:** body brownish dorsally; lateral and ventral parts tan or silvery, with dark spots along midline in some species; distal third of first dorsal fin dark brown to black or, speckled ; upper or both caudal-fin lobes dark brown in many species; dark blotch at caudal fin base.

Remarks: captured in depths of 34 to 1100 m. They sometimes occur in great shoals, evidently rising to the surface at night, and are quite commonly cast ashore during storms. None of the species is fished commercially, but they are often taken along with commercial species; they may also be important prey species for scombrids and other pelagic predators.

Similar families occurring in the area: none. Gapers are easily distinguished from other fishes in the area by having rough, non-overlapping scales; large preopercular spine; 2 lacrimal spines projecting anteriorly over maxilla; pelvic fin, longer than and inserting in front of pectoral fin; large mouth with depressible teeth; and 2 horizontal lateral lines.

Champsodon vorax Günther, 1867

D IV–V + 20–21; A 17–19; P_1 12–14; GR 1 + 10–12; V 12 + 19–20 = 31–32. Body elongate, slightly compressed; snout short, its length equal to eye diameter; maxilla extending beyond posterior margin of eye; premaxilla notched lateral to symphysis. Transverse row of 4 sensory papillae between posterior margins of pterotic ridges. Chin and breast scaled; triangular patch of scales between pectoral and pelvic fin bases; belly partially or fully scaled. **Color:** body dark brown dorsally, pale laterally; distal tip of first dorsal fin speckled thickly with melanophores; upper caudal fin lobe occasionally with a few melanophores; other fins pale; peritoneum pale or silvery, spotted with distinct melanophores. **Size:** maximum length about 8 cm. **Distribution:** known from the South China Sea, northwestern Australia, and Maldives. **Remarks:** usually caught with bottom trawls in depths of 34–84 m.

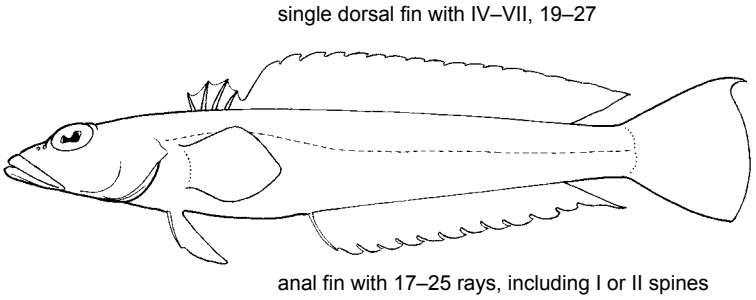
Champsodon vorax, KAUM–I. 17089, 4.4 cm SL
off Terengganu (KT), 28 Dec. 2008

PINGUIPEDIDAE

Sandperches

By Hisashi Imamura

Small to large-sized fishes. Body elongate, cylindrical anteriorly (except *Prolatilus*, having rather deeper body). Eye moderate. Snout slender. Teeth small, in band in jaws. Vomer with V-shaped tooth patch (teeth absent in *Prolatilus*). Palatine teeth present or absent. Gill membranes united, free from isthmus. Dorsal fin single, with 4–7 short spines and 19–27 soft rays. Anal fin with 17–25 rays, including 1 or 2 weak spines anteriorly. Caudal fin usually with 15 branched rays. Pelvic fin with 1 spine and 5 soft rays. Vertebrae 30–37. Several species of *Parapercis* have been shown to be protogynous hermaphrodites (thus females change to males). **Color:** variable (e.g., dark, pale brownish, and reddish), many species with distinct and characteristic markings; some change in the color pattern with the sex change is usually known in *Parapercis*.



Remarks: five genera are known from the world; only *Parapercis* is distributed in the area.

Similar family occurring in the area: Percophidae – 2 dorsal fins present.

Parapercis filamentosa (Steindachner, 1878)

Threadfin Sandperch

D V, 22; A I, 18; P_1 16; LLp 58–59. Body cylindrical. Three pairs of canine teeth on lower jaw anteriorly. Palatine teeth absent. Middle dorsal spines longest. Membrane from spinous dorsal connected by membrane to 1st soft ray near base. First few dorsal soft rays greatly elongated. **Color:** body light brown dorsally with 6 faint V-shaped brown markings, whitish ventrally; pelvic fin dusky; upper caudal fin base with a dark spot. **Size:** maximum total length about 18 cm. **Distribution:** West Pacific, including Singapore, Thailand, Hainan, Java and Borneo, Malaysia.

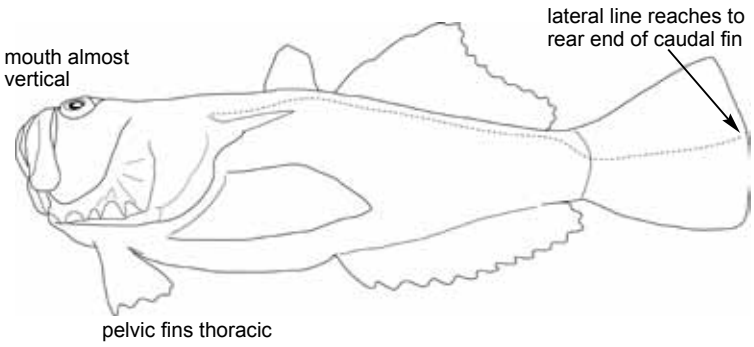
Parapercis filamentosa, KAUM–I. 16936, 11.9 cm SL
off Terengganu (KT), 11 Dec. 2008

URANOSCOPIDAE

Stargazers

By Mizuki Matsunuma

Medium sized (up to 65 cm) marine fishes. Body moderately elongate, depressed anteriorly or compressed. Head massive, nearly cube-shaped, flattened dorsally, rounded anteriorly; dorsal and lateral surfaces of head almost entirely encased in sculptured bones. Eyes directed dorsally or dorsolaterally, placed on or near top of head. Infraorbital bones dilated. Interorbital space noticeably broad, anterodorsal part of skull deeply scooped backward (interorbital fossa). Mouth large, protractile, almost vertical; jaws, prevomer, and palatines toothed; a pair of pockets on anterior roof of mouth (between premaxillae and prevomer). A peculiar dermal appendage present at central tip of respiratory valve inside lower jaw in *Uranoscopus* and young of *Genyagnus*. Branchiostegals 6. First gill arch with gill teeth instead of typical gill rakers; pseudobranchiae present. Membranes of anal, pelvic, and pectoral fins fleshy and thickened. Dorsal fin single with 0–IV rudimentary spines and 12–20 soft rays or divided with IV or V weak spines and 13 or 14 soft rays; anal fin with 13–19 soft rays; caudal fin subtruncate, with 10 or 11 branched rays; pectoral fin broad, "squarish", or knife-shaped, with 13–25 rays; pelvic fin close together, situated on throat and in advance of pectoral fins, with I non-visible weak spine and 5 segmented rays. Body naked or covered with adherent, cycloid scales almost embedded under the skin; lateral line complete, reaching onto caudal fin margin. **Color:** generally brownish dark with dark or pale spots or mottling on body.



Remarks: stargazers are nocturnal and during the day bury their body into sand or mud, with only the eyes and mouth cleft protruding from the substrate. Caught mostly with bottom trawls.

Similar families occurring in the area: Batrachoididae – gill openings small, restricted to sides of body (gill openings wide in Uranoscopidae); pelvic fins with I distinct spine and 5 soft rays (with I non-visible weak spine and 5 soft rays in Uranoscopidae). Champsodontidae – body smaller, more compressed; caudal fin forked.

Uranoscopus cognatus Cantor, 1849

Twospined Yellowtail Stargazer

D III + 14–15; A 13–14; P_1 16–17. Body moderately elongate; head massive; short cirri on eye; respiratory valve inside lower jaw with a threadlike appendage. Preopercle with 4 spines on lower edge; supracleithrum not forming distinct spine at rear end; 2 basipterygial processes. **Color:** head and body brown dorsally, finely mottled and stippled dark brown; dusky white laterally, white ventrally. First dorsal fin black; second dorsal fin translucent, rays tinged with brownish; pectoral fin translucent; posterior half of fin yellow with white margin; pelvic fin white; caudal fin pale yellow, dusky distally. **Size:** maximum length about 22 cm. **Distribution:** eastern Indian Ocean and West Pacific from India east to northern Australia, south to the Philippines. **Remarks:** caught mostly with bottom trawls in depths of 50–250 m.

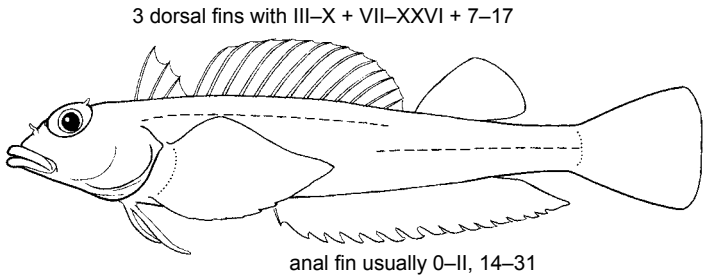
Uranoscopus cognatus, KAUM–I. 16887, 6.5 cm SL
off Terengganu (KT), 6 Dec. 2008

TRIPTERYGIIDAE

Triplefins

By Hisashi Imamura

Small to moderate-sized marine fishes (maximum size about 26 cm, most species less than 6 cm). Body slender. Eye large. Jaws with bands of conical teeth, broadest anteriorly. Gill membranes broadly attached across isthmus. Dorsal fin divided into 3 distinct segments, 1st with III–X spines, 2nd with VII–XXVI spines and 3rd with 7–17 soft rays. Anal fin with 0–II (rarely IV) spines and 14–31 soft rays. Caudal fin with branched rays. Pelvic fin with I spine and 2–3 soft rays. Single lateral line. Scales usually ctenoid (1 species of *Lepidoblennius* with cycloid). **Color:** highly variable, frequently with bars or a mottled pattern; males usually color pattern from females.



Remarks: most occurring in shallow water, often on reef flats or in tidepools.

Similar family occurring in the area: Blenniidae – body always naked and dorsal fin comprised of single fin. Clinidae – dorsal fin consisting of 1 or 2 fins and caudal-fin rays unbranched. Gobiidae – 2 dorsal fins.

Enneapterygius tutuilae Jordan & Seale, 1906

High-hat Triplefin

D III + IX–XIII + 7–10; A I, 15–20; P_1 13–18; LLp 7–13 + 18–25 (interrupted); MP 2–4 + 2 + 2–4. Body slender. Supraorbital region with lobate tentacle. First dorsal fin high, 1st spine higher than 1st and 2nd spines of 2nd dorsal fin. Abdomen lacking scales. **Color:** variable, often translucent greenish with faint, irregular narrow bars from red to brown pigments on scale edges; single black blotch present on middle of 2nd dorsal fin in males, absent in females; anal-fin base with 6–7 dark blotches; pelvic fin black near base in males, lacking black mark in females. **Size:** maximum size about 2.8 cm. **Distribution:** Indo-West Pacific, ranging from Madagascar to southern Japan and to New Caledonia. **Remarks:** known from tidepools and shallow rocky reefs.

Enneapterygius tutuilae, UMTF 1283 (KAUM–I. 16551), 1.6 cm SL
Bidong Island, 13 Oct. 2008

Helcogramma striata, UMTF 1282 (KAUM–I. 16553), 2.3 cm SL
Bidong Island, 13 Oct. 2008

Helcogramma striata Hansen, 1986

Neon Triplefin

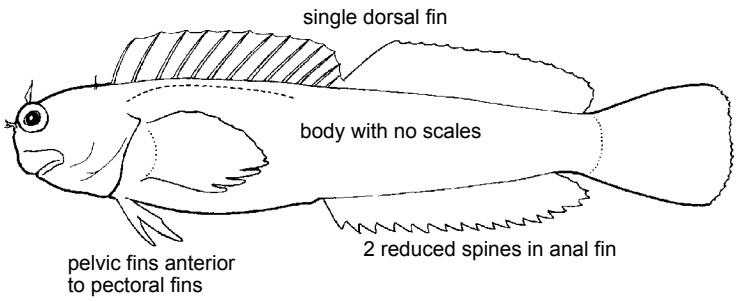
D III + XII–XV + 9–12; A II, 17–23; P_1 15; P_2 I, 2; LLp 14–20; MP 3 + 2 + 3. Body slender. Supraorbital region lacking tentacles. Lateral line ending under 10th–17th dorsal fin elements. Head, abdomen and pectoral-fin base naked. **Color:** body and head red dorsally, green to blue ventrally; 3 longitudinal blue stripes on each side of body running from snout to caudal peduncle; a row of 6–7 blue spots present just below to lateral line and on caudal peduncle; dorsal fins usually red, each with blue longitudinal stripe near base. **Size:** attaining to 5.7 cm. **Distribution:** Indo-West Pacific, including Sri Lanka, Andaman Sea, southern Japan, Indonesia, northern Australia and Solomon Islands. **Remarks:** present species lacks sexual dimorphism.

BLENNIIDAE

Blennies (Combtooth Blennies, Sabertooth Blennies)

By Koichi Shibukawa and Hisashi Imamura

Small, scaleless, often elongate fishes (most species much less than 15 cm). Head usually blunt, often with cirri on eyes, nasal openings, nape, and/or cheeks; gill openings continuous across lower surface of head or restricted to small opening on each side of head. Upper jaw not protractile; teeth incisor-like in single row in each jaw, often very fine and loosely attached; canine teeth occasionally present; no teeth in palatines; vomerine teeth present or absent. Dorsal fin continuous or notched, usually with more segmented rays than spines (III–XVII flexible spines and 9–119 segmented soft rays); anal fin with II spines, often indistinguishable; segmented caudal fin rays 10–14; pelvic fins in advance of pectoral fins, pelvic fin spine not visible externally, soft rays fewer than 5, sometimes deformed or absent. **Color:** very variable, dull to brilliant, full spectrum; often mottled, with irregular vertical bands or stripes, some species almost uniform.



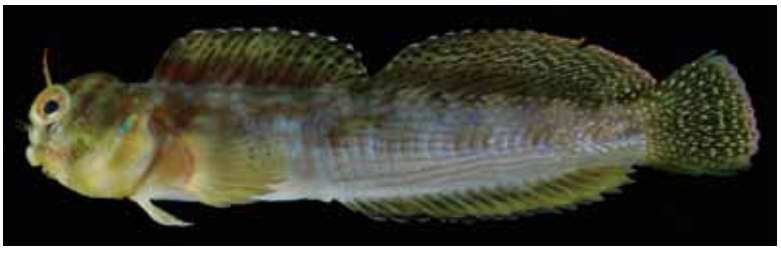
Remarks: mostly bottom dwelling species in sea and estuaries, usually at depths much less than 20 m, mostly among rocky, oyster, or coral reefs, often in tide pools. Feeding on a mixed diet of algae and benthic invertebrates; some are planktivores, and some are specialized to feed on skin or fins of larger fishes, with mimic as cleaner.

Similar families occurring in the area: Clinidae – body with fine, embedded cycloid scales; scales with radii in all fields; many more dorsal fin spines than segmented rays; jaw teeth in more than 1 row. Tripterygidae – body with ctenoid scales; dorsal fin clearly divided into 3 parts; many more dorsal fin spines than rays; jaw teeth in more than 1 row. Gobiidae and Eleotridae – body usually scaly; pelvic fins usually with I spine and 5 soft rays; dorsal fin in 2 well-separated sections, the spinous portion with less than VIII spines, the segmented ray portion with I spine at beginning.

Blenniella bilitonensis (Bleeker, 1858)

D XII–XIV, 19–22; A II, 18–22; P_1 13–15; P_2 I, 3. Body elongate and compressed. Simple cirrus present on eye; nasal cirri branched; cirri absent on nape and cheek. Blade-like fleshy crest on top head in male. Gill opening wide, continuous across ventral surface of head. Dorsal fin continuous, with a distinct notch between spinous and segmented-ray portions. Caudal fin usually with 13 segmented rays, several of them branched. **Color:** 4–9 faint dusky longitudinal lines on body in male, in addition to numerous whitish spots on posterior part of body (both absent in female); several diagonal dusky lines at basal half of segmented-ray portion of dorsal fin in male (absent in female); dark spots on distal half of pectoral fin. **Size:** 9 cm. **Distribution:** West Pacific. **Remarks:** inhabits coastal shallow reefs; common in tidepools. (K. Shibukawa)

Blenniella bilitonensis, UMTF 1159 (KAUM–I. 16394), female, 4.9 cm SL
Dungun, 24 Sept. 2008



Blenniella bilitonensis, UMTF 1328 (KAUM–I. 16690), male, 4.5 cm SL
Kemaman, 21 Oct. 2008

Ecsenius yaeyamaensis (Aoyagi, 1954)

Yaeyama Blenny

D XII–XIII, 13–15; A II, 15–17; P_1 12–14; P_2 I, 3. Body elongate and compressed. No cirri on eye, nape and cheek; nasal cirri simple. Fleshy crest absent on top of head. Gill opening wide, continuous across ventral surface of head. Dorsal fin continuous, with a distinct notch between spinous and segmented-ray portions. Caudal fin usually with 13 segmented rays, all of them unbranched. **Color:** ground color of head and body pale yellowish gray; 1-3 longitudinal series of black spots and/or dashes behind eye; arc-like black line from lower jaw to ventral part of operculum; pectoral-fin base with a forked black line; usually many faint pale spots on posterior part of body. **Size:** 5 cm. **Distribution:** Indo-West Pacific. **Remarks:** inhabits coral reefs. (K. Shibukawa)

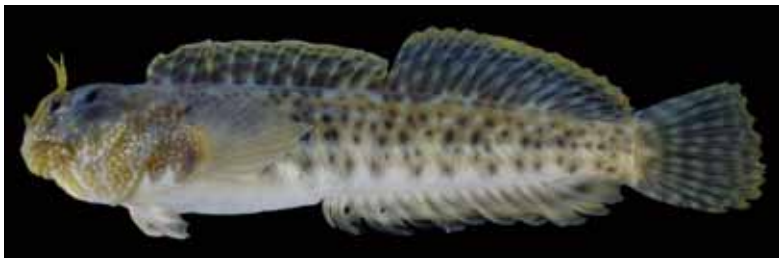
Ecsenius yaeyamaensis, UMTF 1330 (KAUM–I. 16598), 3.6 cm SL
Bidong Island, 12 Oct. 2008

Entomacrodus lighti, KAUM–I. 16373, 5.6 cm SL
Dungun, 23 Sept. 2008

Entomacrodus lighti (Herre, 1938)

D XIII, 15–16; A II, 17–18; P_1 14; P_2 I, 4. Body elongate and compressed. Cirrus on eye typically simple; nasal cirri irregular in size and shape; cirrus on nape occasionally with frayed edge; cirri absent on cheek. Fleshy crest on top head absent in both sexes. Middle third of hind margin of upper lip crenulate. Gill opening wide, continuous across ventral surface of head. Dorsal fin continuous, with a distinct notch between spinous and segmented-ray portions. Caudal fin usually with 13 branched rays, several of them branched. **Color:** body with diffused dusky banded pattern, without fine pale speckles; a dark spot between first two spines of dorsal fin. **Size:** 10 cm. **Distribution:** West Pacific. **Remarks:** found in shallow rocky shore. (K. Shibukawa)

Entomacrodus striatus, KAUM–I. 16382, 7.8 cm SL
Dungun, 23 Sept. 2008



Entomacrodus striatus, KAUM–I. 16370, 5.6 cm SL
Dungun, 23 Sept. 2008

Entomacrodus striatus (Valenciennes, 1836)

Reef Margin Blenny

D XIII, 14–17; A II, 15–18; P_1 14; P_2 I, 4. Body elongate and compressed. Cirrus on eye typically branched, with 1–20; nape and nasal cirri present; cirri absent on cheek. Fleshy crest on top head absent in both sexes. Hind margin of upper lip entirely crenulate. Gill opening wide, continuous across ventral surface of head. Dorsal fin continuous, with a distinct notch between spinous and segmented-ray portions. Caudal fin usually with 13 branched rays, several of them branched. **Color:** body pale brown, with several patches of small black dots; head with numerous, dense pale speckles. **Size:** 12 cm. **Distribution:** Indo-Pacific. **Remarks:** found in shallow rocky shore; common in intertidal zone. (K. Shibukawa)

Istiblennius dussumieri (Valenciennes, 1836)

Dussumier's Rockskipper

D XII–XIV, 19–24; A II, 21–25; P_1 13–15. Body elongate. Nape lacking cirri. Supraorbital tentacle variable, with up to 5 branches on each side. Single blade-like occipital crest present in adult males. Nasal with short cirri. Canine teeth absent on dentary. Several caudal-fin rays branched. Lateral line ending below 4th to 10th dorsal spines. **Color:** body dusky gray with a series of 7 double, brownish orange bars; small dark spots scattered on body in females; outer part of median fins broadly dark in males. **Size:** attaining to about 13 cm. **Distribution:** Indo- West Pacific, ranging from east coast of Africa to Taiwan and to Fiji. (H. Imamura)

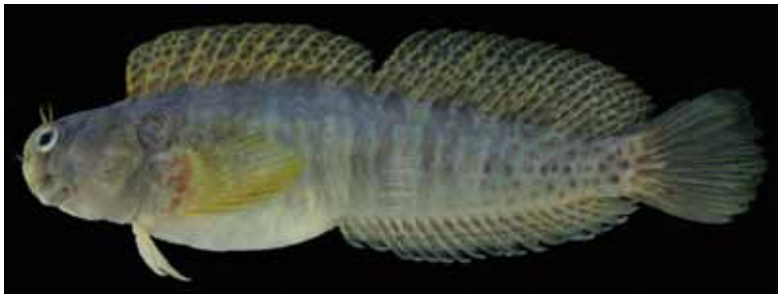
Istiblennius dussumieri, UMTF 1099 (KAUM–I. 16329), female, 7.3 cm SL
Cendering, 16 Sept. 2008

Istiblennius dussumieri, UMTF 1098 (KAUM–I. 16336), male, 3.4 cm SL
Cendering, 16 Sept. 2008

Istiblennius edentulus (Forster & Schneider, 1801)

Rippled Rockskipper

D XII–XIV, 18–23; A II, 20–24; P_1 13–14. Body elongate. Nape with a moderately long cirrus on each side. Supraorbital tentacle usually a long simple filament. Single blade-like occipital crest present in adult males. Nasal with 3 cirri. Canine teeth absent on dentary. Several caudal-fin rays branched. Lateral line without vertical pairs of pores, ending below last dorsal spine and 15th soft ray. **Color:** body pale grayish with dark gray double bars extending basally into dorsal fin; irregular orangish lines in pale interspaces on posterior half of body; a pale-edged gray bar from eye across upper lip; an oblique, pale-edged gray band behind eye; posterior body and dorsal and anal fins with orangish brown spots in females. **Size:** attaining to 17 cm. **Distribution:** widespread in Indo-Pacific, but no records from Hawaiian Islands. **Remarks:** typically found along the edge of rocky shores where wave action is not severe. (H. Imamura)



Istiblennius edentulus, UMTF 1287 (KAUM–I. 16406), female, 10.1 cm SL
Dungun, 24 Sept. 2008

Istiblennius edentulus, KAUM–I. 16408, male, 8.9 cm SL
Dungun, 24 Sept. 2008

Istiblennius lineatus (Valenciennes, 1836)

Lined Rockskipper

D XII–XIV, 21–25; A II, 22–25; P_1 13–15. Body elongate. Nape lacking cirri. Supraorbital tentacle usually a triangular filament with short medial and lateral branches in adults. Single large, blade-like occipital crest present in adult males. Nasal cirri short and palmate. Canine teeth absent on dentary. Several caudal-fin rays branched. Lateral line without vertical pairs of pores, ending below space between 6th dorsal spine and 5th soft ray. **Color:** body pale brown with several longitudinal, dark brown lines; head crossed with vertical, irregular, orangish brown lines. **Size:** attaining to 14 cm. **Distribution:** widespread in Indo-Pacific, including Maldive Islands, southern Japan and Tuamotu Archipelago. **Remarks:** found in rocky shores of coral reefs and tidepools. (H. Imamura)

Istiblennius lineatus, KAUM–I. 16343, female, 8.5 cm SL
Cendering, 16 Sept. 2008

Istiblennius lineatus, UMTF 1093 (KAUM–I. 16407), male, 7.9 cm SL
Dungun, 24 Sept. 2008

Laiphognathus multimaculatus Smith, 1955

Many-spotted Blenny

D X–XII, 18–21; A II, 19–22; P_1 12–14; P_2 I, 3; V 35–39. Body elongate. Nape lacking cirri. Cirri on both anterior and posterior nostrils. Gill opening small, gill membranes on both sides separated. Caudal fin lacking branched rays. **Color:** body pale yellow with many dusky golden spots, abdomen pinkish; spinous dorsal fin with a narrow longitudinal black band; distal half of soft dorsal fin speckled with black; anal fin and margin of caudal fin dusky; pectoral and pelvic fin membranes transparent. **Size:** attaining to 5.5 cm. **Distribution:** widespread in Indo-Pacific, including east coast of Africa, Andaman Sea, and Solomon Islands. (H. Imamura)

Laiphognathus multimaculatus, UMTF 1404 (KAUM–I. 16627), 2.5 cm SL
Bidong Island, 13 Oct. 2008

Omobranchus elongatus, UMTF 1416 (KAUM–I. 16543), female, 3.5 cm SL
Cendering, 6 Oct. 2008

Omobranchus elongatus (Peters, 1855)

Cloister Blenny

D XI–XIII (usually XII), 18–21; A II, 20–23; P_1 13; P_2 I, 2. Body elongate. No cirri or tentacles and crest on head. Single canine tooth present on both jaws posteriorly. Edge of lips smooth. Lower lip with a small, posterior, ventral-projecting flap. Caudal fin lacking branched rays. **Color:** body reddish gray with curved and oblique gray bars and white light red elliptical spot on opercle; small dark spots sometimes present on ventral part of head and on chest; a dusky spot in dorsal fin between 9th and 13th soft rays in males. **Size:** attaining to 6.6 cm. **Distribution:** widespread in Indo-West Pacific, including east coast of Africa, Andaman Sea and Iriomote Island. **Remarks:** found in rocky reefs of estuaries. (H. Imamura)

Omobranchus elongatus, UMTF 1317 (KAUM–I. 16536), male, 4.0 cm SL
Cendering, 6 Oct. 2008

Omobranchus ferox (Herre, 1927)

D XI–XIII, 20–23; A II, 20–26; P_1 13; P_2 I, 2. Body elongate and compressed. No cirri on head. Fleshy crest on top head absent in both sexes. Gill opening narrow, restricted on side of head. Dorsal fin continuous, without distinct notch between spinous and segmented-ray portions. Caudal fin usually with 13 segmented rays, all of them unbranched. **Color:** head and body olive green, typically with several vague dusky bars on body; a short, narrow vertical black band just behind eye (preceded by white vertical line when alive or fresh); a dusky spot frequently found around end of dorsal fin in male. **Size:** 6 cm. **Distribution:** Indo-West Pacific. **Remarks:** found in mangrove swamps and estuaries.

(K. Shibukawa)

Omobranchus ferox, UMTF 1430 (KAUM–I. 16808), 3.9 cm SL
Merang, 2 Nov. 2008

Omobranchus punctatus, KAUM–I. 16327, 6.4 cm SL
Cendering, 16 Sept. 2008

Omobranchus punctatus (Valenciennes, 1836)

Muzzled Blenny

D XI–XIII, 19–24; A II, 22–26; P_1 13; P_2 I, 2. Body elongate and compressed. No cirri on head. Fleshy crest on top head absent in both sexes. Gill opening narrow, restricted on side of head. Dorsal fin continuous, without distinct notch between spinous and segmented-ray portions. Caudal fin usually with 13 segmented rays, all of them unbranched. **Color:** ground color of head and body brownish olive; head with broad dusky vertical bands; body with several irregular, horizontal dusky lines anteriorly. **Size:** 9 cm. **Distribution:** Indo-Pacific; also introduced to Western Atlantic. **Remarks:** found in mangrove swamps, brackish estuaries and adjacent waters.

(K. Shibukawa)

Omobranchus punctatus, UMTF 1147 (KAUM–I. 16337), 4.1 cm SL
Cendering, 16 Sept. 2008

Parablennius thysanius, UMTF 1410 (KAUM–I. 16398), 3.2 cm SL
Dungun, 24 Sept. 2008

Parablennius thysanius (Jordan & Seale, 1907)

Tasseled Blenny

D XII, 13–15; A II, 14–17; P_1 14; P_2 I, 3. Body relatively short, compressed. Cirrus on eye a short fringed flap; nasal cirrus simple; no cirri on nape and cheek. Fleshy crest on top head absent in both sexes. Gill opening wide, continuous across ventral surface of head. Dorsal fin continuous, without distinct notch between spinous and segmented-ray portions. Caudal fin usually with 13 segmented rays, several of them branched. **Color:** body olive gray dorsally, light gray or yellowish gray ventrally, mottled with various-sized dark spots; head olive gray, with numerous dense small dark-brown spots, forming reticulated pattern. **Size:** 5 cm. **Distribution:** Indo-West Pacific; also introduced to Hawaii. **Remarks:** found in shallow coastal waters and brackish estuaries.

(K. Shibukawa)

Salarias fasciatus (Bloch, 1786)

Jeweled Blenny

Salarias fasciatus, UMTF 1208 (KAUM–I. 16642), 10.4 cm SL
Bidong Island, 12 Oct. 2008

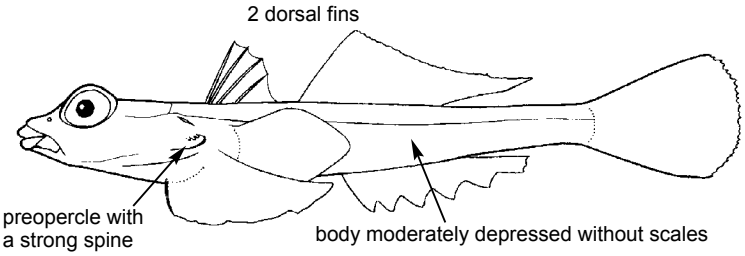
D XII, 18–20; A II, 19–21; P_1 14; P_2 I, 3; V 10 + 26–27 = 36–37. Body moderately elongate. Supraorbital and nuchal cirri branched. Occipital crest absent in both sexes. Gill opening continuous across ventral surface of head. Dorsal fin shallowly notched. Last anal-fin ray bounded by membrane to caudal peduncle. Several caudal-fin rays branched. **Color:** color variable, usually olivaceous to brown with irregular dark bars and many round to oblong white spots; a few very small, bright blue spots dorsally on posterior half of body. **Size:** attaining to 14 cm. **Distribution:** Indo-West Pacific, including east coast of Africa, Red Sea, Andaman Sea, Ryukyu Islands, Great Barrier Reef and New Caledonia. **Remarks:** usually seen on coral reefs.

(H. Imamura)

CALLIONYMIDAE

Dragonets

By Koichi Shibukawa



Small to moderate-sized (up to 45 cm), depressed benthic fishes. Body elongate, depressed or subcylindrical. Head usually wide and well depressed, triangular when seen from above in many species; gill opening restricted to a small dorsal or sublateral pore; preopercle with a strong spine; no spines on opercle and subopercle; jaw with villiform teeth; no teeth on roof of mouth; upper jaw greatly protractile. Two dorsal fins, comprising spinous (with III–V spines; rarely absent) and soft (with 7–10 soft rays) portions; anal fin with 6–10 soft rays; pelvic fins thoracic, with I spine and 5 soft rays. No scales on head and body. **Color:** highly variable, but dull sandy-colored in many species, e.g., head and body grayish or brownish dorsally, whitish ventrally, mottled and/or spotted with paler colored spots; some have entirely reddish body (especially in deep-water species) or several vivid color with complex patterns on head, body and fins.

Remarks: found in seagrass beds, bays, coral reefs, estuaries, and shelf waters, and commonly found on sandy or muddy bottoms. Locally utilized as food fish.

Similar families occurring in the area: Eleotridae – usually no preopercular spine; gill opening wide; scales on body. Gobiidae – usually no preopercular spine; pelvic fins fused medially one another in many species; gill opening wide. Platycephalidae – mouth large, lower jaw projecting beyond upper jaw; short spines, serrae and/or bony tubercles on the head; gill opening wide; scales on body.

Calliurichthys japonicus (Houttuyn, 1782)

Japanese Longtail Dragonet

D IV + 9; A 8; P_1 18–21. Head and body compressed. A pair of small bony bumps on dorsal surface of head behind eye. Preopercular spine slender and straight, with several serrae along its dorsal margin. Transverse canal branch connecting opposite lateral line canals present on caudal peduncle. Anterior two spine of first dorsal fin elongate and filamentous in large male. All but posteriormost one segmented rays of second dorsal fin unbranched. Caudal fin very long. **Color:** head and body light grayish brown dorsally, pale ventrally; a distinct black spot between third and fourth spine of first dorsal fin; a broad submarginal black stripe on anal fin. **Size:** 22 cm SL. **Distribution:** West Pacific. **Remarks:** inhabits sandy-mud bottoms at the depths of 10–200 m. Generic assignment follows Nakabo (1982).

Calliurichthys japonicus, KAUM–I. 17199, 18.1 cm SL
off Terengganu (KR), 5 Jan. 2009

Calliurichthys japonicus, KAUM–I. 17200, 16.7 cm SL
off Terengganu (KR), 5 Jan. 2009

Dactylopus dactylopus (Valenciennes, 1837)

Fingered Dragonet

D IV + 8; A 7; P_1 19. Body subcylindrical or slightly compressed posteriorly. No transverse canal branch connecting opposite lateral line canals on caudal peduncle. Dorsal fin spines elongate and filamentous in male. All rays of second dorsal fin branched. Spine and first ray of pelvic fin connected together, free from other rays. **Color:** head and body grayish brown brownish dorsally, pale ventrally; numerous pale and dusky spots on body. **Size:** 25 cm SL. **Distribution:** eastern Indian Ocean and West Pacific. **Remarks:** inhabits sandy-mud bottoms in shallow coastal waters, particularly seagrass beds.

Dactylopus dactylopus, KAUM–I. 17192, 10.4 cm SL
off Terengganu (KR), 5 Jan. 2009

Repomucenus belcheri recurvispinnis (Li, 1966)

Concave Dragonet

D IV + 9; A 9; P_1 17–21. Head and body compressed. Preopercular spine straight, with several serrae along its dorsal margin. Transverse canal branch connecting opposite lateral line canals present on caudal peduncle. No filamentous spine of first dorsal fin in both sexes. All but posteriormost one segmented rays of second dorsal fin unbranched. Caudal fin moderate in size. **Color:** head and body light grayish brown dorsally, pale ventrally; lower side of body with a series of short, wavy vertical dusky lines in large male; anal fin with submarginal black stripe in male, a series of black blotches in female. **Size:** 22 cm SL. **Distribution:** Indo-West Pacific. **Remarks:** the generic assignment tentatively follows Nakabo (1982; for *R. belcheri*). Fricke (1983, 2002) treated this as subspecies of *Callionymus belcheri* Richardson, 1844.

Repomucenus belcheri recurvispinnis, KAUM–I. 16894, 7.5 cm SL
off Terengganu (KT), 6 Dec. 2008

Repomucenus planus, KAUM–I. 17113, 7.9 cm SL
off Terengganu (KT), 31 Dec. 2008

Repomucenus planus, KAUM–I. 17270, 7.1 cm SL
off Terengganu (KT), 18 Jan. 2009

Repomucenus planus (Ochiai, 1955)

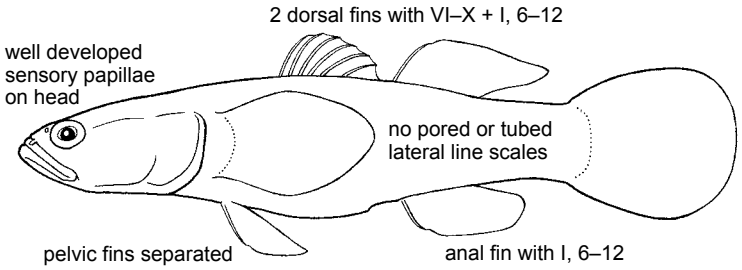
Japanese Darter Dragonet

D IV + 9; A 9; P_1 18–22. Head and body compressed. Preopercular spine with 3–6 serrae along its dorsal margin and curved posteriormost tip. Transverse canal branch connecting opposite lateral line canals present on caudal peduncle. First dorsal fin small, without filamentous spine in both sexes. All but posteriormost one segmented rays of second dorsal fin unbranched. **Color:** head and body light yellowish brown dorsally, pale ventrally, with numerous, dense dark brown dots; first dorsal fin largely blackish in female; many white spots on second dorsal fin in male. **Size:** 10 cm SL. **Distribution:** West Pacific. **Remarks:** inhabits sandy bottoms in shallow coastal waters. The generic assignment follows Nakabo (1982).

ELEOTRIDAE

Sleepers

By Koichi Shibukawa



Small to moderate sized fishes (up to ca. 85 cm, commonly to 20 cm), bottom-oriented fishes. Body moderately elongate, more or less compressed posteriorly; no pored or tubed lateral-line scales on body. Teeth usually conical, forming some or more rows in each jaw; sensory-papillae rows well developed on head (and few on body and caudal fin); branchiostegals 6. Two dorsal fins, first one with VI–X flexible spines, second one with I spine and 6–12 soft rays; pelvic fins separated, innermost or preceding rays longest; pelvic fin usually with I spine and 5 soft rays. **Color:** highly variable, typically blackish or grayish brown with dusky mottles, whereas some species has brilliant color with e.g., bright yellow and/or red spots.

Remarks: typically found in fresh and brackish waters, whereas some found in coral reefs. Carnivorous. Large species often esteemed as food fish; some freshwater colorful species often treated as aquarium fish.

Similar families occurring in the area: Blenniidae – single dorsal fin ; teeth incisor-like, forming single row in each jaw. Callionymidae – preopercle with a strong spine; no scales on body; gill opening restricted to a small dorsal or dorsolateral pore. Gobiidae – pelvic fins fused medially one another in many species; five branchiostegal rays. Platycephalidae – many short spines or bony tubercles on head; no spines on second dorsal and anal fins. Pteroleotridae – bottom-oriented, free swimming fishes, with elongate (but not eel-like) and compressed head and body; five branchiostegal rays. Tripterygiidae – three dorsal fins.

Butis butis (Hamilton, 1822)

Duckbill Sleeper

D VI + I, 8; A I, 8; P_1 18–19; LR 29–31; PDS 25–33. Body elongate, subcylindrical and compressed posteriorly. Head depressed. Snout elongate and depressed, duck-bill shaped. Lower jaw prominent. Bony edge with serrae on interorbital area around dorsal margin of eye. Pelvic fins widely separated. Cheek, operculum and interorbital with ctenoid scales; scales present between eye and interorbital bony ridge; small axillary scale between large body scales. **Color:** head and body blackish brown, with numerous black, orange and pale dots; base of pectoral fin with a distinct large black spot edged with two vivid red spots dorsoventrally. **Size:** 14.5 cm TL. **Distribution:** Indo-West Pacific. **Remarks:** found in brackish estuaries and mangrove swamps.

Butis butis, UMTF 1104 (KAUM–I. 16492), 5.3 cm SL
estuary near UMT, 30 Sept. 2008

Butis koilomatodon, UMTF 1433 (KAUM–I. 16756), 2.7 cm SL
Setiu, 30 Oct. 2008

Butis koilomatodon (Bleeker, 1849)

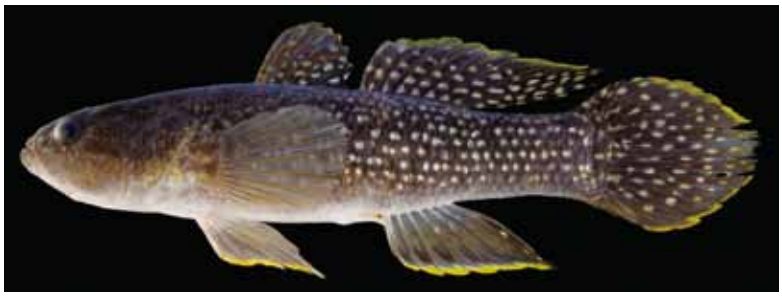
Mud Sleeper

D VI + I, 8; A I, 8; P_1 21–22; LR 25–28; PDS 11–15. Body relatively short, subcylindrical and compressed posteriorly. Head slightly depressed. Lower jaw prominent. Bony edge with serrae on interorbital area around dorsal margin of eye. Pelvic fins widely separated. Cheek and operculum with ctenoid scales; no scales on interorbital area. **Color:** body blackish brown, with indistinct 4–5 broad dusky oblique bands; typically pectoral-fin base with a distinct black spot. **Size:** 7.5 cm SL. **Distribution:** Indo-West Pacific. **Remarks:** found in mangrove swamps, brackish estuaries and adjacent coastal waters with muddy bottoms.

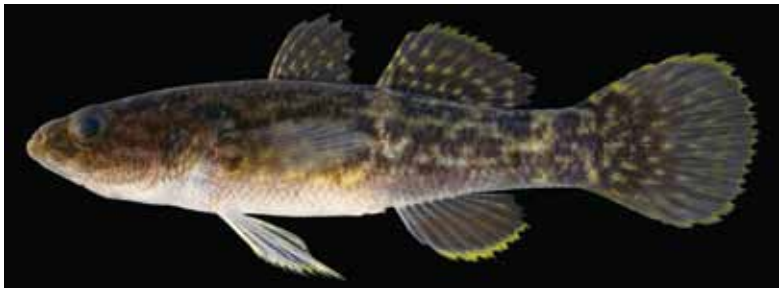
Ophiocara porocephala (Valenciennes, 1837)

Northern Mud Sleeper

D VI + I, 8–9; A I, 6–7; P_1 14–15; LR 33–40; PDS 18–26. Body moderately elongate, subcylindrical and compressed posteriorly. Head depressed. Lower jaw prominent. Pelvic fins widely separated. Cheek and operculum with cycloid scales; predorsal scales extending anteriorly to snout; scales on body ctenoid. **Color:** head and body dark grayish brown dorsally, becoming much paler ventrally; numerous, dense white speckles on body and dorsal and caudal fins in young and adult; some pale vertical bands on body in small specimen. **Size:** 32 cm TL. **Distribution:** Indo-West Pacific. **Remarks:** found in mangrove swamps and brackish estuaries.



Ophiocara porocephala, UMTF 1015 (KAUM–I. 16547), 11.4 cm SL
estuary near UMT, 30 Sept. 2008



Ophiocara porocephala, UMTF 1032 (KAUM–I. 16546), 5.6 cm SL
estuary near UMT, 30 Sept. 2008

Oxyeleotris marmorata (Bleeker, 1852)

Marble Goby

D VI + I, 9; A I, 7–8; P_1 17–19; LR 80–90; PDS 60–65. Body elongate, subcylindrical and compressed posteriorly. Lower jaw prominent. No ventrally-directed spinous projection along posterior margin of preopercle. Vomer edentate. Pelvic fins widely separated. Scales on body small cycloid anteriorly, weak ctenoid posteriorly. **Color:** ground color of head and body light grayish brown, with some large blackish brown markings. **Size:** 63 cm TL. **Distribution:** West Pacific. **Remarks:** found in brackish estuaries, reservoirs and freshwater rivers and ponds. Common cultured fish, highly esteemed as food fish in South Asian countries.

Oxyeleotris marmorata, UMTF 1311 (KAUM–I. 16482), 16.4 cm SL (preserved specimen)
estuary near UMT, 29 Sept. 2008

Oxyeleotris urophthalmus (Bleeker, 1851)

Sinuous Gudgeon

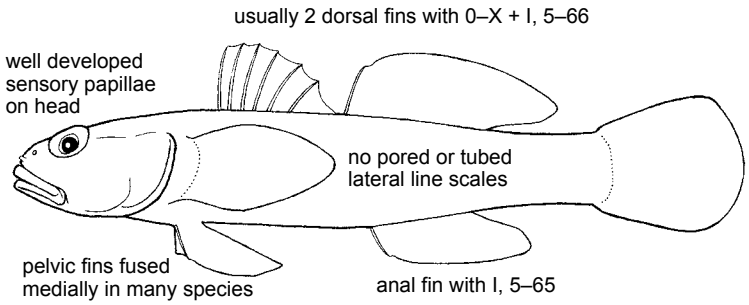
D VI + I, 9–12; A I, 8–10; P_1 15–18; LR 85–102; PDS 55–60. Body elongate, subcylindrical and compressed posteriorly. Lower jaw prominent. No ventrally-directed spinous projection along posterior margin of preopercle. Vomer edentate. Pelvic fins widely separated. Scales on body small cycloid anteriorly, weak ctenoid posteriorly. **Color:** ground color of head and body dark grayish brown; typically an indistinct black ocellated spot at upper part of caudal fin basally; 4–5 narrow saddle-like, vertical yellow bands on body in small specimen. **Size:** 28 cm TL. **Distribution:** West Pacific. **Remarks:** found in mangrove swamps and adjacent brackish estuaries. Carnivorous.

Oxyeleotris urophthalmus, KAUM–I. 17312, 11.5 cm SL
Terengganu River, 20 Jan. 2009

GOBIIDAE

Gobies

By Koichi Shibukawa and Mazlan Abdul Ghaffar



Small to moderate-sized (up to ca. 60 cm, commonly to 10 cm), bottom-oriented fishes. Body shape highly variable, but, typically, moderately elongate and more or less compressed posteriorly; no pored or tubed lateral-line scales on body. Teeth typically conical (flattened and incisor-like in some genera), forming a single to several rows in each jaw; minute sensory papillae well developed on head (and few on body and caudal fin), forming transverse or longitudinal rows; five branchiostegal rays. Usually two dorsal fins, first one with 0–X flexible spines, second one usually with I spine and 5–66 soft rays; anal fin usually with I flexible spine and 5–65 soft rays; pectoral fin with 12–65 soft rays; dorsal- and anal-fin spines usually narrow and flexible; pelvic fins fused medially by frenum (between spines) and connecting membrane (between innermost rays), exclusive of several coral reef genera with separated ones; pelvic fin usually with I spine and 4–5 soft rays. Scales cycloid or ctenoid (with peripheral cteni only), minute to moderately large in size. **Color:** highly variable.

Remarks: found in various habitats from torrential freshwater rivers to shelf waters (to depth of ca. 500 m), but most common in brackish waters and shallow coastal waters. Large species may be esteemed as food fish; several freshwater species may be treated as aquarium fish.

Similar families occurring in the area: Blenniidae – single dorsal fin (may be deep notch developed between spinous and soft portions); teeth incisor-like, forming single row in each jaw; pelvic fins separated. Callionymidae – preopercle with a strong spine; no scales on body; gill opening restricted to a small dorsal or dorsolateral pore; pelvic fins separated. Eleotridae – pelvic fins separated; six branchiostegal rays. Platycephalidae – many short spines or bony tubercles on head; pelvic fins separated. Pteleotridae – bottom-oriented, freeswimming fishes, with elongate (but not eel-like) and compressed body and separated pelvic-fins; mouth almost vertical in many species. Tripterygiidae – three dorsal fins; pelvic fins separated.

Acentrogobius caninus (Valenciennes, 1837)

Tropical Sand Goby

D VI + I, 9; A I, 9; P_1 18; LR 26–27; PDS 16. Body moderately elongate and compressed. Head slightly compressed. Jaws subequal. Gill opening not extending anteriorly to a vertical through posterior margin of preopercle. Single or some enlarged caninoid teeth on each side of lower jaw. Tongue truncate. Pelvic fins united medially; frenum present. Scales ctenoid, excluding those on nape, pectoral base and breast cycloid; no scales on cheek; operculum may be scaled. Sensory canals and pores present on head; longitudinal pattern of sensory-papillae rows on cheek, some rows multiple. **Color:** large ovoid black spot just above dorsalmost of gill opening; four midlateral dusky spots on body. **Size:** 13 cm TL. **Distribution:** Indo-West Pacific. **Remarks:** found in brackish estuaries and adjacent coastal waters with sandy-mud bottom. (K. Shibukawa)

Acentrogobius caninus, KAUM–I. 17111, 9.9 cm SL
off Terengganu (KT), 31 Dec. 2008

Acentrogobius viridipunctatus (Valenciennes, 1837)

Spotted Green Goby

D VI + I, 10; A I, 9–10; P_1 19–20; LR 33–35; PDS 27–33. Body moderately elongate and compressed. Head slightly compressed. Jaws subequal. Gill opening extending anteriorly to a vertical through posterior margin of preopercle. Single or some enlarged caninoid teeth on each side of lower jaw. Tongue truncate. Pelvic fins united medially; frenum present. Scales ctenoid, excluding those on head, nape, pectoral base and breast cycloid; upper part of cheek and operculum scaled. Sensory canals and pores present on head; distinct transverse sensory-papillae rows on cheek. **Color:** head and body grayish brown, with numerous bright light green or blue spots (faded immediately after death); L-shaped dusky marking below eye. **Size:** 12 cm SL. **Distribution:** Indo-West Pacific. **Remarks:** found in brackish estuaries and adjacent coastal waters with sandy-mud bottoms.

(K. Shibukawa)

Acentrogobius viridipunctatus, KAUM–I. 16802, 6.0 cm SL
Merang, 2 Nov. 2008

Amblygobius phalaena, UMTF 1249 (KAUM–I. 16562), 5.7 cm SL
Bidong Island, 12 Oct. 2008

Amblygobius phalaena (Valenciennes, 1837)

White-barred Goby

D VI + I, 14–15; A I, 14–15; P_1 19–20; LR 54–57; PDS 22–25. Body moderately elongate and compressed. Head compressed. Snout rounded, protruding beyond jaws. Gill opening not extending anteriorly to a vertical line through posterior margin of preopercle. Tongue rounded or near truncate. Pelvic fins united medially; frenum present. Scales on body cycloid anteriorly, ctenoid posteriorly; head naked, except for dorsal part of operculum with cycloid scales. Sensory canals and pores present on head; a series of short transverse rows of sensory papillae below eye. **Color:** ground color of head and body grayish olive dorsally, pale ventrally; body with five blackish or grayish brown vertical bands, typically edged with white anteroposteriorly; some small black spot on caudal fin, anterior one of them well apart from caudal-fin base; color of large specimen frequently darkened (probably as nuptial color). **Size:** 8 cm SL. **Distribution:** West Pacific. **Remarks:** found in coral reefs, protected bays, lagoons and estuaries with sandy bottoms and rubbles.

(K. Shibukawa)

Amblygobius stethophthalmus, UMTF 1073 (KAUM–I. 16502), 5.9 cm SL
Cendering, 6 Oct. 2008

Amblygobius stethophthalmus (Bleeker, 1851)

Head-stripe Goby

D VI + I, 14–15; A I, 15–16; P_1 20; LR 66–74; PDS 28. Body moderately elongate and compressed. Head compressed. Snout rounded, protruding beyond jaws. Gill opening not extending anteriorly to a vertical line through posterior margin of preopercle. Tongue rounded or near truncate. Pelvic fins united medially; frenum present. Scales on body cycloid anteriorly, ctenoid posteriorly; head naked, except for dorsal part of operculum with cycloid scales. Sensory canals and pores present on head; a series of short transverse rows of sensory papillae below eye. **Color:** ground color of head and body olive dorsally, pale ventrally; broad black stripe from tip of snout through eye to anterior part of body; middle of operculum with faint broad dusky stripe, meeting posteriorly with black spot on pectoral-fin base. **Size:** 8 cm SL. **Distribution**: West Pacific and Andaman Sea. **Remarks:** found in protected bays, lagoons and estuaries.

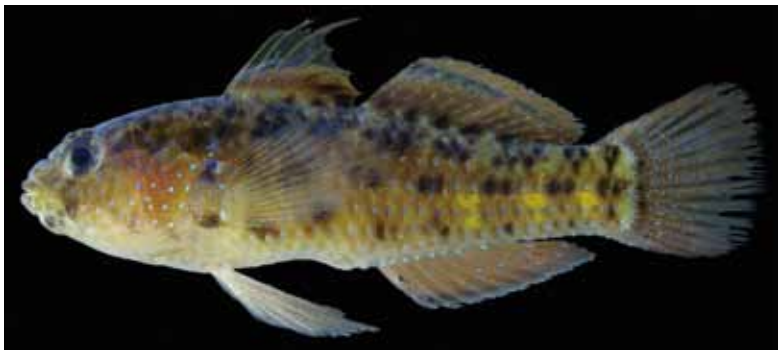
(K. Shibukawa)

Asterropteryx semipunctata Rüppell, 1830

Starry Goby

D VI + I, 10; A I, 9; P_1 16–17; LR 23–25; PDS 7–8. Body relatively short, compressed. Head compressed. Two to10 spinous projections at posterior margin of preopercle. Gill opening not extending anteriorly to a vertical through posterior margin of preopercle. Tongue rounded or near truncate. Third spine of first dorsal fin elongate and filamentous; pelvic fins almost separated; frenum absent. Scales on body ctenoid, exclusive of pectoral-fin base and breast with cycloid scales; cheek, operculum and branchiostegal membrane scaled. Sensory canals and pores present on head; distinct transverse pattern of sensory-papillae rows on cheek. **Color:** head and body grayish with numerous bright blue dots; ca. 4 irregular rows of small dusky blotches on body. **Size:** 4 cm SL. **Distribution:** Indo-Pacific. **Remarks:** found around rubbles on shallow protected bays, coral reefs, lagoons and brackish estuaries.

(K. Shibukawa)



Asterropteryx semipunctata, UMTF 1372 (KAUM–I. 16386), 2.5 cm SL
Dungun, 24 Sept. 2008

Bathygobius cocosensis, UMTF 1253 (KAUM–I. 16660), 3.6 cm SL
Kemaman, 20 Oct. 2008

Bathygobius cocosensis (Bleeker, 1854)

Cocos Frill Goby

D VI + I, 8–10; A I, 7–8; P_1 16–20; LR 33–39; PDS 6–14. Body moderately elongate and compressed. Head subcylindrical. Gill opening not extending anteriorly to a vertical through posterior margin of preopercle. Mental flap well developed, slightly protruding posterolaterally. No flap-like projection at tip of anterior nostril. Anterior margin of tongue notched. Upper part of pectoral fin with filamentous free rays. Pelvic fins united medially; frenum present, with no distinct projection at middle of posterior margin. Scales ctenoid posteriorly, cycloid anteriorly; head naked. Sensory canals and pores present on head; longitudinal pattern of sensory papillae on chin. **Color:** head and body light grayish blown dorsally, pale ventrally; a series of small black blotches on mid-lateral body. **Size:** 5 cm SL. **Distribution**: Indo-Pacific. **Remarks:** found in shallow rocky shores.

(K. Shibukawa)

Bathygobius cyclopterus, UMTF 1181 (KAUM–I. 16290), 3.7 cm SL
Cendering, 14 Sept. 2008

Bathygobius cyclopterus (Valenciennes, 1837)

Spotted Frill Goby

D VI + I, 8–9; A I, 8; P_1 19–23; LR 36–40; PDS 12–20. Body moderately elongate and compressed. Head subcylindrical. Gill opening not extending anteriorly to a vertical through posterior margin of preopercle. Mental flap well developed, slightly protruding posterolaterally. A flap-like projection at tip of anterior nostril. Anterior margin of tongue notched. Upper part of pectoral fin with filamentous free rays. Pelvic fins united medially; frenum present, with a distinct projection at middle of posterior margin. Scales ctenoid posteriorly, cycloid anteriorly; head naked, except for upper part of operculum with cycloid scales. Sensory canals and pores present on head; longitudinal pattern of sensory papillae on cheek. **Color:** head and body dark gray or grayish blown dorsally, pale ventrally; a series of small black blotches on mid-lateral body. **Size:** 5 cm SL. **Distribution:** Indo-Pacific. **Remarks:** found in shallow rocky shores. (K. Shibukawa)

Bathygobius fuscus (Rüppell, 1830)

Dusky Frill Goby

D VI + I, 8–10; A I, 7–8; P_1 16–20; LR 31–40; PDS 10–19. Body moderately elongate and compressed. Head subcylyndrical. Gill opening not extending anteriorly to a vertical through posterior margin of preopercle. Mental flap well developed, trapezoid, but not protruding posterolaterally. No flap-like projection at tip of anterior nostril. Anterior margin of tongue notched. Upper part of pectoral fin with filamentous free rays. Pelvic fins united medially; frenum present, with no distinct projection at middle of posterior margin. Scales ctenoid posteriorly, cycloid anteriorly; head naked. Sensory canals and pores present on head; longitudinal pattern of sensory papillae on chin. **Color:** head and body grayish blown dorsally, pale ventrally; a series of black blotches, each extending ventrally to ventral half of body, on mid-lateral body; dorsal fin with a broad pale yellow distal margin. **Size:** 8 cm SL. **Distribution:** Indo-Pacific. **Remarks:** found in rocky or coral reefs, sandy beaches with rubbles and brackish estuaries.

(K. Shibukawa)

Bathygobius fuscus, UMTF 1199 (KAUM–I. 16288), 5.3 cm SL
Cendering, 14 Sept. 2008

Cryptocentrus maudae, UMTF 1274 (KAUM–I. 16540), 2.6 cm SL
Cendering, 6 Oct. 2008

Drombus triangularis, KAUM–I. 16758, 2.4 cm SL
Setiu, 30 Oct. 2008

Drombus triangularis, KAUM–I. 16760, 2.0 cm SL
Setiu, 30 Oct. 2008

Cryptocentrus maudae Fowler, 1937

Maude's Shrimpgobyy

D VI + I, 9–10; A I, 9–10; P_1 17; LS 120. Body elongate, compressed. Head slightly compressed. Jaws subequal. Gill opening reaching anteriorly around a vertical through posterior margin of preopercle. Pelvic fins united medially; frenum present. Scales minute, cycloid; head, breast and pectoral-fin base naked. Sensory canals and pores present on head; distinct transverse sensory-papillae rows on cheek. **Color:** ground color of head and body blackish brown; anterodorsal part of eye, interorbital space, snout and anterior tip of lower jaw pale or pale brown; several pale or pale brown saddles on head and body, in addition to numerous minute pale spots; anal fin with 5–6 diagonal black bars. **Size:** 5 cm SL. **Distribution:** Andaman Sea and West Pacific. **Remarks:** found in tidal estuaries and protected bays with sandy-mud bottoms and rubble patches; symbiotically associates with alpheid shrimps.

(K. Shibukawa)

Drombus triangularis (Weber, 1909)

Brown Drombus

D VI + I, 9–10; A I, 8; P_1 16–17; LR 30–31; PDS 12–19. Body moderately elongate and compressed. Head slightly depressed. Lower jaw projecting beyond upper jaw. Gill opening not reaching anteriorly to a vertical through preopercular margin. Pelvic fins united medially; frenum present. Scales ctenoid, excluding nape, breast, pectoral-fin base and predorsal area with cycloid scales; head naked. Sensory canals and pores present on head; distinct transverse pattern of sensory-papillae rows on cheek. **Color:** head and body dusky with irregular mottles; yellow triangular spot at uppermost of pectoral base. **Size:** 5 cm. **Distribution:** Indo-West Pacific. **Remarks:** found in mangrove swamps and brackish estuaries with rubbles.

(K. Shibukawa)

Eugnathogobius variegatus (Peters, 1868)

Stripe-face Brackish Goby

D VI + I, 7–9; A I, 7–8; P_1 16–17; LR 29–34. Body elongate and compressed. Head slightly depressed. Jaws subequal. Gill opening not reaching anteriorly to a vertical through preopercular margin. Pelvic fins united medially; frenum present. Scales on body cycloid anteriorly, ctenoid posteriorly. Sensory canals and pores present on head; distinct transverse pattern of sensory-papillae rows on cheek. **Color:** head and body grayish yellow dorsally, becoming paler ventrally; numerous blackish or dark gray speckles on head and body; oblique dusky streaks from eye to cheek and middle of upper jaw. **Size:** 4 cm. **Distribution:** West Pacific. **Remarks:** found in mangrove swamps. (K. Shibukawa)

Eugnathogobius variegatus, UMTF 1507 (KAUM–I. 16712), 3.6 cm SL
Setiu, 27 Oct. 2008

Eviota pellucida Larson, 1976

Pellucida Pygmy Goby

D VI + I, 7–9; A I, 7; P_1 15–16; LR 21–22; PDS 0. Body relatively short, compressed. Head slightly compressed. Jaws subequal. Gill opening not reaching anteriorly to a vertical through preopercular margin. Pelvic fins almost separated; frenum absent. Scales ctenoid; head and pectoral-fin base naked. Sensory canals and pores present on head; reduced longitudinal pattern of sensory-papillae rows on cheek. **Color:** when alive, head and body subtranslucent, with two narrow longitudinal yellow stripe from eye to middle of body; longitudinal white stripe on belly; color immediately turned to pale yellow or pale reddish yellow after death. **Size:** 2 cm SL. **Distribution:** eastern Indian Ocean and Western Central Pacific. **Remarks:** found in coral reefs. (K. Shibukawa)

Eviota pellucida, UMTF 1263 (KAUM–I. 16636), 1.3 cm SL
Bidong Island, 13 Oct. 2008

Eviota storthynx, UMTF 1442 (KAUM–I. 16635), 1.6 cm SL
Bidong Island, 13 Oct. 2008

Eviota storthynx (Rofen, 1959)

Storthynx Pygmy Goby

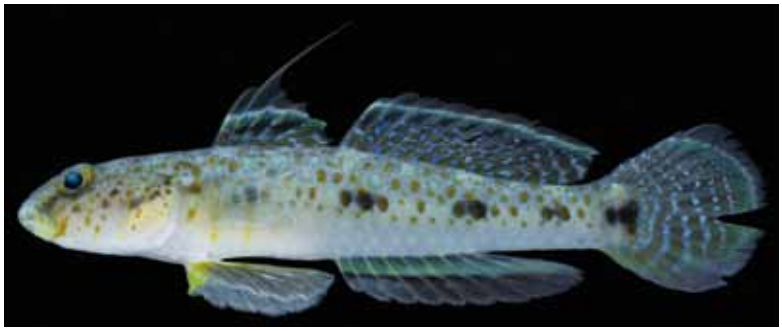
D VI + I, 8–9; A I, 7; P_1 14–16; LR 22–23; PDS 0. Body relatively short, compressed. Head slightly compressed. Jaws subequal. Gill opening not reaching anteriorly to a vertical through preopercular margin. Pelvic fins almost separated; frenum absent. Scales ctenoid; head and pectoral-fin base naked. Sensory canals and pores present on head; reduced longitudinal pattern of sensory-papillae rows on cheek. **Color:** when alive, head and body subtranslucent, with several white spots; nasal tube dark red; edges of scale pockets dusky; 7–8 dark grayish brown subcutaneous vertical bars on ventral half of tail; color immediately turned to pale after death, with a prominent black spot behind eye. **Size:** 2.1 cm SL. **Distribution:** Western Australia and Western Pacific. **Remarks:** found in shallow rocky and coral reefs. (K. Shibukawa)

Exyrias puntang (Bleeker, 1851)

Puntang Goby

D VI + I, 10–11; A I, 8–10; P_1 15–18; LR 29–33; PDS 10–12. Body moderately elongate and compressed. Head subcylindrical. Lower jaw not projecting anteriorly beyond upper jaw. Gill opening not reaching anteriorly to a vertical through posterior margin of preopercle. Spines of first dorsal fin typically elongate and filamentous. Pelvic fins united medially; frenum present. Scales on body cycloid anteriorly, ctenoid posteriorly; cheek and operculum scaled. Sensory canals and pores present on head; longitudinal pattern of sensory-papillae rows on cheek. **Color:** ground color of head and body dull yellow or light yellowish brown, paler and tinged with yellow ventrally; several vague vertical dusky bars on body; dorsal fins with numerous dusky spots. **Size:** 12 cm SL. **Distribution:** Indo-West Pacific. **Remarks:** found in mangrove swamps, brackish estuaries and adjacent shallow coastal waters with sandy-mud bottoms. (K. Shibukawa)

Exyrias puntang, KAUM–I. 16795, 10.2 cm SL
Merang, 2 Nov. 2008



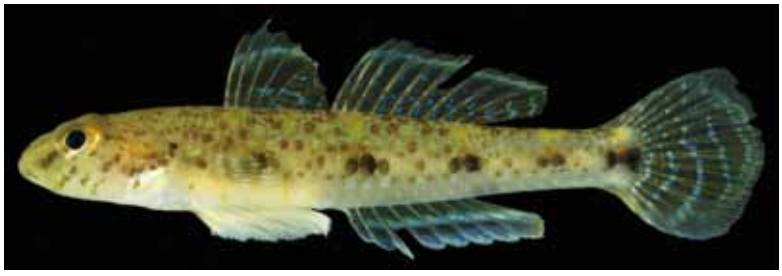
Favonigobius reichei, UMTF 1508 (KAUM–I. 16716), 4.4 cm SL
Setiu, 28 Oct. 2008

Favonigobius reichei (Bleeker, 1854)

Indo-Pacific Tropical Sand Goby

D VI + I, 8; A I, 8; P_1 16; LR 27; PDS 0–3. Body moderately elongate and compressed. Head subcylindrical or slightly depressed. Lower jaw slightly projecting beyond upper jaw. Gill opening not reaching anteriorly to a vertical through posterior margin of preopercle. Tongue near truncate. Second spine of first dorsal fin elongate and filamentous in male; pelvic fins united medially; frenum present. Scales ctenoid, excluding breast and pectoral-fin base with cycloid scales; head naked. Sensory canals and pores present on head; sensory papillae rows on cheek multiple, but not forming distinct transverse rows. **Color:** head and body pale gray with numerous black dots. **Size:** 7 cm SL. **Distribution**: Indo-West Pacific. **Remarks:** found in mangroves, brackish estuaries and adjacent shallow coastal waters with sandy-mud bottoms.

(K. Shibukawa)



Favonigobius reichei, KAUM–I. 16781, 3.5 cm SL
Merang, 2 Nov. 2008

Fusigobius inframaculatus (Randall, 1994)

Longspine Goby

D VI + I, 9; A I, 8; P_1 17–19; LR 23–24; PDS 0. Body moderately elongate, compressed posteriorly. Head subcylindrical. Snout pointed. Lower jaw slightly projecting beyond upper jaw. Gill opening not extending anteriorly to a vertical through posterior margin of preopercle. First spine of first dorsal fin elongate, filamentous. Pelvic fins united medially; frenum present. Scales on body ctenoid, exclusive of side of nape, breast and pectoral-fin base with cycloid scales; head naked. Sensory canals and pores present on head; reduced longitudinal pattern of sensory papillae on cheek. **Color:** head and body pale (subtranslucent when alive) with numerous orange yellow spots; a large black blotch at caudal-fin base. **Size:** 4 cm SL. **Distribution:** Indo-West Pacific. **Remarks:** found on flat sandy bottoms in coral reefs. (K. Shibukawa)

Glossogobius aureus Akihito & Meguro, 1975

Golden Flat-head Goby

D VI + I, 9; A I, 8–9; P_1 18–21; LR 31–34; PDS 22–27. Body elongate and compressed. Head slightly depressed. Lower jaw prominent. Gill opening reaching anteriorly to, or a little beyond, a vertical through posterior margin of preopercle. Anterior margin of tongue notched. Pelvic fins united medially; frenum present. Scales ctenoid, excluding predorsal area, breast, belly and pectoral-fin base and operculum with cycloid scales. Sensory canals and pores present on head; longitudinal pattern of sensory papillae on cheek. **Color:** head and body light yellowish brown, darkened dorsally; body with midlateral series of five dusky blotches, as well as many faint irregular dusky lines and spots dorsally. **Size:** 20 cm SL. **Distribution:** Indo-West Pacific. **Remarks:** found in lower reaches of large rivers, mangroves, brackish estuaries and adjacent shallow coastal waters with sandy-mud bottoms.

(K. Shibukawa)

Fusigobius inframaculatus, UMTF 1329 (KAUM–I. 16626), 3.3 cm SL
Bidong Island, 13 Oct. 2008

Glossogobius aureus, KAUM–I. 17208, 12.9 cm SL
off Terengganu (KT), 10 Jan. 2009

Glossogobius bicirrhosus, KAUM–I. 16779, 4.4 cm SL
Merang, 2 Nov. 2008

Glossogobius bicirrhosus, UMTF 1259 (KAUM–I. 16780), 3.2 cm SL
Merang, 2 Nov. 2008

Glossogobius bicirrhosus (Weber, 1894)

D VI + I, 9; A I, 8; P_1 18–19; LR 30–32; PDS 13–15. Body elongate and compressed. Head slightly depressed. Lower jaw prominent, with a pair of short barbells on chin. Gill opening reaching anteriorly to, or a little beyond, a vertical through posterior margin of preopercle. Anterior margin of tongue notched. Pelvic fins united medially; frenum present. Scales on body largely ctenoid; blest with cycloid scales. Sensory canals and pores present on head; longitudinal pattern of sensory papillae on cheek. **Color:** head and body light grayish brown or beige, darkened dorsally; body with midlateral series of dusky blotches, as well as many faint irregular dusky lines and spots dorsally. **Size:** 9 cm SL. **Distribution:** West Pacific. **Remarks:** found in lower reaches of streams, mangroves and brackish estuaries.

(K. Shibukawa)

Glossogobius circumspectus (Macleay, 1883)

Circumspect Flat-head Goby

D VI + I, 8–10; A I, 8; P_1 18–19; LR 29–33; PDS 15–19. Body elongate and compressed. Head slightly depressed. Lower jaw prominent. Gill opening reaching anteriorly to, or a little beyond, a vertical through posterior margin of preopercle. Anterior margin of tongue notched. Pelvic fins united medially; frenum present. Scales ctenoid, excluding predorsal area, breast, belly and pectoral-fin base and operculum with cycloid scales. Sensory canals and pores present on head; numerous transverse rows of sensory papillae on cheek. **Color:** head and body beige, darkened dorsally; body with midlateral series of five dusky blotches, as well as many faint irregular dusky lines and spots. **Size:** 10 cm SL. **Distribution:** Indo-West Pacific. **Remarks:** found in lower reaches of large rivers, mangroves and brackish estuaries.

(K. Shibukawa)

Glossogobius circumspectus, UMTF 1371 (KAUM–I. 16807), 5.5 cm SL
Merang, 2 Nov. 2008

Gobiodon quinquestrigatus, UMTF 1258 (KAUM–I. 16615), 2.6 cm SL
Bidong Island, 12 Oct. 2008

Gobiodon quinquestrigatus (Valenciennes, 1837)

Fivelined Coralgoby

D VI + I, 10–11; A I, 8–9; P_1 18–20; LR 0; PDS 0. Body ovate, well compressed. Head compressed; snout rounded. Jaws subequal. Gill opening narrow, restricted to pectoral-fin base. Tongue narrow, with rounded anterior margin. Pelvic fins small, united medially; frenum present. No scales on head and body. Sensory canals and pores present on head; reduced longitudinal pattern of sensory papillae on cheek. **Color:** head reddish brown; body and fins dark reddish brown or blackish; four and one vertical sky lines on head and pectoral-fin base, respectively. **Size:** 3 cm SL. **Distribution:** West Pacific. **Remarks:** found in coral reefs; inhabits amongst branches of acroporid corals of the genus *Acropora*.

(K. Shibukawa)

Hemigobius hoevenii, KAUM–I. 16738, 4.1 cm SL
Setiu, 29 Oct. 2008

Hemigobius hoevenii, UMTF 1278 (KAUM–I. 16715), 3.4 cm SL
Setiu, 27 Oct. 2008

Hemigobius hoevenii (Bleeker, 1851)

Banded Mullet Goby

D VI + I, 7–8; A I, 7–9; P_1 13–16; LR 25–32; PDS 8–10. Body relatively short, compressed. Head slightly depressed. Snout rounded, sometimes a little projecting beyond jaws anteriorly. Jaws subterminal. Interorbital space broad. Gill opening not extending anteriorly to a vertical through preopercular margin. Pelvic fins united medially; frenum present. Scales ctenoid, excepting those on predorsal area, pectoral base, belly and operculum cycloid. Sensory canals and pores present on head; longitudinal pattern of sensory-papillae rows on cheek. **Color:** head and body olive or grayish brown, darkened dorsally; body typically with irregular black blotches and oblique bands; fins tinged with yellow in large male. **Size:** 4 cm SL. **Distribution:** West Pacific and Andaman Sea. **Remarks:** found in mangrove swamps and brackish estuaries.

(K. Shibukawa)

Hemigobius mingi (Herre, 1936)

Blue-eyed Mullet Goby

D VI + I, 6–8; A I, 6–7; P_1 13–15; LR 27–32; PDS 8–10. Body relatively short, compressed. Head slightly depressed. Snout rounded, sometimes a little projecting beyond jaws anteriorly. Jaws subterminal. Interorbital space broad. Gill opening not extending anteriorly to a vertical through preopercular margin. Pelvic fins united medially; frenum present. Scales ctenoid, excepting those on predorsal area, pectoral base, breast, cheek and operculum cycloid. Sensory canals and pores present on head; longitudinal pattern of sensory-papillae rows on cheek. **Color:** head and body dark grayish brown dorsally, becoming paler ventrally; typically 4–5 faint narrow beige saddles on body; a distinct black spot on posterior part of first dorsal fin. **Size:** 6 cm SL. **Distribution:** West Pacific. **Remarks:** found in mangrove swamps and brackish estuaries. (K. Shibukawa)

Istigobius decoratus (Herre, 1927)

Decorative Lagoon Goby

D VI + I, 11; A I, 10; P_1 17–19; LR 30–33; PDS 8–10. Body moderately elongate and compressed. Head slightly depressed. Snout rounded, slightly projecting beyond jaws. Jaws subequal. Gill opening not extending anteriorly to a vertical through preopercular margin. No free, filamentous rays on upper part of pectoral fin. Pelvic fins united medially; frenum present. Scales ctenoid, excepting breast, pectoral-fin base and occipital region with cycloid scales; head naked. Sensory canals and pores present on head; longitudinal pattern of sensory-papillae rows on cheek. **Color:** head and body pale grayish brown dorsally, becoming paler ventrally; body with a midlateral series of black spots, as well as many dark brown smaller spots and grayish brown reticulation; a distinct black spot between first and second spines of first dorsal fin. **Size:** 10 cm SL. **Distribution:** Indo-West Pacific. **Remarks:** found in shallow coral reefs with sandy bottoms. (K. Shibukawa)

Hemigobius mingi, UMTF 1504 (KAUM–I. 16709), 3.7 cm SL
Setiu, 27 Oct. 2008

Istigobius decoratus, UMTF 1252 (KAUM–I. 16563), 4.7 cm SL
Bidong Island, 14 Oct. 2008

Istigobius diadema, KAUM–I. 16805, 4.9 cm SL
Merang, 2 Nov. 2008

Istigobius diadema, UMTF 1111 (KAUM–I. 16287), 3.3 cm SL
Cendering, 14 Sept. 2008

Istigobius diadema (Steindachner, 1876)

Black-lined Lagoon Goby

D VI + I, 11; A I, 9; P_1 19; LR 31–33; PDS 18. Body moderately elongate and compressed. Head slightly depressed. Snout rounded, slightly projecting beyond jaws. Jaws subequal. Gill opening not extending anteriorly to a vertical through preopercular margin. No free, filamentous rays on upper part of pectoral fin. Pelvic fins united medially; frenum present. Scales ctenoid, excepting breast, pectoral-fin base and occipital region with cycloid scales; head naked. Sensory canals and pores present on head; longitudinal pattern of sensory-papillae rows on cheek. **Color:** head and body pale grayish brown, with a distinct horizontal black band behind eye. **Size:** 10 cm SL. **Distribution:** Eastern Indian Ocean, Andaman Sea and Indonesia. **Remarks:** found in mangrove creeks and adjacent coastal waters with sandy or muddy bottoms. (K. Shibukawa)

Istigobius goldmanni (Bleeker, 1852)

Goldman's Goby

D VI + I, 10–11; A I, 9; P_1 17–19; LR 26–27; PDS 7–9. Body moderately elongate, compressed. Head subcylindrical or slightly depressed. Snout rounded, slightly projecting beyond jaws. Jaws subterminal. Gill opening not extending anteriorly to a vertical through preopercular margin. No free, filamentous rays on upper part of pectoral fin. Pelvic fins united medially; frenum present. Scales ctenoid, excepting breast, pectoral-fin base and occipital region with cycloid scales; head naked. Sensory canals and pores present on head; longitudinal pattern of sensory-papillae rows on cheek. **Color:** head and body pale gray, with numerous minute black spots. **Size:** 4 cm SL. **Distribution:** West Pacific. **Remarks:** found in shallow coral reefs with sandy bottoms.

(K. Shibukawa)

Istigobius goldmanni, UMTF 1479 (KAUM–I. 16541), 2.5 cm SL
Cendering, 6 Oct. 2008

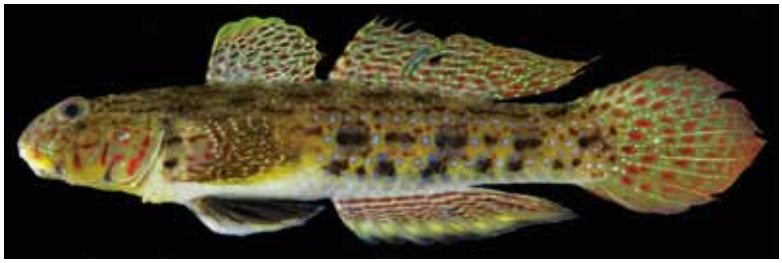
Istigobius nigroocellatus, UMTF 1388 (KAUM–I. 16561), 2.3 cm SL
Bidong Island, 13 Oct. 2008

Istigobius nigroocellatus (Günther, 1873)

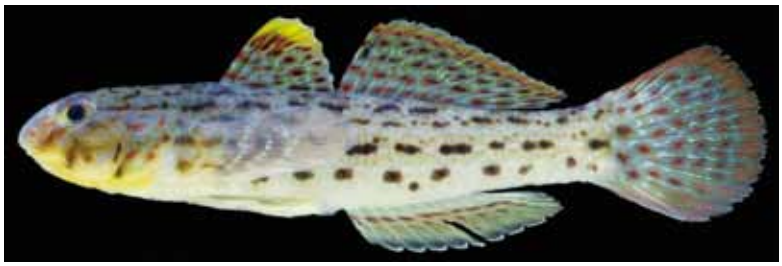
Black Spotted Goby

D VI + I, 10–12; A I, 9–10; P_1 17; LR 28; PDS 9. Body moderately elongate, compressed. Head subcylindrical or slightly depressed. Snout rounded, slightly projecting beyond jaws. Jaws subterminal. Gill opening not extending anteriorly to a vertical through preopercular margin. No free, filamentous rays on upper part of pectoral fin. Pelvic fins united medially; frenum present. Scales ctenoid, excepting breast, pectoral-fin base and occipital region with cycloid scales; head naked. Sensory canals and pores present on head; longitudinal pattern of sensory-papillae rows on cheek. **Color:** head and body pale gray, with numerous minute black spots; a distinct black spot between fifth and sixth spines of first dorsal fin. **Size:** 4 cm SL. **Distribution:** West Pacific. **Remarks:** found in shallow coral reefs with sandy bottoms.

(K. Shibukawa)



Istigobius ornatus, UMTF 1190 (KAUM–I. 16676), 7.4 cm SL
Kemaman, 21 Oct. 2008



Istigobius ornatus, UMTF 1058 (KAUM–I. 16291), 4.0 cm SL
Cendering, 14 Sept. 2008

Istigobius ornatus (Rüppell, 1830)

Ornate Goby

D VI + I, 10–11; A I, 8–10; P_1 17–20; LR 27–28; PDS 9–12. Body moderately elongate and compressed. Head subcylindrical or slightly depressed. Snout rounded, slightly projecting beyond jaws. Jaws subequal. Gill opening not extending anteriorly to a vertical through preopercular margin. Upper part of pectoral fin with some filamentous free rays. Pelvic fins united medially; frenum present. Scales ctenoid, excepting breast, pectoral-fin base and occipital region with cycloid scales; head naked. Sensory canals and pores present on head; longitudinal pattern of sensory-papillae rows on cheek; curved or near transverse sensory-papillae row just behind chin. **Color:** head and body light grayish yellow dorsally, becoming paler ventrally; body with numerous small black dots or horizontally-elongate blotches; distal tip of first dorsal fin tinged with yellow. **Size:** 10 cm SL. **Distribution:** Indo-West Pacific. **Remarks:** found in shallow silty reefs and mangroves. (K. Shibukawa)

"*Lophogobius*" *bleekeri* Popta, 1921

Ornate Goby

D VI + I, 8; A I, 7; P_1 16–18; LR 25–28; PDS 0. Body short and compressed. Head compressed. Lower jaw a little projecting beyond upper jaw. Gill opening not extending anteriorly to a vertical through preopercular margin. Pelvic fins united medially; frenum present. Scales on body largely ctenoid; pectoral-fin base and narrow area on anterior part of body with cycloid scales; head naked. Sensory canals and pores present on head; distinct transverse rows of sensory papillae on cheek. **Color:** head and body beige, with several irregular, broad vertical blackish brown bands; sometimes entirely blackened in particular the large specimen. **Size:** 4 cm SL. **Distribution:** West Pacific. **Remarks:** found in lower reaches of streams and brackish estuaries. Hitherto this species has been mis-assigned to *Lophogobius*; the author and his collaborators are now tackling with this issue. (K. Shibukawa)

"*Lophogobius*" *bleekeri*, UMTF 1460 (KAUM–I. 16806), 2.2 cm SL
Merang, 2 Nov. 2008

Macrodontogobius wilburi, UMTF 1331 (KAUM–I. 16618), 3.4 cm SL
Bidong Island, 12 Oct. 2008

Macrodontogobius wilburi Herre, 1936

Wilbur's Goby

D VI + I, 9–11; A I, 9–10; P_1 15–17; LR 27–31; PDS 7. Body moderately elongate, compressed. Head subcylindrical or slightly depressed. Snout rounded, slightly projecting beyond jaws. Lower jaw not projecting anteriorly beyond upper jaw. Gill opening not extending anteriorly to a vertical through preopercular margin. Pelvic fins united medially; frenum present. Scales on body ctenoid, excepting isthmus with cycloid scales; cheek and operculum with ctenoid scales. Sensory canals and pores present on head; many transverse rows of sensory papillae on cheek. **Color:** head and body light grayish brown, with numerous minute black spots; anal fin with faint diagonal dusky barred pattern. **Size:** 5 cm SL. **Distribution:** Indo-West Pacific. **Remarks:** found in shallow lagoons and coral reefs with rubbles.
(K. Shibukawa)

Mugilogobius chulae, KAUM–I. 16713, 2.7 cm SL
Setiu, 27 Oct. 2008

Mugilogobius chulae (Smith, 1932)

Two-spot Mangrove Goby

D VI + I, 6–8; A I, 6–8; P_1 12–16; LR 25–32; PDS 11–15. Body moderately elongate and compressed. Head slightly depressed. Interorbital space broad. Gill opening not extending anteriorly to a vertical through preopercular margin. Some spines of first dorsal fin elongate and filamentous. Pelvic fins united medially; frenum present. Scales ctenoid, excepting those on predorsal area, pectoral base, belly and upper part of operculum with cycloid scales; other part of head naked. Sensory canals and pores absent on head; longitudinal pattern of sensory-papillae rows on cheek. **Color:** head and body light grayish yellow or beige, with several diagonal black bars and speckles; two black spot at caudal fin base; black spot at posterior part of first dorsal fin. **Size:** 4 cm SL. **Distribution:** Indo-West Pacific. **Remarks:** found in shallow mangrove swamps and brackish estuaries.allow coral reefs with sandy bottoms.
(K. Shibukawa)

Mugilogobius tigrinus Larson, 2001

Narrow-barred Mangrove Goby

D VI + I, 6–7; A I, 6–7; P_1 14–17; LR 24–28; PDS 9–12. Body moderately elongate and compressed. Head slightly depressed. Interorbital space broad. Gill opening not extending anteriorly to a vertical through preopercular margin. Some spines of first dorsal fin may be elongate and filamentous. Pelvic fins united medially; frenum present. Scales ctenoid, excepting those on predorsal area, pectoral base, belly and upper part of operculum with cycloid scales; other part of head naked. Sensory canals and pores absent on head; longitudinal pattern of sensory-papillae rows on cheek. **Color:** head and body whitish with four vertical black bands, in addition to three black saddles and single black spot at caudal-fin base; first dorsal fin with a black spot. **Size:** 2.3 cm SL. **Distribution:** Thailand, Malaysia and Singapore. **Remarks:** found in shallow mangrove creeks and swamps.

(K. Shibukawa)

Paratrypauchen microcephalus (Bleeker, 1860)

Comb Goby

D VI, 48–51; A 48–51; P_1 16–17; LR 52–65; PDS 0. Body very elongate and compressed, with prominent mid-ventral keel on belly. Head compressed. A pouch-like cavity just above operculum. Eye reduced, difficult to be discerned from external view. Dorsal and anal fins confluent with caudal fin. Pelvic fins fused medially, but connecting membrane between innermost rays emarginated posteriorly; frenum low. Scales on body cycloid; head and belly naked. Sensory canals and pores absent on head; numerous sensory papillae scattered on cheek. **Color:** head and body entirely reddish. **Size:** 18 cm SL. **Distribution:** Indo-West Pacific. **Remarks:** found in bays and brackish estuaries with muddy bottom.

(K. Shibukawa)

Mugilogobius tigrinus, UMTF 1261 (KAUM–I. 16740), 2.1 cm SL
Setiu, 29 Oct. 2008

Paratrypauchen microcephalus, KAUM–I. 17081, 8.9 cm SL
off Terengganu, 27 Dec. 2008

Periophthalmus argentilineatus, UMTF 1133 (KAUM–I. 16493), 5.0 cm SL
estuary near UMT, 30 Sept. 2008

Periophthalmus argentilineatus, UMTF 1039 (KAUM–I. 16550), 3.4 cm SL
estuary near UMT, 30 Sept. 2008

Periophthalmus argentilineatus Valenciennes, 1837

Silver-lined Mudskipper

D IX–XVI + I, 9–12; A I, 8–11; P_1 12–14; LR 64–100; PDS 22–37. Body moderately elongate, compressed. Head slightly compressed. Snout steep. Dermal cup-like process developed beneath eye. Single row of conical teeth on each jaws. Pelvic fins almost separated; frenum absent. Scales on head and body cycloid. No sensory canals and pores on head. **Color:** head and body grayish brown with indistinct dusky mottles; first dorsal fin with many white spots, in addition to a broad distal submarginal black band. **Size:** 9 cm SL. **Distribution:** Indo-Pacific. **Remarks:** found in schools in intertidal zone of mangrove areas and brackish estuaries; feeds on algal mats and small invertebrates on the sand / mud flats.

(M. A. Ghaffar & K. Shibukawa)

Periophthalmus novemradiatus (Hamilton, 1822)

Dusky-gilled Mudskipper

D IX–XI + I, 12–13; A I, 11–13; P_1 11–14; LR 61–76; PDS 20–28. Body moderately elongate, compressed. Head slightly compressed. Snout steep. Dermal cup-like process developed beneath eye. Single row of conical teeth on each jaws. Pelvic fins almost separated with serrated margin; frenum present. Scales on head and body cycloid. No sensory canals and pores on head. **Color:** head and body grayish brown with indistinct dusky mottles; first dorsal fin with several dusky spots tinged with red, in addition to broad distal submarginal black band. **Size:** 10 cm SL. **Distribution:** Eastern Indian Ocean, Andaman Sea and West Pacific. **Remarks:** normally found in large schools on the sand flats of estuaries; feeds on small invertebrates and algal mats.

(M. A. Ghaffar & K. Shibukawa)

Periophthalmus novemradiatus, UMTF 1505 (KAUM–I. 16741), 5.4 cm SL
Setiu, 30 Oct. 2008

Pleurosicya labiata, UMTF 1483 (KAUM–I. 16552), 1.9 cm SL
Bidong Island, 13 Oct. 2008

Pleurosicya labiata (Weber, 1913)

D VI+I, 7–9; A I, 8–9; P_1 15–18; LR 24–27; PDS 9–11. Body relatively moderately elongate, compressed. Head slightly depressed. Snout pointed. Upper jaw projecting anteriorly beyond lower jaw; lower jaw triangular. Gill opening not extending anteriorly to a vertical through preopercular margin. Pelvic fins united medially; frenum present; skin around pelvic-fin spine thickened, forming a lobe-like appearance. Scales on body ctenoid; head naked. Sensory canals and pores present on head; reduced longitudinal pattern of sensory-papillae rows on cheek. **Color:** head and body subtranslucent, with numerous minute brown speckles. **Size:** 2.5 cm SL. **Distribution:** Andaman Sea and West Pacific. **Remarks:** found in coral reefs; commensal with sponges.

(K. Shibukawa)

Priolepis semidoliata, UMTF 1390 (KAUM–I. 16388), 2.4 cm SL
Dungun, 24 Sept. 2008

Priolepis semidoliata (Valenciennes, 1837)

Halfbarred Goby

D VI+I, 9–10; A I, 7–8; P_1 16–18; LR 25–28; PDS 0. Body relatively short, compressed posteriorly. Head subcylindrical or slightly depressed. Lower jaw projecting anteriorly a little beyond upper jaw. Gill opening extending slightly beyond a vertical through preopercular margin anteriorly. Tongue near truncate or rounded. Some spines of first dorsal fin elongate, filamentous. Pelvic fins united medially; frenum absent. Scales on body ctenoid; head naked. Sensory canals and pores absent on head; reduced longitudinal pattern of sensory-papillae rows on cheek. **Color:** ground color of head and body orange yellow to dark grayish brown; several vertical or oblique pale bars on head and body, two of them around end of head connected one another at dorsum. **Size:** 2 cm SL. **Distribution:** Indo-Pacific. **Remarks:** found in shallow coral reefs. (K. Shibukawa)

Psammogobius biocellatus (Valenciennes, 1837)

Sleepy Goby

D VI + I, 9; A I, 8–9; P_1 18; LR 29–30; PDS 14–15. Body moderately elongate and subcyrindrical, compressed. Head depressed. Lower jaw prominent. Tongue bilobate. Small lappet over iris. Gill opening extending anteriorly beyond a vertical through preopercular margin; gill membranes united medially, with free posterior margin across isthmus. Pelvic fins united medially; frenum present. Scales ctenoid, excepting those on belly and pectoral base cycloid. Sensory canals and pores present on head; longitudinal pattern of sensory-papillae rows on cheek. **Color:** head and body blackish or grayish brown with indistinct black mottles and lines. **Size:** 12 cm TL. **Distribution:** Indo-West Pacific. **Remarks:** found in mangrove swamps, brackish estuaries and adjacent coastal waters with sandy-mud bottoms. (K. Shibukawa)

Psammogobius biocellatus, UMTF 1381 (KAUM–I. 16752), 3.6 cm SL
Setiu, 30 Oct. 2008

Pseudogobius javanicus, KAUM–I. 16294, female, 2.8 cm SL
Cendering, 14 Sept. 2008

Pseudogobius javanicus (Bleeker, 1856)

Java Fat-nose Goby

D VI + I, 7; A I, 7; P_1 14–16; LR 24–28; PDS 7–8. Body moderately elongate, compressed. Head slightly depressed. Snout rounded, projecting beyond upper jaw. Gill opening not extending anteriorly to a vertical through preopercular margin. Pelvic fins united medially; frenum present. Scales ctenoid, excepting those on predorsal area, pectoral base, belly and operclum cycloid. Sensory canals and pores present on head; longitudinal pattern of sensory-papillae rows on cheek. **Color:** head and body pale gray, with numerous dusky spots and a diagonal dusky bar below first dorsal fin; black spot at posterior part of first dorsal fin; rays of second dorsal and caudal fins with several dusky dots; two black spots at caudal-fin base. **Size:** 3 cm SL. **Distribution:** West Pacific and Andaman Sea. **Remarks:** Found in mangrove swamps and brackish estuaries with sandy-mud bottoms. (K. Shibukawa)

Pseudogobius javanicus, UMTF 1467 (KAUM–I. 16494), male, 2.6 cm SL
estuary near UMT, 30 Sept. 2008

Pseudogobius melanostictus (Day, 1876)

Black Spotted Fat-nose Goby

D VI+I, 7; A I, 7; P_1 14–15; LR 25–26; PDS 7–8. Body moderately elongate, compressed. Head slightly depressed. Snout rounded, projecting beyond upper jaw. Gill opening not extending anteriorly to a vertical through preopercular margin. Pelvic fins united medially; frenum present. Scales ctenoid, excepting those on pectoral base and belly cycloid; operculum with ctenoid and cycloid scales. Sensory canals and pores present on head; longitudinal pattern of sensory-papillae rows on cheek. **Color:** head and body pale gray, with numerous dusky spots; 2 broad, irregular black stripes on first dorsal fin; rays of second dorsal and caudal fins with several dusky dots; two black spots at caudal-fin base. **Size:** 4 cm SL. **Distribution:** Indo-West Pacific. **Remarks:** Found in mangrove swamps and brackish estuaries with sandy-mud bottoms.

(K. Shibukawa)

Pseudogobius melanostictus, KAUM–I. 16817, female, 3.3 cm SL
estuary near UMT, 3 Dec. 2008

Pseudogobius melanostictus, UMTF 1426 (KAUM–I. 16486), male, 2.6 cm SL
estuary near UMT, 30 Sept. 2008

Redigobius balteatus (Herre, 1935)

Rhinohorn Goby

D VI + I, 7–8; A I, 6–7; P_1 17–19; LR 27–28; PDS 9–11. Body relatively deep, compressed. Head subcylindrical or slightly compressed. Gill opening not extending anteriorly to a vertical through preopercular margin. Pelvic fins united medially; frenum present. Scales on body cycloid or weak ctenoid anteriorly, ctenoid posteriorly; breast, belly and pectoral-fin base with cycloid scales; dorsal part of operculum with ctenoid scales; cheek naked. Sensory canals and pores present on head; longitudinal pattern of sensory-papillae rows on cheek. **Color:** ground color of head and body grayish yellow dorsally, pale beige ventrally; a conspicuous, broad diagonal black bar from first dorsal fin to belly; a narrow diagonal black band from eye to middle of operculum. **Size:** 3 cm SL. **Distribution**: Indo-West Pacific. **Remarks:** found in mangrove swamps and brackish estuaries. (K. Shibukawa)

Redigobius balteatus, KAUM–I. 16803, 3.0 cm SL
Merang, 2 Nov. 2008

Redigobius balteatus, UMTF 1271 (KAUM–I. 16774), 2.4 cm SL
Merang, 2 Nov. 2008

Stigmatogobius pleurostigma (Bleeker, 1849)

Peach Knight Goby

D VI + I, 7; A I, 7–8; P_1 17–21; LR 23–28; PDS 7–13. Body relatively short, compressed. Head slightly compressed. Jaws subequal. Gill opening not extending anteriorly to a vertical through preopercular margin. Anterior margin of tongue rounded. Middle some spines of first dorsal fin elongate, forming tall pointed fin; pelvic fins united medially; frenum present. Scales ctenoid, excepting those on nape, opercle, breast and pectoral-fin base cycloid. Sensory canals and pores present on head; transvers rows of sensory papillae on cheek. **Color:** head and body grayish brown or beige, darkened dorsally; a series of black spots on midlateral body (some additional black spots frequently found in large specimen); a small black spot between first and second spines of first dorsal fin; many small black spots on caudal fin. **Size:** 6 cm SL. **Distribution:** West Pacific. **Remarks:** found in mangrove creeks and brackish estuaries. (K. Shibukawa)

Stigmatogobius pleurostigma, UMTF 1237 (KAUM–I. 16739), 3.5 cm SL
Setiu, 29 Oct. 2008

Trypauchen vagina, KAUM–I. 17300, 17.9 cm SL
off Terengganu (KT), 20 Jan. 2009

Trypauchen vagina, KAUM–I. 17302, 13.5 cm SL
off Terengganu (KT), 20 Jan. 2009

Trypauchen vagina (Bloch & Schneider, 1801)

Pink Worm Goby

D VI, 40–50; A39–47; P_1 15–20; LR 80–115; PDS 0. Body very elongate and compressed. Head compressed. A pouch-like cavity just above operculum. Eye reduced, difficult to be discerned from external view. Dorsal and anal fins confluent with caudal fin. Pelvic fins fused medialy, but connecting membrane between innermost rays emarginated posteriorly; frenum low. Scales on body cycloid; head naked. Sensory canals and pores absent on head; numerous sensory papillae scattered on cheek. **Color:** head and body entirely reddish. **Size:** 15 cm SL. **Distribution:** Indo-West Pacific. **Remarks:** found in bays and brackish estuaries with muddy bottom.
(K. Shibukawa)

Valenciennea muralis, KAUM–I. 16500, 9.1 cm SL
Cendering, 6 Oct. 2008

Valenciennea muralis (Valenciennes, 1837)

Mural Goby

D VI + I, 11–13; A I, 11–13; P_1 18–21; LR 73–94; PDS 0. Body moderately elongate, compressed. Head subcylindrical. Lower jaw not projecting anteriorly beyond upper jaw. Gill opening relatively narrow, restricted to pectoral-fin base. Third spine of first dorsal fin slightly elongate, forming pointed fin. Pelvic fins separated; frenum absent. Caudal fin rounded. Scales small ctenoid, excepting those on belly and breast, if present, cycloid; head and pectoral-fin base naked. Sensory canals and pores present on head; longitudinal pattern of sensory-papillae rows on cheek. **Color:** head and body pale gray or pale beige, with 4-5 longitudinal narrow pink or dusky stripes; lips yellowish; black spot at distal part of first dorsal fin just behind third spine. **Size:** 10 cm SL. **Distribution:** Indo-West Pacific. **Remarks:** found on shallow coastal waters with flat sandy bottoms and rubbles. (K. Shibukawa)

Valenciennea sexguttata (Valenciennes, 1837)

Sixspot Goby

D VI + I, 11–13; A I, 11–13; P_1 19–21; LR 71–94; PDS 0. Body moderately elongate, compressed. Head slightly compressed. Lower jaw not projecting anteriorly beyond upper jaw. Gill opening relatively narrow, restricted to pectoral-fin base. Third spine of first dorsal fin slightly elongate, forming pointed fin. Pelvic fins separated; frenum absent. Caudal fin rhomboid. Scales small ctenoid, excepting those on belly, prepelvic region and pectoral-fin base, if present, cycloid; head naked. Sensory canals and pores present on head; longitudinal pattern of sensory-papillae rows on cheek. **Color:** head and body pale gray or pale beige; several sky spots on cheek and operculum; narrow longitudinal faint pinkish stripe on body; black spot on distal part of first dorsal fin just behind third spine. **Size:** 15 cm SL. **Distribution:** Indo-Pacific. **Remarks:** found on flat sandy-mud bottoms with rubbles in shallow coastal waters. (K. Shibukawa)

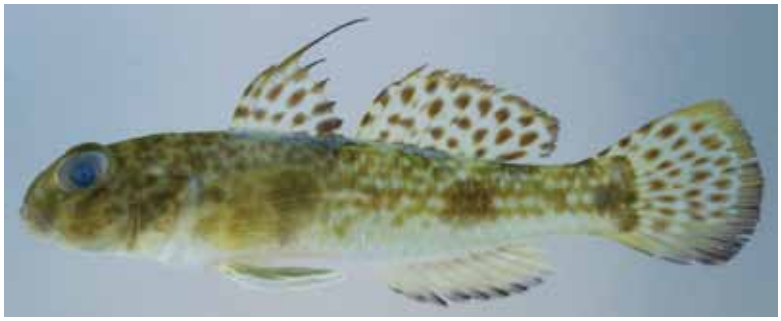
Valenciennea sexguttata, UMTF 1304 (KAUM–I. 16616), 4.8 cm SL
Bidong Island, 12 Oct. 2008

Valenciennea wardii, KAUM–I. 17191, 8.5 cm SL
off Terengganu (KR), 5 Jan. 2009

Valenciennea wardii (Playfair, 1867)

Ward's Goby

D VI + I, 11–12; A I, 11–12; P_1 19–22; LR 70–88; PDS 0. Body moderately elongate, compressed. Head slightly compressed. Lower jaw not projecting anteriorly beyond upper jaw. Gill opening relatively narrow, restricted to pectoral-fin base. First dorsal fin rounded, without elongate spines. Pelvic fins separated; frenum absent. Caudal fin rounded. Scales small ctenoid, excepting those on belly, prepelvic region and pectoral-fin base, if present, cycloid; head naked. Sensory canals and pores present on head; longitudinal pattern of sensory-papillae rows on cheek. **Color:** head and body pale gray or pale beige, with three broad vertical brown bars and some small brown saddles; a narrow bright blue oblique stripe through cheek and operculum; distinct black ocellated spot on rear part of first dorsal fin; posterior part of caudal fin brown, with pale distal margin; small black spot on dorsal part of caudal fin.



Yongeichthys nebulosus, UMTF 1038 (KAUM–I. 16766), 5.9 cm SL
Setiu, 31 Oct. 2008

Size: 10 cm SL. **Distribution:** Indo-West Pacific. **Remarks:** found on sandy-mud or soft mud bottom in bays. (K. Shibukawa)

Yongeichthys nebulosus (Forsskål, 1775)

Shadow Goby

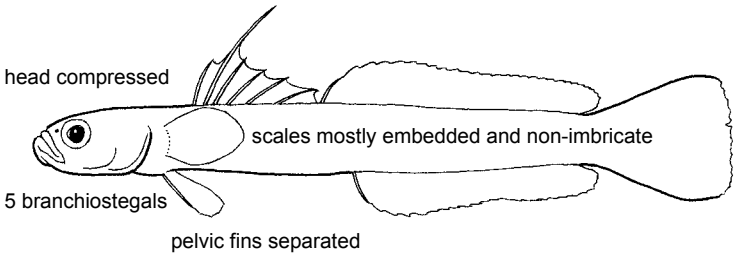
D VI + I, 9; A I, 9; P_1 17–19; LR 25–30; PDS 0. Body moderately elongate, compressed. Head slightly compressed. Jaws subequal. Gill opening not extending anteriorly to a vertical through preopercular margin. Pelvic fins united medially; frenum present. Scales ctenoid, excepting those on breast and pectoral-fin base cycloid; head naked. Sensory canals and pores present on head; longitudinal pattern of sensory-papillae rows on cheek, some rows multiple. **Color:** body pale gray or pale brown, with two dusky saddles and three large dusky midlateral spots. **Size:** 10 cm SL. **Distribution:** Indo-West Pacific. **Remarks:** found in mangrove creeks, brackish estuaries and protected bays with sandy-mud bottoms. (K. Shibukawa)

PTERELEOTRIDAE

Dart Gobies

By Koichi Shibukawa

Small to moderate-sized (up to ca. 18 cm SL, commonly to 10 cm), bottom-oriented free swimming fishes. Body elongate, sometimes highly compressed; head more or less compressed; no pored or tubed lateral-line scales on body. Teeth conical, forming some or several rows in each jaw; minute sensory papillae developed on head (and few on body and caudal fin), forming transverse or longitudinal rows; five branchiostegal rays. Usually two dorsal fins (continuous in one species of *Ptereleotris*), first with IV–VI flexible spines and second with single flexible spine and 9–39 soft rays; anal fin with single flexible spine and 14–37 soft rays; pectoral fin with 10–25 soft rays; pelvic fins separated, with single spine and 3–5 soft rays in each; caudal fin rounded, truncate or often emarginate. Scales small cycloid (except for *Nemateleotris* and some species of *Ptereleotris* with ctenoid scales), mostly embedded and nonimbricate. **Color:** variable.



Remarks: typically found in coral reefs and brackish estuaries. Several species often treated as aquarium fish.

Similar families occurring in the area: Blenniidae – teeth incisor-like, forming single row in each jaw. Eleotridae – six branchiostegal rays; head subcylindrical or rather depressed in many species; scales imbricate in most species. Gobiidae – pelvic fins usually united medially; scales, if present, imbricate in most species.

Parioglossus formosus (Smith, 1931)

Beautiful Hover Goby

D V–VI + I, 13–15; A I, 13–15; P_1 15–17; LR 66–78; PDS 0. Body elongate, compressed. Head compressed. Lower jaw slightly projecting anteriorly beyond upper jaw. Gill opening not extending anteriorly to a vertical line through middle of operculum. Middle some spine of first dorsal fin slightly elongate in male. Pelvic fins separated. Scales on body small cycloid, embedded and non-imbricate; head naked. Sensory canals and pores present on head; reduced transverse pattern of sensory-papillae rows on cheek. **Color:** head and body pale beige, with a longitudinal black stripe from snout to posterior margin of caudal fin through eye and ventral half of body; additional black stripe along dorsal profile from snout to base of caudal fin, continuous to dark brown stripe on dorsal part of caudal fin.

Parioglossus formosus, UMTF 1266 (KAUM–I. 16340), 2.0 cm SL Cendering, 16 Sept. 2008

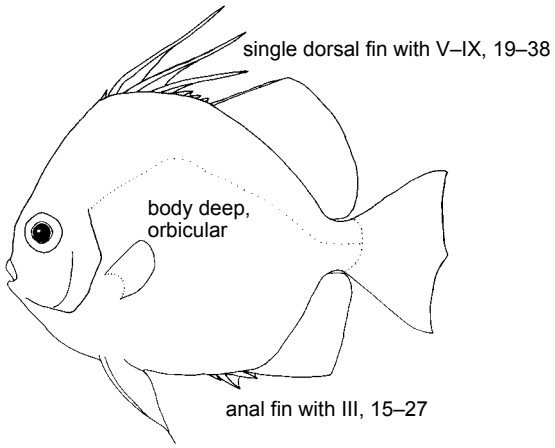
Size: 3.5 cm SL. **Distribution:** Andaman Sea, northwestern Australia and West Pacific. **Remarks:** found in shallow coastal area of coral or rocky reefs at high-tide hour; free swimming species, usually forming aggregations.

EPHIPPIDAE

Spadefishes (Batfishes)

By Keiichi Matsuura and Seishi Kimura

Medium sized (up to 20 cm) marine fishes. Body deep, orbicular and strongly compressed. Head short, its length shorter than half of body depth; interorbital region and anterior part of head naked or head covered with scales. Mouth small, rear end of upper jaw not reaching vertical through anterior edge of eye; upper jaw not protrusible; jaws covered with bands of slender setiform or compressed teeth. Dorsal fin single or deeply notched before soft-rayed part, with V–IX spines and 19–38 soft rays; anal fin with III spines and 15–27 soft rays; pectoral fins rounded and usually shorter than head; caudal fin truncate or wedge shaped. Scales large and smooth, or small and ctenoid. Lateral line complete. **Color:** adults silvery, silvery blue-green, or yellowish silvery; frequently with vertical dark bars.



Remarks: occurring in various shallow water habitats including estuaries, harbors, and coral reefs. Marketed fresh but with small commercial importance.

Similar families occurring in the area: Drepaenidae – upper jaw greatly protrusible; pectoral fins elongate reaching posterior part of anal fin base. Chaetodontidae – dorsal fin with VI–XVII spines and 14–34 soft rays; anal fin with III–V spines and 15–24 soft rays. Monodactylidae – pelvic fins rudimentary or absent. Scatophagidae – dorsal fin notched or divided to base before soft rayed part, with XI or XII spines and 15–18 soft rays; anal fin with IV spines and 13–17 soft rays.

Ephippus orbis (Bloch, 1787)

Spadefish

D IX, 19–20; A III, 15–17; P_1 18–19; LL 39–43. Body orbicular, strongly compressed, head length less than half of body depth. Mouth small, upper jaw not reaching posteriorly vertical through anterior edge of eye; upper jaw not protrusible; jaws covered with bands of slender incisiform teeth. Preopercle distinctly serrate with a wide naked margin. Single dorsal fin with a deep notch before soft rayed part; pectoral fins shorter than head. Scales relatively large and smooth. Lateral line complete. **Color:** head and body silvery blue-green; 4 to 5 vertical dark bars frequently on body; fins dusky. **Size:** maximum size 20 cm. **Distribution:** tropical regions of the Indo-West Pacific from India to Indonesia, north to southern Japan. (K. Matsuura)

Ephippus orbis, KAUM–I. 16900, 11.5 cm SL
off Terengganu (KT), 6 Dec. 2008

Platax orbicularis (Forsskål, 1775)

Copper Batfish

D V, 34–39; A III, 25–29; P_1 16–18; LL 44–52. Body orbicular, strongly compressed. Snout short, dorsal contour somewhat concave in large adults. Five pores on each side of lower jaw. Tricuspid teeth on jaws; middle cusp larger than lateral cusps; no teeth on vomer or palatines. Caudal fin truncate. **Color:** body yellowish silver with 2 vertical black bands in adults; juvenile reddish brown with small white ocellii on body. **Size:** maximum length 50 cm. **Distribution:** Indo-West Pacific. **Remarks:** found on near reefs in adults. Juveniles appear in mangrove areas, mimic floating leaves.

(S. Kimura)

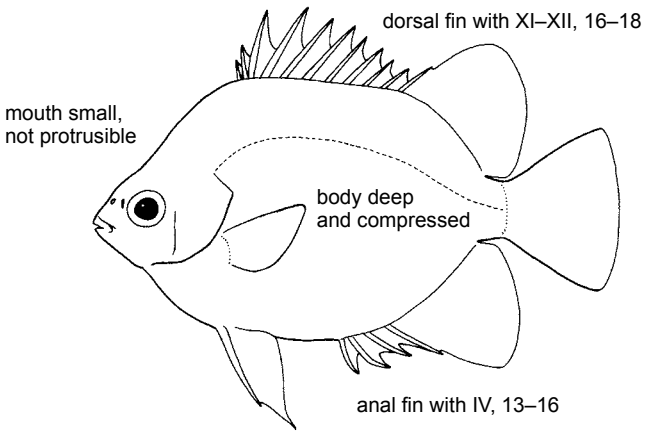
Platax orbicularis, KAUM–I. 17059, 20.1 cm SL
off Terengganu (KT), 24 Dec. 2008

SCATOPHAGIDAE

Scats

By Keiichi Matsuura and Mazlan Abdul Ghaffar

Body greatly compressed, reaching to 32 cm. Dorsal profile of head steeply ascending to dorsal fin origin; snout rounded. Mouth small, terminal; jaws not protrusible; villiform teeth in several rows on jaws. Eye relatively large, its diameter slightly shorter than snout length. Dorsal fin with XI or XII spines and 16–18 soft rays; first dorsal fin spine procumbent; a deep notch between spinous and soft portions of dorsal fin. Anal fin with IV spines and 13–16 soft rays. Pectoral fin with 16 or 17 soft rays. Caudal fin rounded in juveniles, truncate or slightly emarginated in adults. Head and body covered with small cycloid scales. **Color:** head and body greenish or silvery with many black spots or bars.



Remarks: occurring in estuaries, harbors, and lower reaches of rivers. Marketed fresh but with small commercial importance.

Similar families occurring in the area: Chaetodontidae – lacking a deep notch between spinous and soft parts of dorsal fin; jaws protrusible. Drepaenidae – anal fin with III spines; jaws protrusible; pectoral fins elongate, reaching beyond anal fin origin. Pomacanthidae – preopercle with a strong, backwardly pointed spine; no deep notch between spinous and soft parts of dorsal fin.

Scatophagus argus (Linnaeus, 1766)

Spotted Scat

D XI, 16–18; A IV, 14–15; P_1 16. Body quadrangular, strongly compressed. Dorsal profile of head steeply ascending to dorsal fin origin; snout rounded. Mouth small, terminal; jaws protrusible; villiform teeth in several rows on jaws. Teeth villiform, making several rows on jaws. Eye relatively large, its diameter slightly shorter than snout length. **Color:** ground color of head and body greenish; juveniles with a few large round blotches being almost equal to eye in size, or with 5–6 wide dark, vertical bars; adults with less distinct dark blotches or markings. **Size:** maximum size 35 cm. **Distribution:** tropical regions of Indo-West Pacific. **Remarks:** euryhaline fish commonly found in estuarine ecosystem extended to uppermost streams freshwater river tributaries. Named based on their feeding habit (Scat / human feces feeder = *Scato* + *phagus*). However, recent research finding denoted that they are omnivorous (subsisting mainly on plant material and detritus).

(K. Matsuura & M. A. Ghaffar)

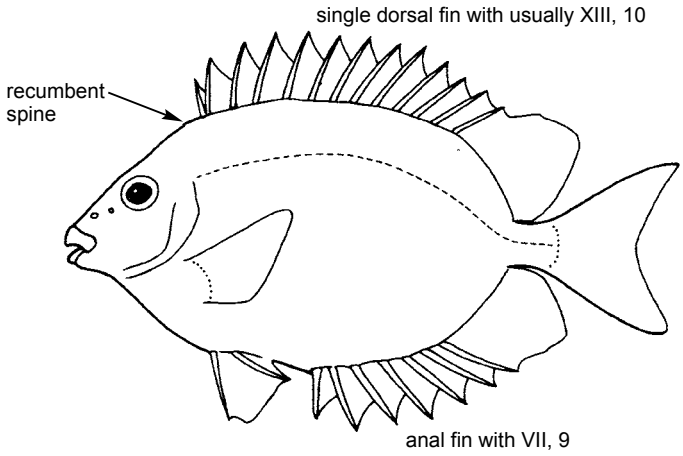
Scatophagus argus, KAUM–I. 17148, 9.3 cm SL
Setiu, 3 Jan. 2009

SIGANIDAE

Rabbitfishes

By Keiichi Matsuura, Seishi Kimura and Mizuki Matsunuma

Body oval, strongly compressed, reaching to 55 cm. Mouth small, terminal; jaws not protrusible; a single row of compressed, incisiform teeth on jaws. Dorsal fin with XIII spines and 10 soft rays, preceded by embedded, recumbent spine. Anal fin with VII spines and 9 soft rays. Pelvic fins with an inner and outer spines and separated 3 soft rays. Fin spines with a pair of grooves containing venom glands. Body covered with small, cycloid scales. **Color:** species inhabiting coral reefs having bright color with reticulations and markings, and other species with drab mottled pattern.



Remarks: dwelling on bottom in shallow coastal waters. Some species found in coral reefs and others in mangroves and seagrass beds. Primarily herbivorous. Caught by bottom trawlers, traps, set nets and by spear. Marketed fresh.

Similar families occurring in the area: Acanthuridae and Chaetodontidae – I spine and 5 soft rays in pelvic fins.

Siganus fuscescens (Houttuyn, 1782)

Mottled Spinefoot

D XIII, 10; A VII, 9; P_1 15–17. Body oval, relatively slender, its depth 2.3–2.9 in SL. Last anal-fin spine 1.3–1.5 in longest anal-fin spine. Soft parts of dorsal and anal fins low, longest dorsal-fin ray 0.5–1 times in longest dorsal-fin spine. Caudal fin slightly concave in individuals smaller than 10 cm SL, and becoming more concave with growth. **Color:** greatly variable, but body ground color olive green or light brown on sides and back, silvery on ventral half; many small light blue spots scattered on head and body. **Size:** maximum size 40 cm, commonly to 25 cm. **Distribution:** western coast of Malay Peninsula and West Pacific from Thailand eastward to New Caledonia, northward to the Ryukyu Islands, and southward to northern Australia. (K. Matsuura)

Siganus fuscescens, KAUM–I. 16844, 18.7 cm SL
off Terengganu (KT), 5 Dec. 2008

Siganus fuscescens, UMTF 1104 (KAUM–I. 16375), 9.3 cm SL
Dungun, 23 Sept. 2008

Siganus guttatus (Bloch, 1787)

Orangespotted Spinefoot

D XIII, 10; A VII, 9; P_1 15–17. Body oval, strongly compressed, its depth 1.8–2.3 in SL. Snout short, dorsal profile of head steep anteriorly, somewhat concave above eye. Fifth to eighth dorsal-fin spine longest. Last anal-fin spine longest, longer than longest dorsal-fin spine. Caudal fin emarginate but moderately forked in large adults. Scales minute. **Color:** many large to medium-sized orange to bronze spots scattered laterally on body with a bright yellow spot at base of last few dorsal-fin rays. **Size:** maximum length about 40 cm, commonly to 25 cm. **Distribution:** Andaman Sea and western Pacific. **Remarks:** inhabits shallow coastal waters, often in brackish waters especially sea grass and mangrove areas. Marketed fresh. (S. Kimura)

Siganus guttatus, KAUM–I. 17027, 16.7 cm SL
off Terengganu (KT), 16 Dec. 2008

Siganus javus (Linnaeus, 1766)

Streaked Spinefoot

D XIII, 10; A VII, 9; P_1 15–17. Body relatively deep, its depth 2.0–2.3 in SL. Last dorsal fin spine 1.2–1.6 in fourth to sixth spine. Except for short first spine, all anal-fin spines similar in length. Soft parts of dorsal and anal fins moderately high, longest anal-fin ray subequal to longest anal-fin spine. Caudal fin slightly concave. **Color:** dark bronze on dorsal half, becoming paler ventrally; many gun-metal blue spots on head and dorsal half of body; silvery blue undulating lines on ventral half of body. **Size:** maximum size 50 cm, commonly to 30 cm. **Distribution:** Indo-West Pacific from the Persian Gulf through the Malay Peninsula eastward to Vanuatu, northward to the Philippines, and southward to northern Australia. (K. Matsuura)

Siganus javus, UMTF 1005 (KAUM–I. 16674), 9.5 cm SL
Kemaman, 21 Oct. 2008

Siganus punctatus (Schneider & Forster, 1801)

Goldspotted Spinefoot

D XIII, 10; A VII, 9; P_1 16–17. Body deep and compressed; its depth 1.9–2.3 in SL. Last dorsal fin spine 1.1–1.3 in fourth to seventh spine. Last anal-fin spine typically longest. Soft parts of dorsal and anal fins moderately high, longest dorsal-fin ray subequal to slightly shorter than longest dorsal-fin spine. Caudal fin emarginate in young; deeply forked with rounded tips in large adults. Scales minute. **Color:** head and body brown; numerous golden spots scattered on head, body, and caudal fin; a large deep brown blotch below origin of lateral line. **Size:** maximum size 45 cm. **Distribution:** eastern Indian Ocean and western Pacific. **Remarks:** inhabits shallow coastal waters at depths of 3–50 m. (M. Matsunuma)

Siganus punctatus, KAUM–I. 17083, 23.7 cm SL
off Terengganu (KT), 28 Dec. 2008

Siganus virgatus (Valenclennes, 1835)

Doublebarred Spinefoot

D XIII, 10; A VII, 9; P_1 16–17. Body oval, strongly compressed, its depth 1.8–2.3 in SL. Snout moderate, dorsal profile of head convex. Fifth to seventh dorsal-fin spine longest. Third or fourth anal-fin spine usually longest. Caudal fin emarginate. **Color:** a dark brown band running from nape through eye to chin; another from fourth to fifth dorsal-fin spine bases to pectoral-fin base; these dark bands containing light blue small spots and short lines; posterior to second band, orange to yellow dorsally with light blue spots, silver white ventrally. **Size:** maximum length about 33 cm, commonly 20 cm. **Distribution:** eastern Indian Ocean and western Pacific, from southern India to northern Australia, north to southern Japan. **Remarks:** inhabits shallow coastal waters, around coral reefs. Juveniles often enter mangrove areas.

(S. Kimura)

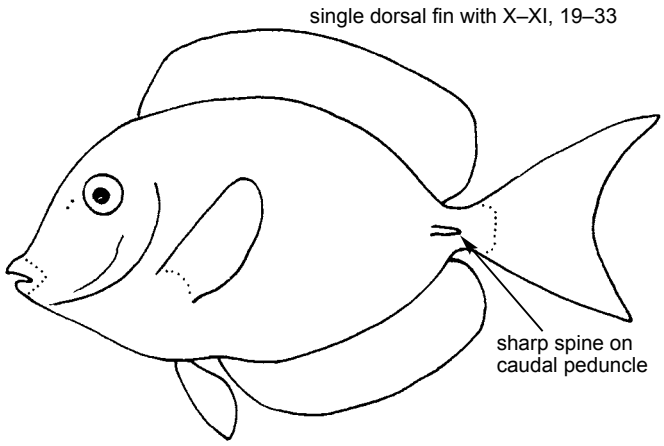
Siganus virgatus, KAUM–I. 17156, 16.3 cm SL
Redang Island, 4 Jan. 2009

Siganus virgatus, KAUM–I. 17026, 13.9 cm SL
off Terengganu (KT), 16 Dec. 2008

ACANTHURIDAE

Surgeonfishes

By Hisashi Imamura



High-bodied, compressed marine fishes (up to 75 cm) with very small ctenoid scales. Eye high on head. Mouth small, terminal; premaxilla not protractile. Small close-set teeth on jaws; no teeth on roof of mouth. Dorsal fin continuous with IV–IX spines and 19–33 soft rays. Anal fin with II or III spines and 18–28 soft rays. Caudal fin emarginated to lunate, with 16 principal rays. Pectoral fin with 14–18 rays. Pelvic fin with 1 spine and 3 or 5 soft rays. Side of caudal peduncle with sharp spine(s). **Color:** usually predominantly brown to gray, but some species very colorful.

Remarks: acanthurids occur on coral reefs or over rocky substrata, generally at depths less than 100 m. It is divisible into 3 subfamilies: the Acanthurinae, Prionurinae and Nasinae.

Similar family occurring in the area: Siganidae – pelvic fin with 2 spines and 3 soft rays between them; dorsal fin with 13 spines; anal fin with 7 spines. Zanclidae – snout protruding; premaxilla protractile; dorsal fin with a long filament from 3rd spine; no spine or keels on caudal peduncle.

Acanthurus mata (Cuvier, 1829)

Elongate Surgeonfish

D IX, 24–26; A III, 23–24; P_1 16–17; GR 13–15. Body deep, 2.1–2.5 in SL; elongate in adults; caudal peduncle slender. Mouth small; teeth fixed, denticulate on all of margin, with expanded incurved tips. Caudal fin deeply emarginate, the caudal concavity 5.5–8.0 in SL. Caudal peduncle with 1 folding spine. **Color:** body gray to brown with lengthwise blue lines on head and body; a small blackish spot at upper end of gill opening, preceded by a yellow band that continues in front of eye as a double band. Capable of changing body color to pale bluish overall. **Size:** maximum length 50 cm, commonly to 35 cm. **Distribution:** Indo-West Pacific, including the Red Sea, Andaman Sea, Ryukyu Islands and New Caledonia. **Remarks:** occurring on rocky and coral reefs.

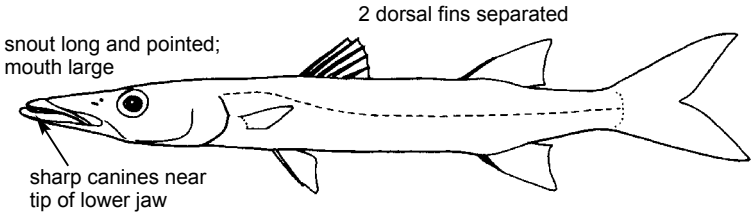
Acanthurus mata, KAUM–I. 17155, 17.7 cm SL
Redang Island, 4 Jan. 2009

SPHYRAENIDAE

Barracudas

By Keiichi Matsuura, Seishi Kimura and Mizuki Matsunuma

Body elongate, slightly compressed, reaching to 170 cm. Head long; snout pointed. Mouth horizontal, large; lower jaw projecting; large, sharp flattened or conical teeth on jaws; usually 1 or 2 canine teeth on tip of lower jaw. Gill rakers, if present, as short spinules, 1 or 2 at angle of gill arch. Two short dorsal fins, widely separated; the first with IV spines located above or slightly behind pelvic fins; the second with I spine and 9 soft rays. Anal fin with II spines and 7–9 soft rays. Caudal fin deeply forked. **Color:** gray to blue, or light brown dorsally, with silvery reflections, paler or white ventrally.



Remarks: carnivorous pike-like, pelagic to demersal fishes in tropical and temperate seas. Most members of Sphyraenidae found in coastal areas but also in the surface of open seas or down to depths of 100 m. Caught by handlines, gill nets, set nets or trawls. Marketed fresh, also dried-salted.

Similar families occurring in the area: Atherinidae and Mugilidae – having 2 separate dorsal fins and silver body, but having a short snout and small mouth without canine teeth.

Sphyraena forsteri Cuvier, 1829

Bigeye Barracuda

D V + I, 9; A II, 8; LL 112–133; GR 0. A medium-sized species. Body elongate, subcylindrical. Maxilla either not reaching anterior margin of eye, or to just below anterior margin. First gill arch with many platelets, each bearing distinct small spines. Caudal fin typically forked in all stages, without a pair of lobes at posterior margin; origin of pelvic fins before first dorsal-fin origin. **Color:** head and body silvery white, dark gray dorsally, without bars and stripes on body sides; a dusky blotch present behind axil of pectoral fins; upper part of second dorsal fin dusky yellow; caudal fin darkish. **Size:** maximum length about 65 cm, commonly to 50 cm. **Distribution:** widespread in the tropical and subtropical Indo-Pacific, from East Africa to the Marquesas Islands; north to southern Japan. **Remarks:** inhabits coral reefs. Caught mostly by handlines. (M. Matsunuma)

Sphyraena forsteri, KAUM–I. 17079, 26.1 cm SL
off Terengganu (KT), 27 Dec. 2008

Sphyraena putnamae, UMTF 1352 (KAUM–I. 16466), 21.4 cm SL
estuary near UMT, 29 Sept. 2008

Sphyraena putnamae Jordan & Seale, 1905

Sawtooth Barracuda

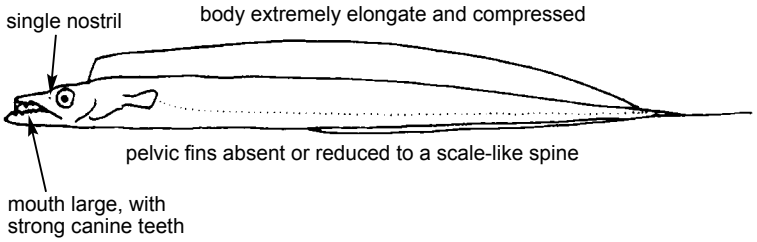
D V + I, 9; A II, 7–9; LLp 124–134; GR 0. Body elongate, subcylindrical. Snout long, pointed; posterior tip of maxilla just reaching to below anterior margin of eye. First gill arch without gill raker. Last rays of second dorsal and anal fin elongate in comparison with penultimate rays. Caudal fin deeply forked. Pelvic-fin origin anterior to origin of first dorsal fin. **Color:** head and body dark brown dorsally, silvery white ventrally. Many typical dark chevron markings crossing lateral line on body. Caudal fin blackish without white tips. **Size:** maximum length 90 cm. **Distribution:** widely distributed in Indo-West Pacific, from East Africa and Red Sea to Vanuatu and New Caledonia, north to southern Japan. **Remarks:** inhabits bays and turbid inner lagoons. Marketed fresh. (S. Kimura)

TRICHIURIDAE

Cutlassfishes

By Mizuki Matsunuma

Body remarkably elongate and compressed, ribbon-like, with a tapered tail or small forked caudal fin (up to over 2 m). A single nasal opening on each side of head. Mouth large, jaws not protractile, lower jaw extends anterior to upper jaw. Teeth extremely strong, fang-like in anterior part of upper jaw and sometimes in anterior part of lower jaw. Dorsal fin low and long, beginning shortly behind eye, its anterior spinous part shorter than posterior soft part, 2 parts continous mostly or interrupted by a shallow notch sometimes. Anal fin low or reduced to short spinules. Caudal fin either small and forked or absent. Pectoral fins short and low in position. Pelvic fins reduced to a scale-like spine (plus a rudimentary ray in *Benthodesmus*) or completely absent (in *Trichiurus* and *Lepturacanthus*). Preanal length less than 1/2 standard length. Lateral line single. Scales absent. **Color:** body generally metallic silvery or more or less brown in *Aphanopus* and *Lepidopus*; pectoral fin semi transparent; dorsal and anal fins sometimes tinged with pale yellow. Usually no distinct marks or blotches on body.



Remarks: benthopelagic on continental shelves and slopes and underwater rises, from the surface to a depth of about 2 000 m, found in tropical to warm-temperate waters. Excellent eating, although the flesh is scanty. Marketed mostly fresh or salted, sometimes also frozen.

Similar families occurring in the area: Gempylidae – double nostrils on each side of head; 2 dorsal fins.

Trichiurus lepturus Linnaeus, 1758

Largehead Hairtail

D III, 124–138; A II, 105–108; P_1 10–12. Body extremely elongate and strongly compressed, ribbon-like, tapering to a point posteriorly. Eye large; mouth large, with a dermal process at tip of each jaw; 2 or 3 pairs of enlarged fangs with barbs near tip of upper jaw, and another pair near tip of lower jaw, a single series of sharp, compressed lateral teeth in both jaws, minute teeth on palatines. Lower hind margin of gill cover concave. Dorsal fin high and long, without a notch between spinous and soft parts; pectoral fin rather short, but extend beyond lateral line; caudal and pelvic fins absent. No scales on body. **Color:** fresh specimens steel blue with silvery reflection, pectoral fins semi-transparent, other fins sometimes tinged with pale yellow hyaline in fresh, especially strong yellow just after death. **Size:** maximum length about 1.8 m. **Distribution:** considered as a cosmopolitan species of tropical and temperate waters. **Remarks:** basically offshore waters, and occurs in somewhat deeper coastal area, but often collected even in mangrove or estuary basin and to a depth of ca. 150 m depth.

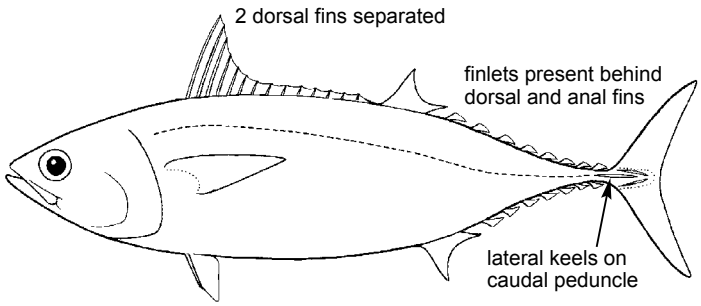
Trichiurus lepturus, KAUM–I. 16971, 51.0 cm TL
off Terengganu (KT), 11 Dec. 2008

Trichiurus lepturus, KAUM–I. 16972, 43.0 cm TL
off Terengganu (KT), 11 Dec. 2008

SCOMBRIDAE

Mackerels and Tunas

By Seishi Kimura and Mizuki Matsunuma



Medium to large sized marine fishes, maximum size over 5 m. Body relatively elongate and fusiform, moderately compressed. Snout pointed, upper jaw not protrusible. Caudal peduncle slender with 2 or more lateral keels on each side. Two dorsal fins, the first usually short based with IX–XXVII spines, separated from or apparently contiguous to the second. Finlets (5–12 each) present behind second dorsal and anal fins. Caudal fin deeply forked. Pectoral fins inserted high on body. Pelvic fins relatively small with I spine and 5 soft rays, located below pectoral fins. Body covered with small to medium cycloid scales or a corselet developed on area behind head and pectoral fins. Lateral line present. **Color:** body dark blue or dark green dorsally, silvery white ventrally. Usually dark vertical or longitudinal bands and/or spots on sides.

Remarks: typical pelagic fishes; smaller fishes usually inhabits inshore waters; large tunas, *Thunnus*, transoceanic migrants. Important food fishes.

Similar families occurring in the area: Carangidae – dorsal-fin spines III–VIII; II detached anal-fin spines; scutes developed along posterior part of lateral line in most species. Gempylidae – body dark brown to brown dorsally without distinct marks or blotches; no keels on caudal peduncle except *Lepidocybium*.

Auxis rochei rochei (Risso, 1810)

Bullet Tuna

D X–XI + 10–12; A 12–13; P_1 22–23; GR 43–48. Body robust, elongate and rounded. Teeth small and conical, in a single series. Second dorsal fin followed by 8 finlets; anal fin followed by 7 finlets; pectoral fin short, not reaching vertical line from anterior margin of scaleless area above corselet; a large, single-pointed flap (interpelvic process) between pelvic fins. Body naked except for corselet; corselet well developed posteriorly, extending beyond vertical through second dorsal fin origin. A strong central keel on each side of caudal-fin base between 2 smaller keels. **Color:** back bluish, turning to deep purple or almost black on head; scaleless area with pattern of 15 or more fairly broad, nearly vertical dark bars; belly white; pectoral and pelvic fins purple. **Size:** maximum 40 cm, commonly to 35 cm FL. **Distribution:** a cosmopolitan species of tropical and temperate waters except for the eastern Pacific. **Remarks:** caught with seines, lift nets, pole-and-line, and by trolling. Marketed fresh. (M. Matsunuma)

Auxis rochei rochei, KAUM–I. 17227, 24.8 cm SL
off Terengganu (KT), 12 Jan. 2009

Auxis rochei rochei, UMTF 1899, 23.0 cm SL
off Terengganu (KT), 11 Jan. 2009

Euthynnus affinis (Cantor, 1849)

Kawakawa

D XI–XIV + 12–13; A 12–14; P_1 25–27; GR 31–34; V 39. Body robust and fusiform, somewhat elongate. Jaws with small conical teeth in a single series; no vomerine teeth. Caudal peduncle with a large lateral keel and caudal-fin base with 2 small keels. Two dorsal fins separated by only a narrow interspace. Eight to 10 dorsal and 6–8 anal finlets. Pectoral fins short; 2 flaps between pelvic fins (interpelvic process). Body naked except for corselet and lateral line. **Color:** head and body dark blue dorsally, silvery-white ventrally. Dark blue oblique stripes dorsolaterally on posterior body. Several black spots between pectoral and pelvic fins. **Size:** maximum length about 100 cm, commonly to 60 cm FL. **Distribution:** widely distributed in warm waters of Indo-Pacific. **Remarks:** inhabits coastal waters and around offshore islands. Marketed fresh, dried, salted, and smoked.

(S. Kimura)

Euthynnus affinis, UMTF 1886, 29.3 cm SL
off Terengganu (KT), 25 Dec. 2008

Euthynnus affinis, KAUM–I. 17068, 28.3 cm SL
off Terengganu (KT), 26 Dec. 2008

Rastrelliger kanagurta (Cuvier, 1816)

Indian Mackerel

D VIII–XI + 11–13; A I, 11–12; P_1 19–22; LGR 30–46. Body slightly deep, compressed. Head longer than body depth. Maxilla covered by lacrimal bone. Adipose eyelid well developed. Gill rakers very long, visible when mouth is opened. Caudal fin base with 2 small lateral keels. Two dorsal fins widely separated. Anal fin spine rudimentary. Five or six dorsal and anal finlets. Pectoral fins short; a small single flap between pelvic fins (interpelvic process). Body covered with small scales. **Color:** head and body bluish green dorsally, silvery-white ventrally. One or two rows of small, dark spots dorsolaterally on body. First dorsal, caudal and pectoral fins yellowish. **Size:** maximum length 35 cm, commonly to 25 cm FL. **Distribution:** widely distributed in Indo-West Pacific, from South Africa and Red Sea to Samoa, north to southern Japan. **Remarks:** found in coastal waters. Feeds on macrozooplanktons. Marketed fresh, dried, salted, and smoked. (S. Kimura)

Rastrelliger kanagurta, KAUM–I. 17002, 13.8 cm SL
off Terengganu (KT), 14 Dec. 2008

Rastrelliger kanagurta, UMTF 1885, 15.8 cm SL
off Terengganu (KT), 25 Dec. 2008

Scomberomorus commerson (Lacepède, 1800)

Narrowbarred Spanish Mackerel

D XV–XVIII + 15–20; A 16–21; P_1 21–24; GR 0–2 + 1–8 = 1–8, V 19–20 + 23–27 = 42–46. Body elongate, strongly compressed. Upper jaw reaching to or extending slightly beyond posterior margin of eye. Teeth on jaws strong with finely serrated edge. Caudal peduncle with a large lateral keel and caudal-fin base with 2 small keels. Two dorsal fins scarcely separated. Eight to 11 dorsal and 7–12 anal finlets. Pectoral fins short, pointed. Body covered with small scales. A single lateral line abruptly bent downward below posterior end of dorsal-fin base. **Color:** head and body bluish silver dorsally, silvery-white ventrally. Many vertical dark bars on body. **Size:** maximum length 220 cm, commonly to 90 cm FL. **Distribution:** widely distributed in Indo-West Pacific, from South Africa and Red Sea to Fiji, north to Japan. **Remarks:** found in coastal waters. Feeds on fishes. Marketed mainly fresh. (S. Kimura)

Scomberomorus commerson, KAUM–I. 16943, 15.0 cm SL
off Terengganu (KT), 11 Dec. 2008

Scomberomorus commerson, UMTF 1893, 14.4 cm SL
off Terengganu (KT), 11 Jan. 2009

Thunnus obesus (Lowe, 1839)

Bigeye Tuna

D XIV–XV + 13–15; A 13–15; P_1 32–35; GR 26–28. Body robust, fusiform, slightly compressed. Two dorsal fins, separated only by a narrow interspace, with 8–10 finlets; pectoral fins very long, its tip reaching to extending beyond vertical through second dorsal fin origin; 2 flaps (interpelvic process) between pelvic fins; anal fin followed by 7–10 finlets. Very small scales on body; corselet of larger and thicker scales developed, but not very distinct. Caudal peduncle with a strong lateral keel between 2 smaller keels. Ventral surface of liver striated. **Color:** back metallic dark blue, lower sides and belly whitish; a lateral iridescent blue band runs along sides in live specimens; first dorsal fin deep yellow, second dorsal and anal fins light yellow, finlets bright yellow edged with black. **Size:** maximum length over 200 cm, commonly to 180 cm FL. **Distribution:** worldwide in tropical and subtropical waters. **Remarks:** a pelagic oceanic species, taken from the surface to depths of 250 m. Marketed fresh. (M. Matsunuma)

Thunnus obesus, UMTF 1901, 26.2 cm SL
off Terengganu (KT), 12 Jan. 2009

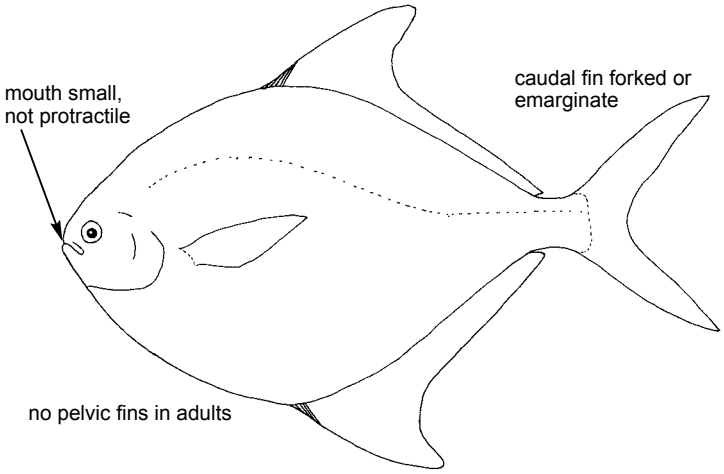
Thunnus obesus, KAUM–I. 17228, 26.0 cm SL
off Terengganu (KT), 12 Jan. 2009

STROMATEIDAE

Butterfishes

By Seishi Kimura

Medium sized (up to 60 cm) marine fishes. Body strongly deep and compressed. Snout short, blunt. Mouth small, terminal or slightly inferior, not protractile. Teeth on jaws uniserial, small and flattened with 3 minute cusps. No teeth on vomer or palatines. Gill membranes joined to breast (*Pampus*) or not usually connected to isthmus (*Peprilus* and *Stromateus*). Branchiostegal rays 5 or 6. Caudal peduncle short and compressed with no scutes or keels. Dorsal fin single, anal fin similar in shape to dorsal fin. Caudal fin forked or emarginate. Pectoral fins long. Pelvic fins absent in adults. Body covered with small cycloid scales. Lateral line single dorsolaterally on body. **Color:** body silvery white, dark brownish in some species.



Remarks: coastal fishes, feeds mainly on zooplanktons. Three genera, *Pampus* (Indo-West Pacific), *Peprilus* (western Atlantic and eastern Pacific), and *Stromateus* (Atlantic and eastern Pacific). Important food fishes.

Similar families occurring in the area: Carangidae – *Parastromateus niger*, very similar in shape to *Pampus*, having small scutes along posterior part of lateral line; gill membrane not united to isthmus. Centrophidae – pelvic fins present; 7 branchiostegals. Nomeidae – 2 dorsal fins; pelvic fins present.

Pampus argenteus (Euphrasen, 1788)

Silver Pomfret

D V–X + 37–43; A V–X + 34–43; P_1 24–27; GR 10–13; V 34–37. Body oval, strongly compressed. Gill opening short, slit-like. Gill rakers very small, vestigial. Anterior dorosal and anal fins falcate. Caudal fin deeply forked, lower lobe often extended. Sensory canal area on temporal extending backward along lateral line. **Color:** head and body dark brownish silver dorsally, silvery white ventrally. Anal and caudal fins yellowish. **Size:** maximum length 60 cm. **Distribution:** Indo-West Pacific, from Persian Gulf to Indonesia. **Remarks:** found in coastal waters over muddy bottom. Marketed fresh.

Pampus argenteus, KAUM–I. 17066, 15.6 cm SL
off Terengganu (KT), 26 Dec. 2008

Pampus chinensis (Euphrasen, 1788)

Chinese Silver Pomfret

D 43–50; A 39–42; P_1 24–27; GR 11–14; V 33. Body oval, deep, strongly compressed. Gill opening short, slit-like. Gill rakers slender, needle-like. Anterior dorsal and anal fins not falcate. Caudal fin emarginate. Sensory canal area on temporal extending backward along lateral line. **Color:** body grayish brown, abdomen paler. **Size:** maximum length 40 cm SL. **Distribution:** Indo-West Pacific, from Persian Gulf to eastern Indonesia. **Remarks:** found in inshore waters over muddy bottom. Marketed fresh.

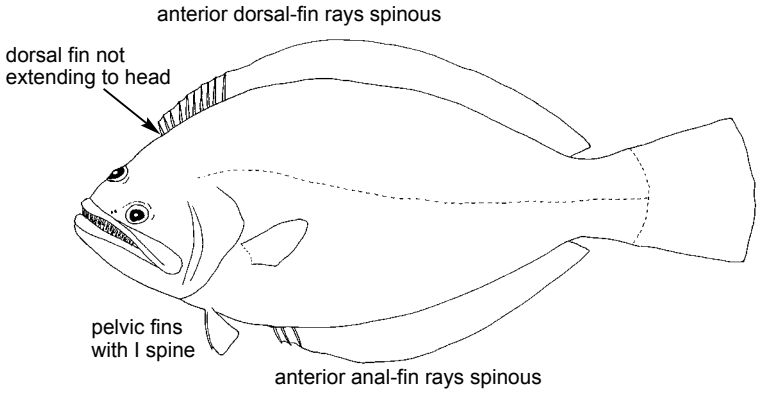
Pampus chinensis, KAUM–I. 17115, 7.1 cm SL
off Terengganu (KT), 31 Dec. 2008

Pampus chinensis, KAUM–I. 17298, 10.1 cm SL
off Terengganu (KT), 20 Jan. 2009

PSETTODIDAE

Spiny Turbots

By Hisashi Imamura



Marine flatfishes in middle size, maximum size ca. 80 cm. Body oval, caudal peduncle deeper than its length. Eyes on right or left side of head. Mouth large, extending well beyond posterior margin of lower eye. Teeth on jaws large canines, many with barbed tips; vomer and palatine with teeth. Margin of preopercle distinct, not covered with skin. Dorsal fin origin well posterior to upper eye. Anterior rays of dorsal and anal fins spinous. Pelvic fin with 1 spine and 5 soft rays, nearly symmetrically placed on each sides of midventral line. Caudal fin with 15 branched rays, separated from dorsal and anal fins. Lateral line on both sides of body, only slightly curved above pectoral fin. Weak ctenoid scales covering both sides of body. Vertebrae usually 10 + 14=24. **Color:** ocular side brownish, blind side pale brown.

Remarks: single genus, *Psettodes*, with one species (*P. erumei*) from Indo-West Pacific and two (*P. belcheri* Bennett, 1831 and *P. bennettii* Steindachner, 1870) from western Africa. Occurring in coastal waters. Food fish.

Similar family occurring in the area: Psettodidae differs from all other flatfish families in having dorsal fin origin well posterior to upper eye, and anterior rays of dorsal and anal fin spinous. Citharidae – lateral line highly arched above pectoral fin. Paralichthyidae – pelvic fin without spine; lateral line highly arched above pectoral fin. Bothidae – pelvic fin without spine; origin of pelvic fin on eyed side anterior to that on blind side; lateral line highly arched above pectoral fin. Samaridae – pelvic fin on blind side absent. Soleidae – pelvic fin without spine; origin of pelvic fin on eyed side anterior to that on blind side. Cynoglossidae – caudal fin continuous with dorsal and anal fins.

Psettodes erumei (Bloch & Schneider, 1801)

Indian Halibut

Psettodes erumei, KAUM–I. 16836, 10.6 cm SL
off Terengganu (KT), 5 Dec. 2008

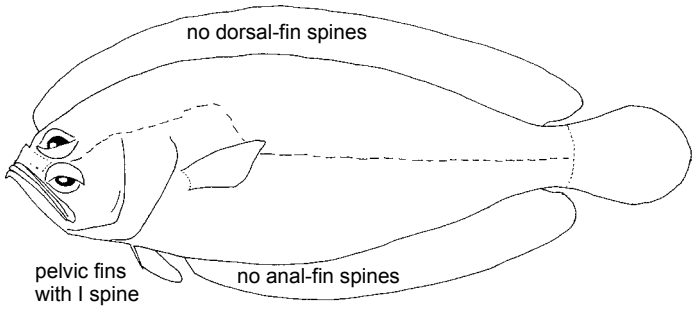
D IX–XI, 38–45; A I, 33–43; P_1 14–16; P_2 I, 5; LL 61–77. Body oval, strongly compressed. Eyes on right or left side of head. Mouth large, extending well beyond posterior margin of lower eye. Teeth on jaws large canines; vomer and palatine with small conical teeth. Anterior rays of dorsal and anal fin spinous. Caudal fin separated from dorsal and anal fins. Lateral line on both sides of body, only slightly curved above pectoral fin. Scales on small, weakly ctenoid on both sides of body. **Color:** eyed side generally brownish or grayish, sometimes with 4 or 5 broad dark cross bands; dorsal, anal, posterior portion of caudal in darker; blind side pale brown. **Size:** maximum total length about 60 cm, most commonly 20–40 cm. **Distribution:** Indo-West Pacific, from South Africa and Red Sea to northern Australia, north to Taiwan. **Remarks:** found on sandy and muddy bottoms. Marketed fresh.

CITHARIDAE

Largescale Flounders

By Hisashi Imamura

Marine flatfishes in small size, maximum size less than 40 cm. Body elliptical strongly compressed. Eyes on left side of head in some species, on right side in others. Mouth moderate or somewhat large. Small and slender teeth on jaws. Margin of preopercle distinct, not covered with skin. Dorsal fin origin anterior to eyes. Anterior rays of dorsal and anal fins not spinous. Pelvic fin with 1 spine and 5 soft rays, fin bases on both sides short. Caudal fin with 13–15 branched rays, separated from dorsal and anal fins. Lateral line usually present on both sides of body, with high arch above pectoral fin. Body scales large; ctenoid scales on eyed side, weakly ctenoid or cycloid scales on blind side. **Color:** eyed side with some spots on body and fins; blind side whitish.



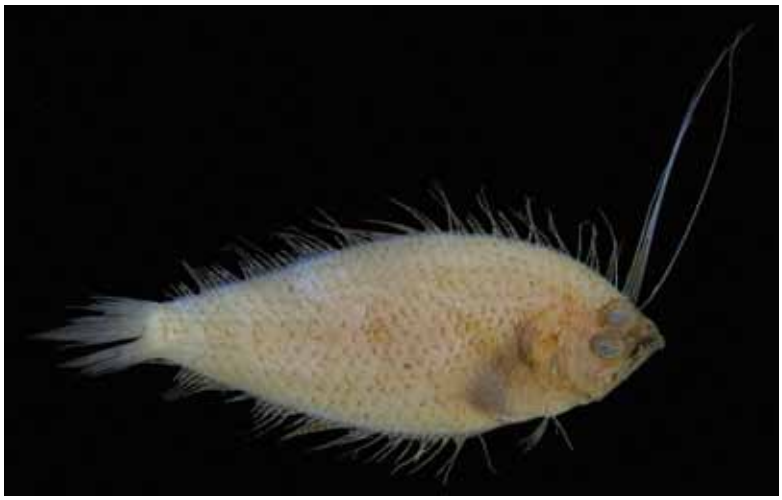
Remarks: five genera, *Brachypleura*, *Citharoides*, *Citharus*, *Lepidoblepharon* and *Paracitharus*, are known from Indo-West Pacific. Usually found on sandy or muddy-sandy bottoms. Food fish.

Similar family occurring in the area: Psettodidae – dorsal fin origin well posterior to upper eye; anterior rays of dorsal and anal fin spinous; lateral line slightly curved above pectoral fin. Paralichthyidae – pelvic fin without spine. Bothidae – pelvic fin without spine; origin of pelvic fin on eyed side anterior to that on blind side. Samaridae – pelvic fin on blind side absent. Soleidae – pelvic fin without spine. Cynoglossidae – caudal fin continuous with dorsal and anal fins.

Brachypleura novaezeelandiae (Günther, 1862)

Widemouth Largescale Flatfish

D 65–77; A 41–50; P_1 11–13 (eyed side), 10–13 (blind side); P2 I, 5; LL 28–33; GR 5–6 + 7–10. Body elliptical, strongly compressed. Both eyes on right side of body. Head 2.2–2.7 in SL. Mouth large, arched, reaching to or beyond center of lower eye, but not reaching to posterior margin of lower eye. Some anterior rays of dorsal fin elongate in males, not in females. Caudal fin rounded posteriorly. Lateral line usually present on both sides of body, with high arch above pectoral fin. Body scales large; ctenoid scales on eyed side, weakly ctenoid or cycloid scales on blind side. **Color:** eyed side of body yellowish or yellowish brown; dorsal, anal and caudal fins paler than body, with dark spots; blind side of body whitish. **Size:** maximum total length 14 cm. **Distribution:** Indo-West Pacific, including Maldives, Andaman Sea, and northern area of South China Sea. **Remarks:** found on sandy and muddy bottoms, at depths of 18 to 73 m. Marketed fresh.



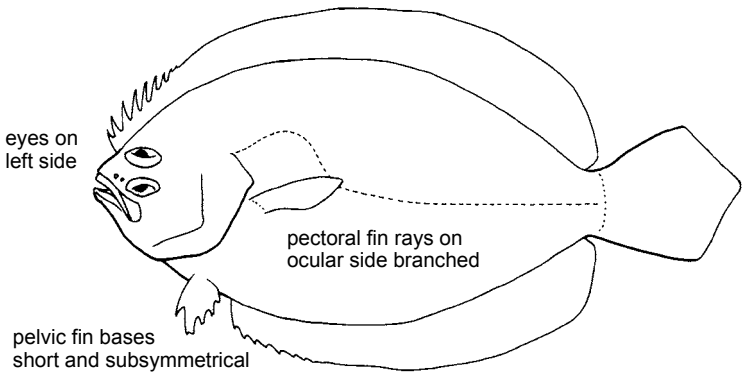
Brachypleura novaezeelandiae, KAUM–I. 16828, male, 8.6 cm SL
off Terengganu (KT), 5 Dec. 2008

Brachypleura novaezeelandiae, KAUM–I. 16830, female, 8.2 cm SL
off Terengganu (KT), 5 Dec. 2008

PARALICHTHYIDAE

Sand Flounders

By Hisashi Imamura



Body elliptical to oval, strongly compressed, reaching to 40 cm. Head large, 3.0–4.4 in SL. Mouth rather large. Teeth uniserial on both jaws. Eyes on left side of head, separated by a bony ridge. Margin of preopercle distinct, not covered with skin. Dorsal fin origin anterior to eyes. Anterior rays of dorsal and anal fins not spinous. Pelvic fin without spines; pelvic fin bases on both sides short, subequal and subsymmetrical in position. Caudal fin separated from dorsal and anal fins. Lateral line equally developed on both sides of body, with high arch above pectoral fin and supratemporal branch, running upward to anterior part of dorsal fin. Body scales large; ctenoid scales on eyed side, weakly ctenoid or cycloid scales on blind side. **Color:** body brownish or light greenish with dark spots or rings.

Remarks: most species known from shallow sandy and muddy bottoms of continental shelf; some species from brackish waters near river mouths.

Similar family occurring in the area: Psettodidae – dorsal fin origin well posterior to upper eye; anterior rays of dorsal and anal fin spinous; pelvic fin with one spine; lateral line slightly curved above pectoral fin. Citharidae – pelvic fin with one spine. Bothidae – origin of pelvic fin on eyed side anterior to that on blind side. Samaridae – pelvic fin on blind side absent. Soleidae – eyes on left side of head. Cynoglossidae – caudal fin continuous with dorsal and anal fins.

Pseudorhombus arsius (Hamilton, 1822)

Largetooth Flounder

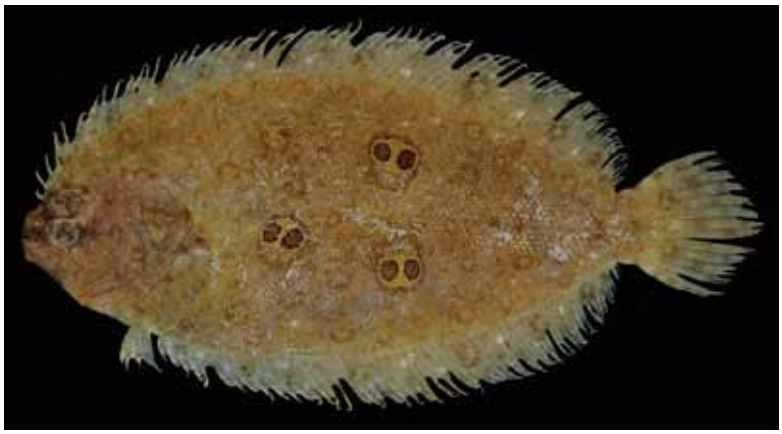
D 71–84; A 53–62; P_I 12–13 (eyed side); LL 69–81. Body oval. Head 3.3–3.6 in SL; upper profile of head with a slight notch anterior to upper eye. Upper jaw extending to below posterior margin of lower eye. Several pairs of moderately large canine teeth in anterior part of both jaws. Scales ctenoid on eyed side, cycloid on blind side. **Color:** body greenish or light brown; a dark blotch at junction of straight and curved parts of lateral line; a smaller blotch halfway to caudal fin base. **Size:** maximum standard length 45 cm, commonly to 30 cm. **Distribution:** widespread in Indo-West Pacific, from eastern coast of Africa eastward to Australia and Fiji. **Remarks:** found from shallow muddy-sandy or muddy bottoms from coastal areas to river mouths.

Pseudorhombus arsius, UMTF 1516 (KAUM–I. 16720), 14.6 cm SL
Setiu, 29 Oct. 2008

Pseudorhombus dupliciocellatus Regan, 1905

Ocellated Flounder

D 72–78; A 59–63; P_1 11–12 (eyed side); LL 73–84. Body oval. Head 3.4–3.7 in SL; upper profile of head with a strong notch in front of upper eye. Upper jaw extending to below or beyond middle of lower eye. Both jaws with small teeth, lacking strong canines. Scales ctenoid on eyed side, cycloid on blind side. **Color:** body brownish, with 1 or 2 pairs of distinct double ocelli above and below lateral line. **Size:** maximum standard length 40 cm, commonly to 20–30 cm. **Distribution:** widespread in Indo-West Pacific, from Nicobar Islands to Japan and to Australia. **Remarks:** inhabits shallow waters on mud and sand bottoms of continental shelf, at depths of 50–150 m.

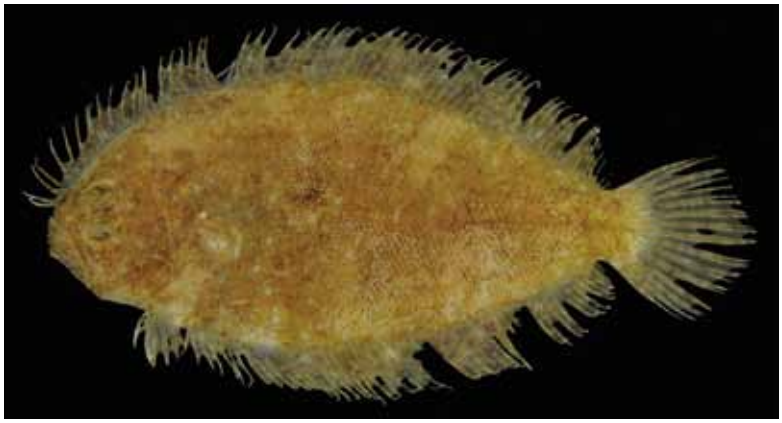


Pseudorhombus dupliciocellatus, KAUM–I. 17278, 26.0 cm SL
off Terengganu (KT), 18 Jan. 2009

Pseudorhombus javanicus (Bleeker, 1853)

Javan Flounder

D 67–76; A 51–56; P_1 11–12 (eyed side); LL 66–74. Body oval. Head 3.2–3.6 in SL; upper profile of head without notch anterior to upper eye. Upper jaw extending to below middle of lower eye. Teeth on both jaws small, with slightly enlarged teeth anteriorly. Scales ctenoid on anterior part, and dorsal and ventral margins of body of eyed side; those on other areas of eyed side and blind side cycloid. **Color:** body brownish, with a distinct, large dark blotch at junction of straight and curved parts of lateral line, and a smaller blotch on middle of straight section of lateral line. **Size:** maximum standard length 35 cm, commonly to 20 cm. **Distribution:** Indo-West Pacific, from eastern coast of India eastward to western New Guinea and to southern China. **Remarks:** found from shallow waters on mud and sand bottoms of continental shelf.

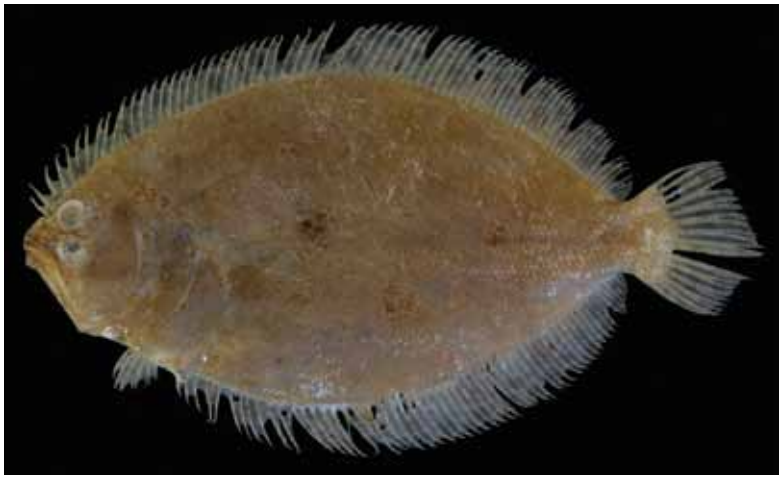


Pseudorhombus javanicus, KAUM–I. 17303, 12.7 cm SL
off Terengganu (KT), 20 Jan. 2009

Pseudorhombus malayanus Bleeker, 1865

Malayan Flounder

D 72–74; A 58–59; P_1 12–13 (eyed side); LL 70–78. Body deeply oval. Head 3.1–3.3 in SL; upper profile of head with a slight notch anterior to upper eye. Upper jaw extending to below posterior margin of lower eye. Teeth on upper jaw small and close-set laterally, and enlarged anteriorly; teeth on lower jaw stronger and more widely spaced than those on upper jaw. Scales ctenoid on both sides of body. **Color:** body brownish, with a small dark blotch at junction of straight and curved parts of lateral line. **Size:** maximum standard length 35 cm, commonly to 20 cm. **Distribution:** Indo-West Pacific, from Persian Gulf to Malay Archipelago and to Philippines. **Remarks:** inhabits shallow waters on mud and sand bottoms.

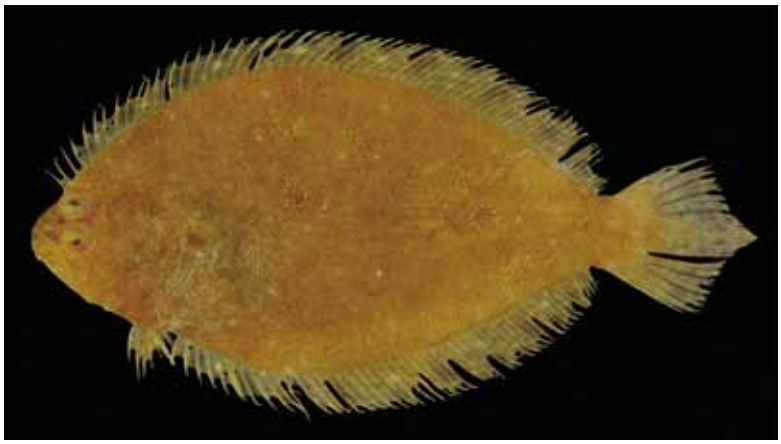


Pseudorhombus malayanus, KAUM–I. 17024, 16.6 cm SL
off Terengganu (KT), 16 Dec. 2008

Pseudorhombus neglectus Bleeker, 1865

Neglected Flounder

D 72–75; A 56–59; P_1 12–13 (eyed side); LL 77–79. Body elliptical. Head 3.5–3.6 in SL; upper profile of head without a distinct notch or with a slight notch anterior to upper eye. Upper jaw extending to below or beyond middle of lower eye. Teeth on upper jaw small, slightly enlarged anteriorly; teeth on lower jaw larger and more widely spaced than those on upper jaw. Scales ctenoid on eyed side, cycloid on blind side. **Color:** body pale brownish, with small ocelli at junction of straight and curved parts of lateral line, and another one near middle of straight section. **Size:** maximum standard length 25 cm. **Distribution:** known from eastern Indian Ocean to West Pacific. **Remarks:** found from shallow waters on mud and sand bottoms of continental shelf, at depths of 30–40 m.



Pseudorhombus neglectus, KAUM–I. 16979, 16.3 cm SL
off Terengganu (KT), 12 Dec. 2008

Pseudorhombus pentophthalmus, KAUM–I. 16952, 8.8 cm SL
off Terengganu (KT), 11 Dec. 2008

Pseudorhombus pentophthalmus Günther, 1862

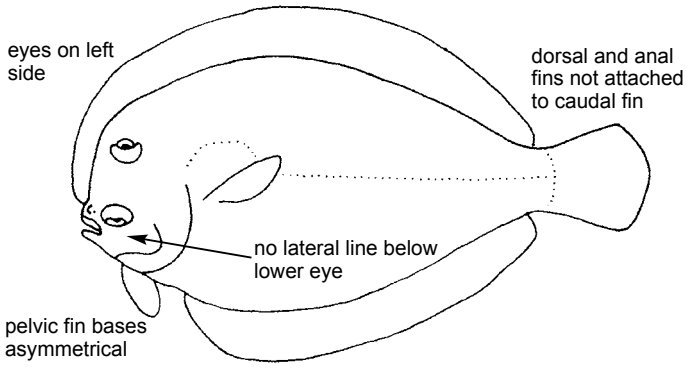
Fivespot Flounder

D 68–76; A 53–57; P_1 11–12 (eyed side); LL 62–75. Body oval. Head 3.2–3.4 in SL; upper profile of head with a distinct notch anterior to upper eye. Mouth extending to below or a little beyond middle of lower eye. Teeth on upper jaw small and close-set; teeth on lower jaw moderately larger and more widely spaced than those on upper jaw. Scales ctenoid on eyed side, cycloid on blind side. **Color:** body pale brownish, with 2 ocelli above and below lateral line and 1 ocellus on posterior third of straight section of lateral line. **Size:** maximum standard length 18 cm, commonly 12 cm. **Distribution:** West Pacific, from Java Sea through Indo-China, north to northern Japan. **Remarks:** found from fairly deep waters on mud and sand bottoms of continental shelf, at depths of 50–150 m.

BOTHIDAE

Lefteye Flounders

By Hisashi Imamura



Marine flatfishes. Body elliptical to oval, strongly compressed, reaching to 88 cm. Mouth small to large. Eyes on left side of head. Interorbital width variable; males of some species with wider interorbit than female. Margin of preopercle distinct, not covered with skin. Dorsal fin origin above or ahead of anterior margin of upper eye. Anterior rays of dorsal and anal fins not spinous. Pelvic fin without spines; pelvic fin of eyed side on midventral line with origin anterior to origin of pelvic fin of blind side; pelvic fin of blind side above midventral line. Caudal fin separated from dorsal and anal fins. Lateral line on eyed side highly arched above pectoral fin; lateral line absent below lower eye. **Color:** eyed side of body brownish, usually with spots, blotches, or rings; blind side of body whitish, but dark colored in some species.

Remarks: usually found on sandy and muddy bottoms, but some species on rocky or coral reefs. Feeds on small fishes, crustaceans, gastropods and other benthic animals. Twenty genera. Food fish.

Similar family occurring in the area: Psettodidae – dorsal fin origin well posterior to upper eye; anterior rays of dorsal and anal fin spinous; pelvic fin with one spine; lateral line slightly curved above pectoral fin. Citharidae – pelvic fin with one spine. Paralichthyidae – pelvic fin bases on both sides short, subequal and subsymmetrical in position. Samaridae – pelvic fin on blind side absent. Soleidae – eyes on left side of head. Cynoglossidae – caudal fin continuous with dorsal and anal fins.

Arnoglossus macrolophus Alcock, 1889

Largecrested Lefteye Flounder

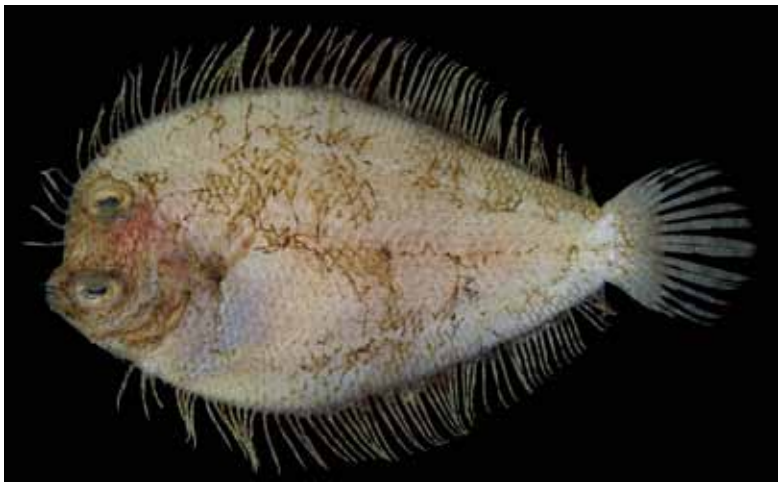
D 91–98; A 70–76; P_1 12–14 (eyed side); LL 56–62. Body elliptical. Head 3.6–4.2 in SL; upper profile of head with a distinct notch anterior to upper eye. Upper jaw extending slightly beyond anterior margin of lower eye. Teeth on both jaws small, closely spaced. First 4 or 5 dorsal fin rays greatly elongate in males, only slightly elongate in females. **Color:** body light brownish, with a dark spot at base of posterior parts of dorsal and anal fins; a dark spot on distal portion of pectoral fin. **Size:** maximum total length 13 cm. **Distribution:** northern Indian Ocean and West Pacific, including southern Japan, Taiwan, South China Sea and Indo-Australian Archipelago.

Arnoglossus macrolophus, KAUM–I. 17145, 7.9 cm SL off Terengganu (KT), 1 Jan. 2009

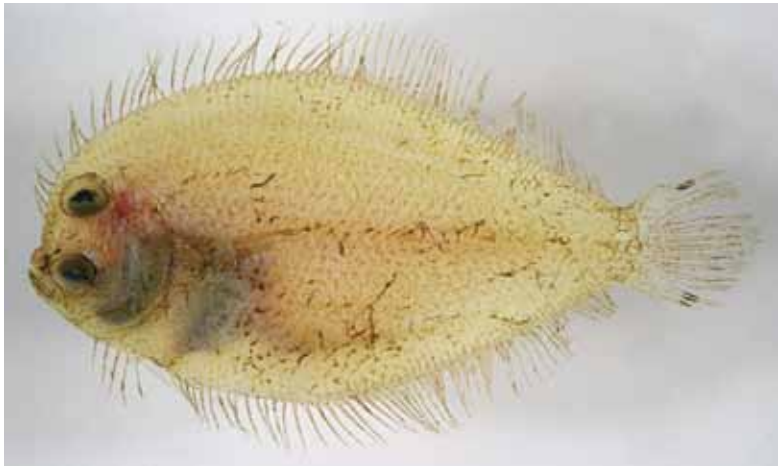
Engyprosopon grandisquama (Temminck & Schlegel, 1846)

Largescale Flounder

D 80–91; A 57–69; P_1 10–13 (eyed side); LL 41–48. Body oval. Head 3.5–4.2 in SL; upper profile of head with a slight concavity anterior to upper margin of lower eye. Single strong rostral spine near snout in males, absent or feeble in females. Upper jaw extending to below anterior portion of lower eye. Teeth on upper jaw biserial, those on lower jaw uniserial. Scales large, with short ctenii on eyed side, cycloid on blind side. **Color:** eyed side light brown, many dark spots and rings irregularly scattered on it; caudal fin with a pair of large prominent jet-black blotches. **Size:** maximum standard length about 11 cm, commonly to 8 cm. **Distribution:** Indo-West Pacific, including East Africa, southern Japan and northern Australia. **Remarks:** found from mud and sand bottoms of continental shelf, at depths of 10–100 m.



Engyprosopon grandisquama, KAUM–I. 16827, 7.9 cm SL
off Terengganu (KT), 5 Dec. 2008



Engyprosopon grandisquama, KAUM–I. 16885, 7.2 cm SL
off Terengganu (KT), 6 Dec. 2008

Grammatobothus polyophthalmus (Bleeker, 1865)

Manyeyed Flounder

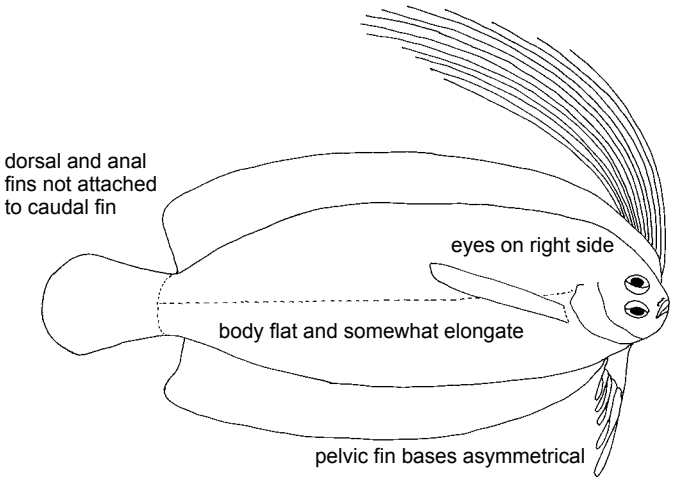
D 77–86; A 61–71; P_1 14–17 (eyed side); LL 75–77. Body oval. Head 3.5–4.0 in SL; upper profile of head with a deep notch anterior to interorbital region. Upper jaw reaching to or slightly beyond below anterior portion of lower eye. Teeth on both jaws uniserial. 2nd to 10th dorsal fin rays elongate in both sexes, longer in males than females. Pectoral fin elongate in males. Lateral line on both sides of body. Scales on eyed side ctenoid, those on blind side cycloid. **Color:** eyed side pale brownish, with 3 large and prominent dark ocelli, 1 each above and below pectoral fin, 1 on middle of strait section of lateral line. **Size:** maximum total length about 21 cm, most specimens about 17cm. **Distribution:** Indo-West Pacific, including India, Ryukyu Islands, Philippines and northwestern Australia. **Remarks:** inhabits on mud, sand and rubble bottoms at depths of 0–90 m.

Grammatobothus polyophthalmus, KAUM–I. 17304, 11.7 cm SL
off Terengganu (KT), 20 Jan. 2009

SAMARIDAE

Crested Flounders

By Hisashi Imamura



Marine flatfishes, maximum size smaller than 22 cm. Body elliptical to somewhat oval, strongly compressed. Mouth small, reaching t almost anterior margin of upper eye. Eyes on right side of head. Margin of preopercle distinct, not covered with skin. Dorsal fin origin anterior to anterior margin of upper eye. Anterior rays of dorsal and anal fins not spinous. Pectoral fin present on eyed side but absent on blind side. Pelvic fins symmetrical, without spines. Caudal fin separated from dorsal and anal fins. Lateral line well developed or rudimental. **Color:** eyed side of body brownish, usually with spots, blotches, or rings; blind side of body whitish.

Remarks: known from tropical and subtropical regions in Indo-Pacific, primarily deeper waters. Three genera, *Plagiopsetta*, *Samaris* and *Samariscus*, with about 20 species.

Similar family occurring in the area: Psettodidae – dorsal fin origin well posterior to upper eye; anterior rays of dorsal and anal fin spinous; pelvic fin with one spine; lateral line slightly curved above pectoral fin. Citharidae – pelvic fin with one spine. Paralichthyidae – eyes on left side of head, pelvic fin bases on both sides short, subequal and subsymmetrical in position. Bothidae – eyes on left side of head. Soleidae – preopercle without free margin. Cynoglossidae – eyes on left side of head; preopercle without free margin; pectoral fins absent.

Samaris cristatus Gray, 1831

Cockatoo Righteye Founder

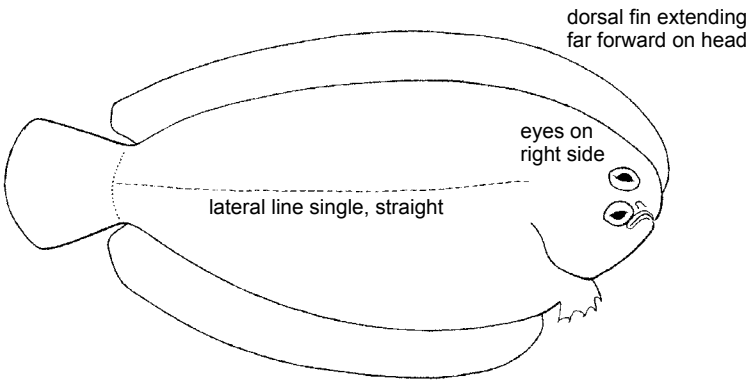
D 71–85; A 49–60; P_1 4 (eyed side); LL 60–80. Body elliptical. Head 3.8–5.3 in SL; upper profile of head with a slight notch anterior to upper eye. Mouth small; upper jaw extending to below anterior portion of lower eye. Both jaws with small villiform teeth in band. Anterior 12 or 13 rays greatly elongate and filamentous. Pectoral fin on eyed side somewhat elongate. Pelvic fin on eyed side continuous with anal fin by membrane. Lateral line present only on eyed side. Scales on eyed side ctenoid, those on blind side feebly ctenoid or cycloid. **Color:** eyed side pale brownish, with a series of obscure dark blotches along dorsal and ventral margins of body; blind side whitish. **Size:** maximum length 22 cm. **Distribution:** Indo-West Pacific, from southeastern Africa to New Caledonia, north to Japan and south to northern Australia. **Remarks:** found from mud and sand bottoms.

Samaris cristatus, KAUM–I. 17197, 12.8 cm SL
off Terengganu (KR), 5 Jan. 2009

SOLEIDAE

Soles

By Hisashi Imamura



Marine flatfishes (excepting one species entering rivers in Africa), reaching to 32 cm. Body somewhat elongate to oval, strongly compressed. Mouth small and asymmetrical, terminal or slightly inferior. Eyes on right side of head. Preopercle without free margin, embedded in skin. Dorsal fin origin anterior to upper eye. Anterior rays of dorsal and anal fins not spinous. Pectoral fins sometimes absent; when present, eyed side pectoral fin usually longer than on blind side. Pelvic fins without spines, sometimes asymmetrical, either free or fused with anal fin. Caudal fin separated from or fused with dorsal and anal fins. Lateral line single, running straight on body, sometimes branched on head. **Color:** highly variable according to substratum, uniformly dull brown to strikingly colored with scattered black spots or blotches or dark cross bands on eyed side of body; usually uniformly yellowish or white on blind side of body.

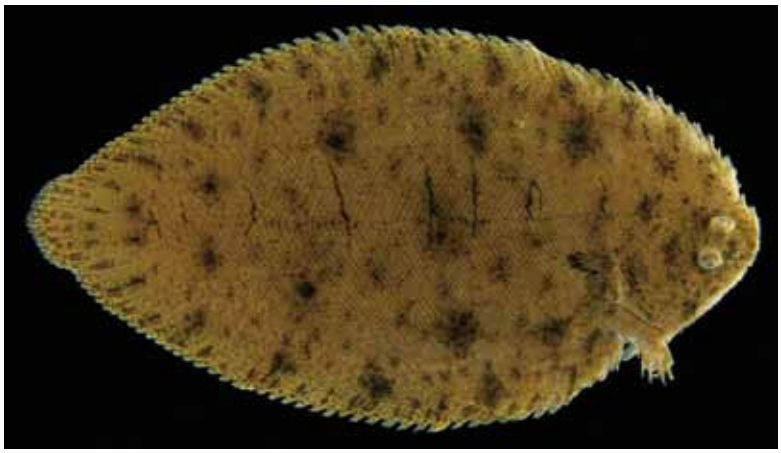
Similar family occurring in the area: Soleidae differs from all other flatfish families, except for Cynoglossidae, in lacking free preoperclar margin. Psettodidae – dorsal fin origin well posterior to upper eye; anterior rays of dorsal and anal fin spinous; pelvic fin with one spine; lateral line slightly curved above pectoral fin. Citharidae – pelvic fin with one spine. Paralichthyidae, Bothidae and Cynoglossidae – eyes on left side of head.

Remarks: inhabits muddy and sandy bottom in coastal areas. About 35 genera with about 130 species.

Brachirus orientalis (Bloch & Schneider, 1801)

Oriental Sole

D 61–65; A 44–48; P_1 7–8 (eyed side); LL 70–85. Body oval, 1.8–2.2 in SL. Head 4.2–5.3 in SL. Mouth small, terminal, slightly curved. Eyes separated by a scaly interorbital space. Very small teeth on both jaws on blind side. Pectoral fins well developed. Pelvic fin separated from anal fin. Caudal fin separated from dorsal and anal fins. Lateral line with high rounded arch on head not directed posteriorly. Scales strongly ctenoid on eyed side; mostly weakly ctenoid on blind side with some cycloid. **Color:** eyed side gray or brown with numerous, cloudy and indistinct spots, and several narrow blackish lines; blind side uniformly light yellow, without sooty blotches. **Size:** maximum total length about 30 cm, commonly 10 to 12 cm.



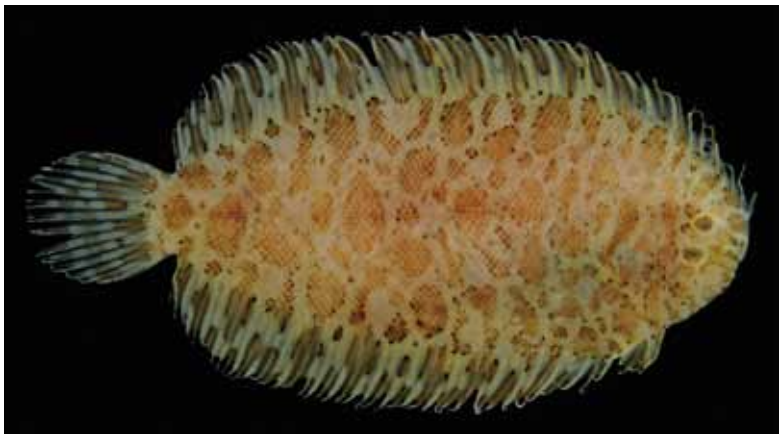
Brachirus orientalis, UMTF 1487 (KAUM–I. 16719), 9.5 cm SL
Setiu, 29 Oct. 2008

Distribution: Indo-West Pacific, including Gulf of Thailand, Philippines, southern Japan, New Guinea and Australia. **Remarks:** found from mud and sand bottoms in coastal waters.

Liachirus melanospilos (Bleeker, 1854)

Darkspotted Sole

D 59–62; A 42–47; LL 57–65. Body oval, 2.1–2.4 in SL. Head 3.9–4.2 in SL. Mouth small, slightly curved. Eyes separated by a scaly interorbital space. Pectoral fins absent. Pelvic fin separated from anal fin. Caudal fin separated from dorsal and anal fins. Scales on both sides small cycloid. **Color:** eyed side light to dark brown with scattered darker dots and blotches; blind side pale. **Size:** attaining to 7.5 cm SL. **Distribution:** Indo-West Pacific, including South China Sea, southern Japan and Australia. **Remarks:** inhabits on mud and sand bottoms around 100 m depth.

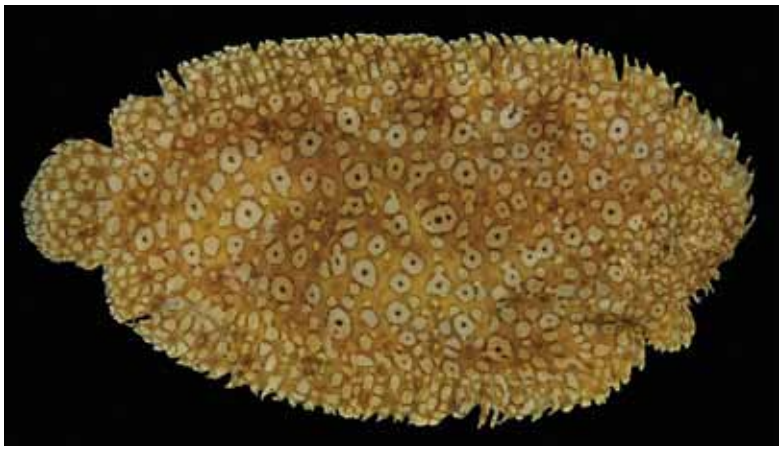


Liachirus melanospilos, KAUM–I. 16959, 7.1 cm SL
off Terengganu (KT), 11 Dec. 2008

Pardachirus pavoninus (Lacepède, 1802)

Peacock Sole

D 66–70; A 50–53; LL 75–82. Body oval. Mouth strongly curved, cleft reaching to anterior margin of lower eye. Eyes separated by a scaly interorbital space. Pectoral fins absent. Pelvic fin separated from anal fin. Caudal fin separated from dorsal and anal fins. Lateral line distinct, straight, single. Series of toxin glands with pores along bases of dorsal and anal fin rays. **Color:** eyed side reddish brown, densely spotted on head, body and fins; spots in various sizes and shapes, bordered by a dark rim and some with a blackish spot in center. **Size:** maximum total length about 22 cm, commonly 10–15 cm. **Distribution:** widespread tropical Indo-West Pacific, including southern Japan, Philippines and Australia. **Remarks:** inhabits on sandy bottoms of coral reef areas, at depths of about 40 m.



Pardachirus pavoninus, KAUM–I. 17212, 16.0 cm SL
off Terengganu (KT), 10 Jan. 2009

Zebrias quagga (Kaup, 1858)

Zebra Sole

D 60–75; A 50–62. Body elliptical. Mouth small, terminal, slightly curved. Eyes contiguous, each with a short tentacle. Pectoral fins well developed. Pelvic fin separated from anal fin. Caudal fin continuous with dorsal and anal fins. Scales ctenoid. **Color:** eyed side cream or beige with 11–12 brown single or double cross-bands, slightly wider than interspaces; body pattern continued onto dorsal and anal fins; caudal fin cream with elongate black blotches. **Size:** maximum length 15 cm. **Distribution:** Indo-West Pacific, including Red Sea, Persian Gulf, Malaysia, Thailand, China and Australia. **Remarks:** found from mud and sand bottoms in shallow coastal waters.

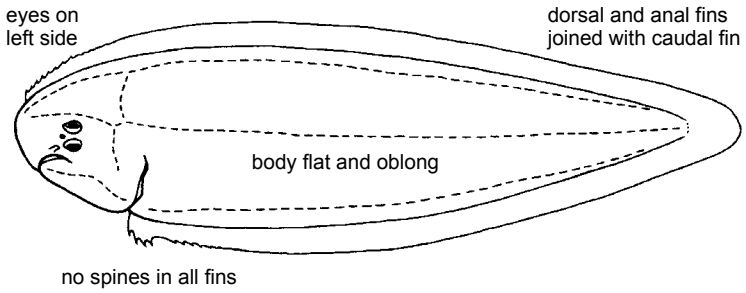
Zebrias quagga, KAUM–I. 16957, 8.5 cm SL
off Terengganu (KT), 11 Dec. 2008

CYNOGLOSSIDAE

Tonguesoles

By Hisashi Imamura

Marine flatfishes (some species entering freshwater), reaching to 40 cm. Body tongue-shaped, strongly compressed. Mouth small, subterminal and asymmetrical, reaching posteriorly below lower eye. Eyes on left side of head. Posterior margin of preopercle strongly attached to opercle, without free margin and embedded in skin. Dorsal fin reaching far forward on head. Anterior rays of dorsal and anal fins not spinous. Pectoral fins absent. Usually only pelvic fin on blind side present. Caudal fin separated fused with dorsal and anal fins. Scales small, ctenoid or cycloid. **Color:** variable even in a species, usually brownish or grayish, often variably marked with spots, blotches or cross bands on eyed side of body; usually uniformly yellowish or whitish on blind side of body.



Remarks: commonly found on muddy bottoms and other substrates, from tide pools to deep waters on continental shelves and slopes. Marketed fish. Includes 3 genera and about 130 species.

Similar family occurring in the area: Cynoglossidae differs from all other flatfish families in this area, except for Soleidae, in having caudal fin fused with dorsal and anal fins, and lacking free preoperclar margin. It is also separable from most flatfishes in lacking pectoral fins. Psettodidae – dorsal fin origin well posterior to upper eye; anterior rays of dorsal and anal fin spinous; pelvic fin with one spine; lateral line slightly curved above pectoral fin. Citharidae – pelvic fin with one spine. Samaridae and Soleidae – eyes on right side of head.

Cynoglossus bilineatus (Lacepède, 1802)

Fourlined Tonguesole

D 107–113; A 80–88; C usually 12; LL 88–96 (midlateral line). Body elongate, 3.5–4.5 in SL. Mouth moderate, extending beyond lower eye. Eyes small, slightly larger than interorbital space. Two lateral lines on each side of body; upper one along dorsal fin base, lower one midlaterally on body. Scales ctenoid on eyed side and cycloid on blind side. **Color:** eyed side of body pale brown; blind side of body whitish. **Size:** maximum length 40 cm. **Distribution:** Indo-West Pacific, from Persian Gulf to New Guinea, north to southern Japan, south to Australia. **Remarks:** inhabits sandy and muddy bottoms at depths of 13 to ca. 400 m.

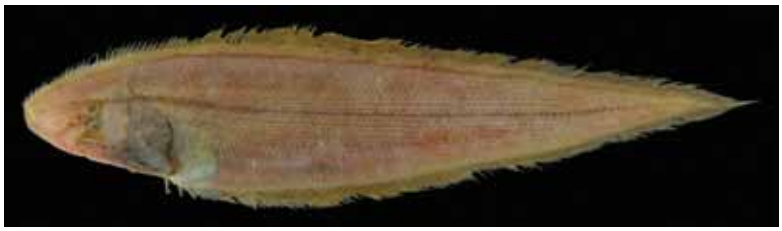
Cynoglossus bilineatus, KAUM–I. 17096, 24.9 cm SL
off Terengganu (KT), 28 Dec. 2008

Cynoglossus bilineatus, UMTF 1874, 10.9 cm SL
off Terengganu (KT), 29 Dec. 2008

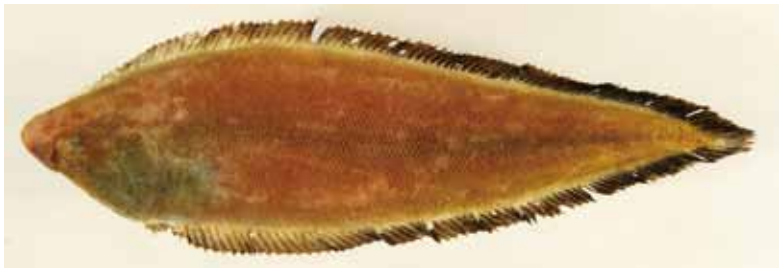
Cynoglossus lingua Hamilton, 1822

Long Tonguesole

D 126–138; A 97–114; C usually 10; LL 90–101 (midlateral line). Body very elongate, 4.5–5.9 in SL. Mouth moderate, extending well beyond posterior margin of lower eye. Eyes separated by narrow interorbital space. Two lateral lines present on eyed side of body; upper one along dorsal fin base, lower one midlaterally on body. Lateral lines absent on blind side of body. Scales comparatively large, ctenoid on eyed side and cycloid on blind side. **Color:** eyed side of body reddish brown, sometimes with irregular brown-black patches, with a large black blotch on opercular region. **Size:** maximum total length about 40 cm. **Distribution:** Indo-West Pacific, including Red Sea, Gulf of Thailand, Philippines and Indonesia. **Remarks:** inhabits mainly shallow sandy and muddy bottoms on inner continental shelf, often entering estuaries.



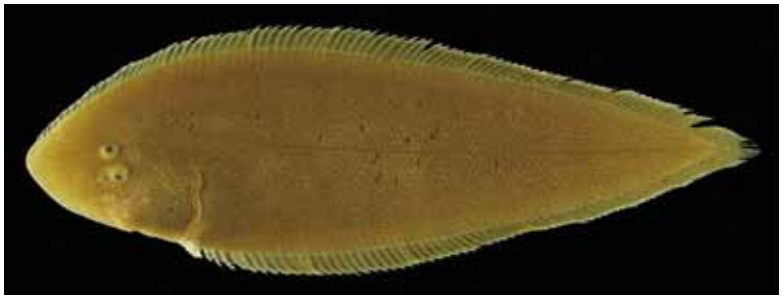
Cynoglossus lingua, KAUM–I. 17005, 27.1 cm SL
off Terengganu (KT), 14 Dec. 2008



Cynoglossus monopus, KAUM–I. 17119, 13.0 cm SL
off Terengganu (KT), 31 Dec. 2008

Cynoglossus monopus (Bleeker, 1849)

D 115–120; A 92–96; C 10; LL 108–125 (midlateral line). Body very elongate, 3.8–4.6 in SL. Mouth moderate, extending to below posterior margin of eye or just behind it. Eyes pedunculate. Two lateral lines present on eyed side of body; upper one along dorsal fin base, lower one midlaterally on body. Lateral lines absent on blind side of body. Scales ctenoid on both sides of body. **Color:** eyed side of body brownish; dorsal, anal and caudal fins darker. **Size:** maximum length about 19 cm. **Distribution:** Indo-West Pacific, from northern part of Bay of Bengal to Hong Kong and Malay Archipelago.

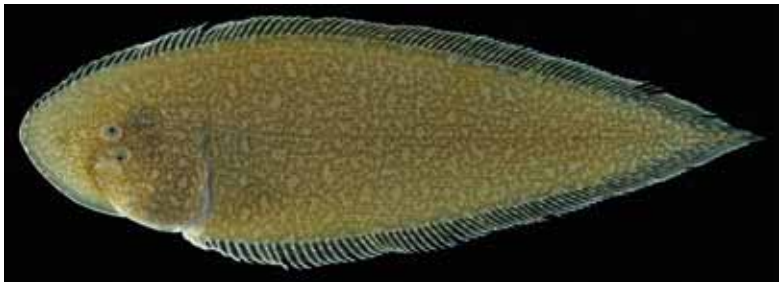


Paraplagusia blochii, UMTF 1321 (KAUM–I. 16450), 13.7 cm SL
estuary near UMT, 28 Sept. 2008

Paraplagusia blochii (Bleeker, 1851)

Bloch's Tonguesole

D 99–105; A 76–82; C 8; LL 75–83 (midlateral line). Body elongate, 3.6–3.8 in SL. Mouth extending to below posterior margin of lower eye. Eyes small, separated by a scaly interorbital space about equal to eye diameter. Two lateral lines present on eyed side of body; lateral lines absent on blind side of body. Scales ctenoid on eyed side and weakly ctenoid on blind side. **Color:** eyed side of body brown; scale centers paler than edges. **Size:** maximum length 22 cm. **Distribution:** Indo-West Pacific, including Oman, India, Indonesia and Philippines.



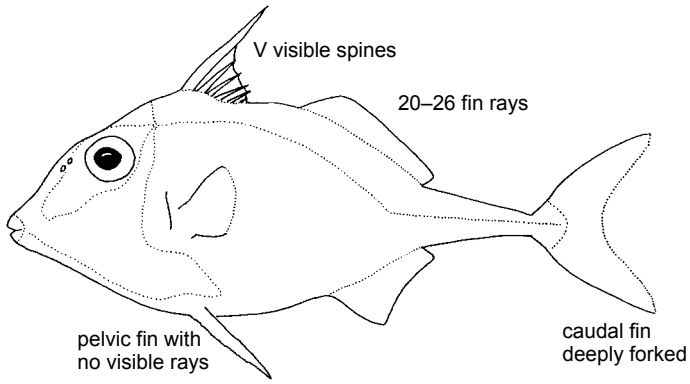
Paraplagusia blochii, UMTF 1083 (KAUM–I. 16518), 7.4 cm SL
Cendering, 6 Oct. 2008

TRIACANTHIDAE

Triplespines

By Keiichi Matsuura

Small fishes less than 30 cm, with moderately elongate, strongly compressed body covered by moderately thick skin with numerous minute scales. Mouth small and terminal; teeth in an outer series of about 10 heavy incisors in each jaw, internally to which are several molariform teeth, usually 4 in upper jaw and 2 in lower jaw. Gill opening a moderately short vertical slit in front of pectoral-fin base. Dorsal fin spine VI (usually only V visible, the sixth rudimentary), dorsal-fin rays 20 to 26; caudal fin deeply forked; pelvic fins with I large spine and no visible rays; most dorsal-, anal, and pectoral-fin rays branched. Caudal peduncle distinctly tapering to a narrow transversely indented region just in front of caudal-fin base, where the peduncle is wider than deep. Lateral line inconspicuous. **Color:** generally silvery, with upper half of body dusky, with or without darker blotches.



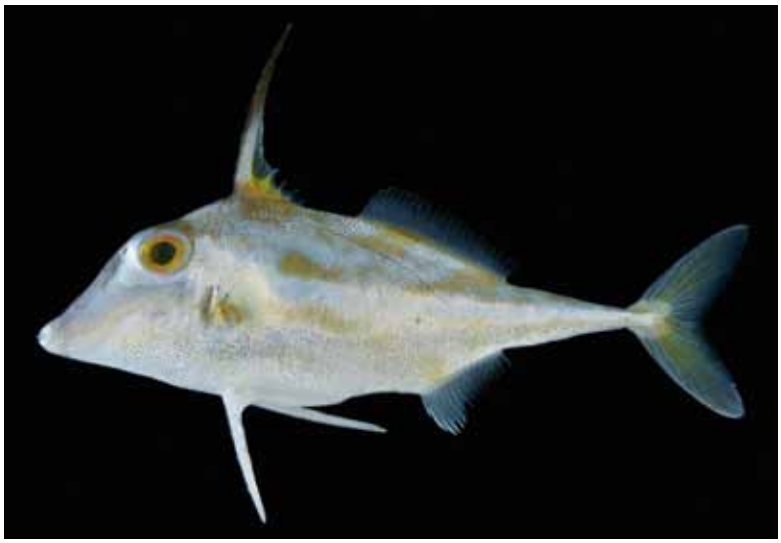
Remarks: benthic, occurring usually on flat, sandy or weed-covered bottoms. Feed on bottom invertebrates. Marketed but not commercially important.

Similar families occurring in the area: Triacanthodidae – caudal fin not deeply forked, rounded to almost truncate; caudal peduncle not distinctly tapered, deeper than wide; dorsal-fin rays 12 to 18 (20 to 26 in Triacanthidae).

Tripodichthys blochi (Bleeker, 1852)

Longtail Tripodfish

D VI + 20−24; A 15−19; P_1 13−15. Scale covered ventral surface of pelvis distinctly tapered to a point posteriorly. Second dorsal spine much less than half the length of first dorsal spine. Pelvis between bases of pelvic spines narrow (1.4−3.0 %SL), the width 7.2−12.4 (usually about 9 or 10) times in length of pelvis. Dorsal rays modally 22 and anal rays modally 17. **Color:** dorsal half of body silvery light brown, ventral half silvery white; several irregular dark yellow markings on side of body; spiny dorsal fin membrane pale; basal part of spiny dorsal fin yellowish orange; soft dorsal, anal and pectoral fins pale; caudal fin light yellow. **Size:** 15 cm. **Distribution:** known from China and countries in Southeast Asia, a stray found from southern Japan. **Remarks:** coastal and estuarine shallow waters at depths of 0−40 m; usually found on sandy or muddy flat; feeds on benthic invertebrates.



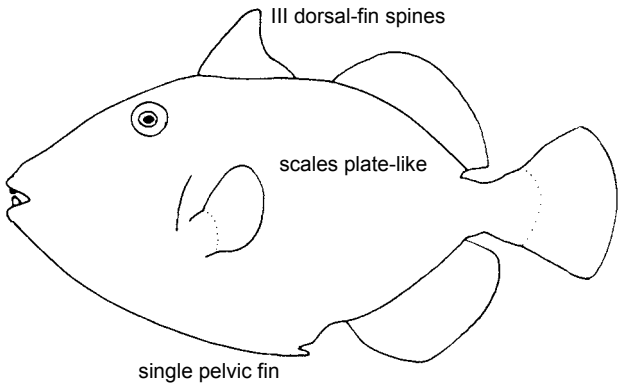
Tripodichthys blochi, KAUM–I. 16730, 9.1 cm SL
Setiu, 28 Oct. 2008

BALISTIDAE

Triggerfishes

By Keiichi Matsuura

Small to medium-sized fishes, up to 80 cm in total length, with deep, moderately compressed body encased in very thick, tough skin with large scale plates easily discernible as individual unites; scale above pectoral-fin base in many species enlarged, forming a flexible tympanum. Gill opening a relatively short vertical to oblique slit in front of pectoral-fin base; mouth small and usually more or less terminal; teeth heavy, 8 in outer series of upper jaw and lower jaw. Three dorsal-fin spines, the second spine more than one half of the length of the first; the first spine capable being locked in an upright position of erection by the second; most dorsal, anal and pectoral-fin rays branched; pelvic fins and spines rudimentary, represented by a series of 4 pairs of enlarged scales encasing the end of pelvis. Lateral line inconspicuous. **Color:** variable and many species having bright color markings on head and body.



Remarks: most species benthic, occurring in coral and rocky reefs from the coastline to a depth of 100 m; some species (e.g. *Canthidermis*) pelagic in open water. Feed on bottom invertebrates, but also zooplankton (e.g. *Melichthys indicus* and *Odonus niger*). High valued as food in many handline fisheries.

Similar families occurring in the area: Monacanthidae – two dorsal-fin spines, only the first of which is long and prominent; body more laterally compressed; fewer and less massive teeth in jaws; scales shagreen-like, with individual basal plates small and not readily distinguishable from one another to the unaided eye.

Abalistes stellatus (Annonymous, 1798)

Starry Triggerfish

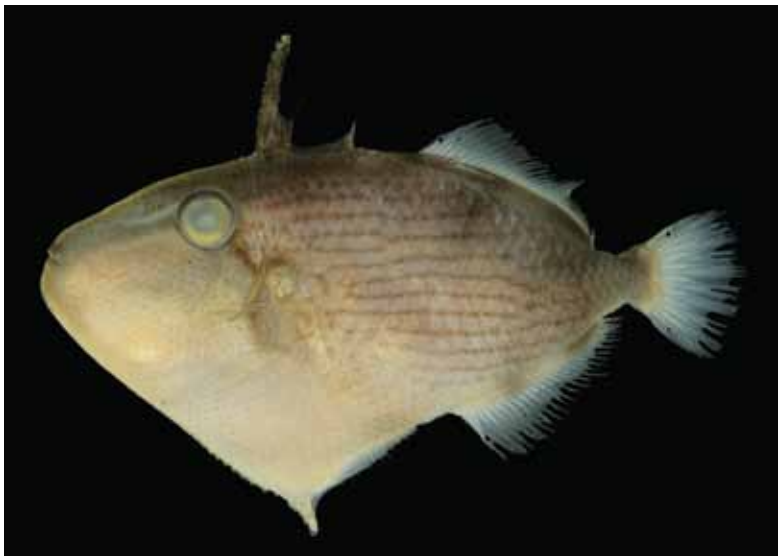
D III + 26–27; A 24–26; P_1 14–15 (usually 14). Scales enlarged above pectoral-fin base and just behind gill opening to form a flexible tympanum. A groove in front of eye. Mouth terminal. Caudal peduncle depressed, wider than deep. **Color:** grayish brown to olivaceous on back, with small pale blue or yellow spots dorsally and large yellow spots ventrally; 3 large white blotches on back, disappearing in large specimens. **Size:** 60 cm. **Distribution:** widespread in Indo-West Pacific, from East Africa to northern Australia, north to southern Japan. **Remarks:** occurring on sand, sponge, and weed bottoms to depths of 100 m. Similar to *Abalistes filamentosus* Matsuura & Yoshino, 2004 but distinguished by lacking produced caudal fin rays. Feeds on marine invertebrates.

Abalistes stellatus, KAUM–I. 17123, 12.5 cm SL
off Terengganu (KT), 31 Dec. 2008

Sufflamen fraenatum (Latreille, 1804)

Masked Triggerfish

D III + 26−28; A 23−26; P_1 12−14. Scales enlarged above pectoral-fin base and just behind gill opening to form a flexible tympanum. A groove in front of eye. Mouth terminal. Caudal peduncle compressed, deeper than wide. Scales of posterior part of body with large tubercles forming longitudinal ridges extending forward to level of soft dorsal-fin origin. **Color:** head and body dark brown; a light yellow line running obliquely from corner of mouth to below a groove before eye in male, but lacking in female; all fins dark brown; head and body of juveniles white with many longitudinal black lines below level of eye, dorsal side above level of eye dark brown. **Size:** 35 cm. **Distribution:** widespread in Indo-West Pacific, from East Africa eastward to Tuamotu Islands, northward to southern Japan. **Remarks:** occurring in coral reefs shallower than 50 m.

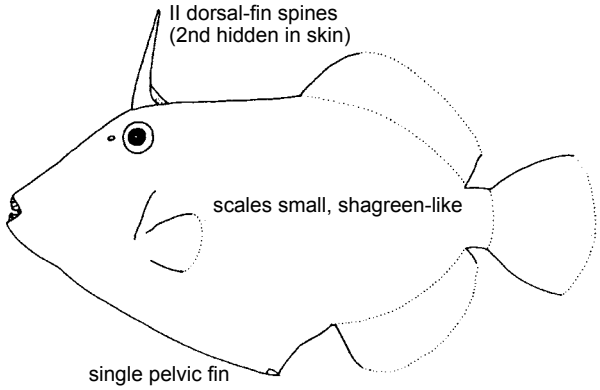


Sufflamen fraenatum, KAUM–I. 17108, juvenile, 4.2 cm SL off Terengganu (KT), 28 Dec. 2008

MONACANTHIDAE

Filefishes

By Keiichi Matsuura



Small to medium-sized fishes, usually less than 20 cm (but up to 50 cm for some species of *Aluterus*), with deep, highly compressed body covered by thin but rough or shagreen-like skin with minute scales not individually easily discernible to the unaided eye. Mouth small and usually more or less terminal or slightly supraterminal; teeth only moderately heavy, 6 in an outer series in upper jaw and 6 or fewer in the lower. Gill opening a relatively short, vertical to oblique slit in front of pectoral-fin base. Two (sometimes 1) dorsal−fin spines, second spine not more than 1/3 the length of first; first spine usually capable of being locked in an upright position of erection by the second; dorsal-, anal- and pectoral-fin rays unbranched; pelvic fin and spines rudimentary or absent, represented by a series of 3 or fewer pairs of enlarged scales encasing end of pelvis, or segments of indeterminate number, or entirely absent. Scales above pectoral-fin base unmodified, not forming a tympanum. Lateral line inconspicuous or only slightly apparent. **Color:** variable, drab brown, gray, or greenish, but often with strikingly marked and vivid patterns.

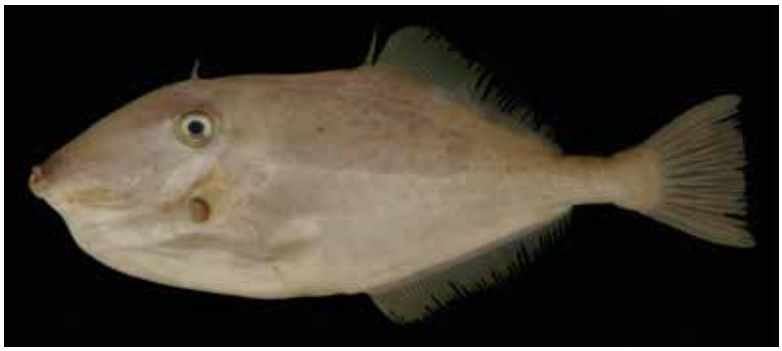
Remarks: found in shallow coral and rocky reefs, seagrass beds, and sandy-muddy bottoms in depths of 10 to over 200 m. Feed on coral polyps, epiphytes attached to seagrass, or other marine invertebrates. Marketed fresh.

Similar families occurring in the area: Balistidae – III spines in first dorsal fin; skin tough but not shagreen-like, individual scales distinct, usually forming prominent, oblique rows. Triacanthidae – VI spines (usually only V spines visible) in first dorsal fin; pair of strong pelvic-fin spines.

Aluterus monoceros (Linnaeus, 1758)

Unicorn Leatherjacket

D II + 45−51; A 47−53; P_1 14−15. Body elongate, strongly compressed. Dorsal profile of head slightly convex. Gill opening short oblique slit below eye extending antero-ventrally beyond anterior margin of eye. Dorsal spine above eye, very long and fragile; broken frequently in collected specimens. Soft part of dorsal fin opposite to anal fin. Caudal fin shorter than snout. **Color:** body grayish with many irregular dark lines and dots; dorsal-, anal- and pectoral-fin rays yellow; caudal fin dark. **Size:** 76 cm. **Distribution:** circum tropical; in West Pacific known from west coast of peninsular Malaysia eastward to the Solomon Islands, northward to the Ryukyu Islands. **Remarks:** forming large schools in coastal waters.

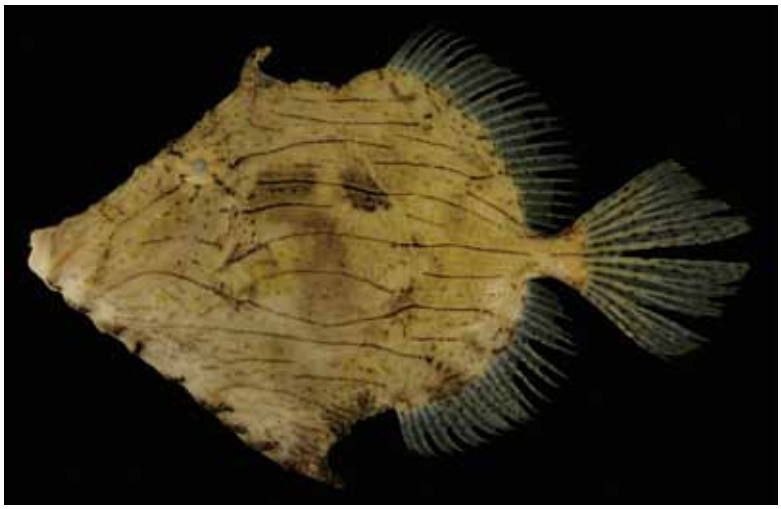


Aluterus monoceros, KAUM–I. 16897, 21.0 cm SL
off Terengganu (KT), 6 Dec. 2008

Chaetodermis penicilligerus (Cuvier, 1816)

Prickly Leatherjacket

D II + 25−26; A 23−24; P_1 12−13. Body deep; dorsal profile of head ascending from mouth to dorsal spine. Body covered with many fleshy filaments. Pelvic terminus prominent, composed of 3 segments of encasing scales, movable dorso-ventrally. Scales on body relatively large with a backwardly curved spine. Dorsal spine with many fleshy filaments, located above gill opening. Caudal fin rhomboidal. **Color:** light brown with many longitudinal black lines on side of body; fin rays of dorsal, anal and caudal fins with many black spots. **Size:** 31 cm. **Distribution:** tropical eastern Indian Ocean and West Pacific from west coast of Malaysia eastward to northern Australia, northward to southern Japan. **Remarks:** collected from rocky reefs and sandy-muddy bottom, usually from depths shallower than 200 m; feeds on marine invertebrates.



Chaetodermis penicilligerus, KAUM–I. 16852, 18.1 cm SL
off Terengganu (KT), 5 Dec. 2008

Monacanthus chinensis (Osbeck, 1765)

Fanbellied Leatherjacket

D II + 28−30; A 27−30; P_1 12. Body deep; dorsal profile of head concave, ascending from mouth through eye to soft dorsal fin. Pelvic terminus prominent, composed of 3 segments of encasing scales, movable dorso-ventrally; ventral flap very large. Upper caudal fin rays produced into a filament. **Color:** body light brown with many irregular dark brown blotches. **Size:** 38 cm. **Distribution:** west coast of Malay Peninsula and tropical West Pacific from Thailand eastward to New Guinea. **Remarks:** occurring in sea grass bed and rocky reefs in shallow waters.

Monacanthus chinensis, KAUM–I. 17071, 13.8 cm SL
off Terengganu (KT), 27 Dec. 2008

Paramonacanthus pusillus (Rüppell, 1829)

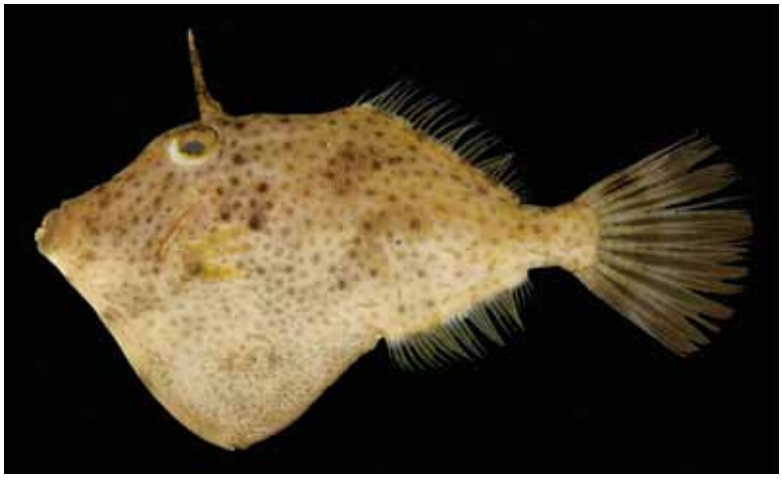
D II + 25−30; A 24−29; P_1 11−13. Body relatively elongate; dorsal profile of head convex in male, with prominent hump immediately in front of nostrils, slightly convex or straight in female. Pelvic terminus elongate, composed of 3 segments of encasing scales, movable dorso-ventrally; ventral flap developed. First dorsal spine depressed in cross section, armed with 4 rows of downward-directed barbs. **Color:** head and body pale grayish brown to whitish, with many yellowish to dark brown markings tending to form 3−4 irregular curved stripes on body; soft dorsal fin pale with 2 dark blotches at its base, anal fin and pectoral fins pale, caudal fin pale with 2 curved dark cross bands. **Size:** 18 cm. **Distribution:** tropical Indo-West Pacific from South Africa eastward to northern Australia, northward to southern Japan. **Remarks:** this species is the most widespread member of *Paramonacanthus*.

Paramonacanthus pusillus, KAUM–I. 16937, 7.7 cm SL
off Terengganu (KT), 11 Dec. 2008

Pseudomonacanthus macrurus (Bleeker, 1856)

Strap-weed Filefish

D II + 29−30; A 27−30; P_1 11−12. Body relatively elongate, strongly compressed. Doral profile of head slightly concave. Pelvic terminus small, composed of 2 segments of encasing scales, not movable; ventral flap large. Dorsal spine located above posterior half of eye. Gill opening oblique, extending from below middle of eye to below nasal organ. **Color:** head and body light brown with many black spots, ventral half of body paler than the dorsal half. Fin rays of all fins yellow; caudal fin with 2 transverse dark brown bands. **Size:** 20 cm. **Distribution:** South China Sea eastward to New Guinea, northward to the Ryukyu Islands. **Remarks:** occurring in sea grass bed and on sandy-muddy bottom in shallow waters.

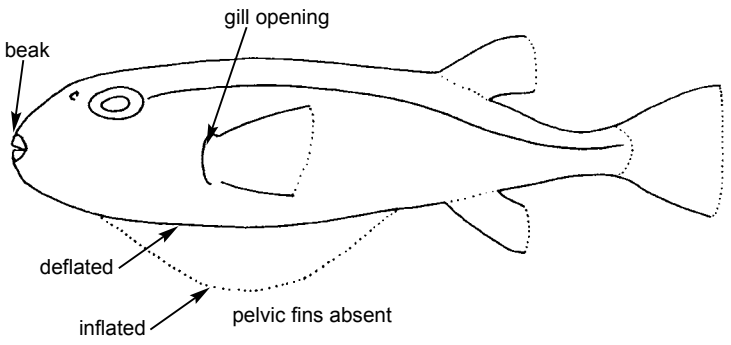


Pseudomonacanthus macrurus, KAUM–I. 17042, 15.7 cm SL
off Terengganu (KT), 17 Dec. 2008

TETRAODONTIDAE

Puffers

By Keiichi Matsuura



Small to moderate-sized fishes, most species less than 30 cm, with a heavy blunt body capable of rapid inflation by intake of water (or air). Head large and blunt; jaws modified to form a beak of 4 heavy, powerful teeth, 2 above and 2 below. Gill openings without distinct opercular cover, appearing as simple slits anterior to the pectoral fin; eyes located high on head. Dorsal and anal fins located far posteriorly bearing no spines, but 7 to 15 soft rays; caudal fin usually truncate to slightly rounded; pelvic fins absent. Typical scales absent, but most species are partially covered with tiny prickles or spinules, and many species have small fleshy tabs or lappets on the dorsal and/or lateral surfaces. **Color:** most species are mottled, variegated, or barred on the upper and lateral surfaces, often with spots of various sizes and colors; ventral surfaces are almost always unpigmented.

Remarks: occurring in tropical and temperate seas, most frequently in shallow inshore waters, sometimes entering brackish and fresh waters, but a few species are pelagic. The viscera, skin, and blood of most species are poisonous; in some species even the flesh is poisonous. Laymen are strongly recommended not to eat puffers, although connoisseurs like to consume puffers in licensed restaurants in some countries (e.g., Japan).

Similar families occurring in the area: Diodontidae – head and body covered with strong elongate spines; 1 tooth plate in each jaw.

Lagocephalus lunaris (Bloch & Schneider, 1801)

Rough Golden Puffer

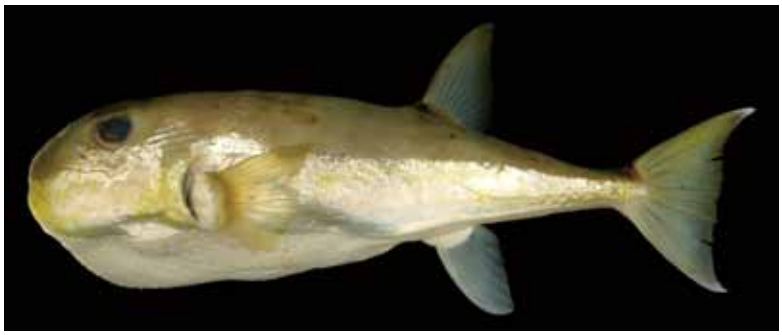
D 12−13; A 11−12; P_1 16−17. A patch of spinules on back reaching to dorsal-fin origin; belly covered with spinules. Nasal organ with 2 openings. Caudal fin concave. **Color:** dorsal half of body grayish light brown, side silvery white, and belly white; caudal fin white in the ventral lobe and dark yellow in the dorsal lobe. **Size:** 35 cm. **Distribution:** tropical Indo-West Pacific from East Africa to northern Australia; found recently from southern Japan. **Remarks:** strongly toxic and frequently confused with other species of *Lagocephalus* such as *L. gloveri* Abe & Takita, 1983 and *L. spadiceus* (Richardson, 1845).

Lagocephalus lunaris, KAUM–I. 17207, 11.7 cm SL
off Terengganu (KT), 10 Jan. 2009

Lagocephalus spadiceus (Richardson, 1845)

Half-smooth Golden Puffer

D 11−13; A 10−12; P_1 14−17. A patch of spinules on back between snout and halfway to dorsal fin origin; belly covered with spinules. Nasal organ with 2 openings. Caudal fin slightly concave. **Color:** dorsal half of body grayish brown, side silver white, and belly white; caudal fin white in the ventral lobe and dark yellow in the dorsal lobe. **Size:** 30 cm. **Distribution:** warm areas in eastern Indian Ocean and West Pacific from Japan through Thailand and Indonesia to northern Australia. **Remarks:** frequently confused with other species of *Lagocephalus* including a very dangerous toxic species, *L. lunaris*, having an enlarged patch of spinules on back reaching posteriorly to dorsal-fin origin.



Lagocephalus spadiceus, KAUM–I. 17175, 16.2 cm SL
off Terengganu (KR), 10 Jan. 2009

Lagocephalus spadiceus, KAUM–I. 16839, 14.0 cm SL
off Terengganu (KT), 5 Dec. 2008

Lagocephalus suezensis Clark & Gohar, 1953

Suez Puffer

D 10−12; A 9−10; P_1 14−16. A patch of spinules on back from between snout to dorsal-fin origin, belly covered with spinules. Nasal organ with 2 openings. Caudal fin deeply lunate. Caudal peduncle depressed, wider than deep. **Color:** dorsal half of body light brown with many irregularly shaped brown dots and lines, side silvery white and belly white; dorsal, anal and pectoral fins pale; caudal fin white in the ventral lobe, yellow in the dorsal lobe. **Size:** 20 cm. **Distribution:** tropical Indo-West Pacific from Red Sea to northern Australia, northward to southern Japan. **Remarks:** frequently confused with *Lagocephalus sceleratus* (Gmelin, 1789) but distinguished from it by lacking many small black spots on back and by having fewer fin-ray counts (in *L. sceleratus*, dorsal-fin rays 12−13, anal-fin rays 10−12, and pectoral-fin rays 16−17). Probably toxic.

Lagocephalus suezensis, KAUM–I. 17034, 13.1 cm SL
off Terengganu (KT), 17 Dec. 2008

Tetraodon nigroviridis, KAUM–I. 16706, 9.3 cm SL
Setiu, 27 Oct. 2008

Tetraodon nigroviridis Marion de Procé, 1822

Spotted Green Puffer

D 12−14; A 10−12; P_1 18−23. 17cm. Body rounded in cross section. Head and body covered with spinules. Nasal organ composed of a tentacle divided distally into 2 flattened and broadened elements. **Color:** back and side of body dark greenish yellow with many black spots, belly white; dorsal, anal and pectoral fins pale; caudal fin pale with several transverse dark lines. **Size:** 15 cm. **Distribution:** freshwater and brackish water in tropical Asia from Sri Lanka to Indonesia, northward to Vietnam. **Remarks:** toxic.

Torquigener gloerfelti Hardy, 1984

Brown Spotted Puffer

Torquigener gloerfelti, KAUM–I. 17043, 17.2 cm SL
off Terengganu (KT), 17 Dec. 2008

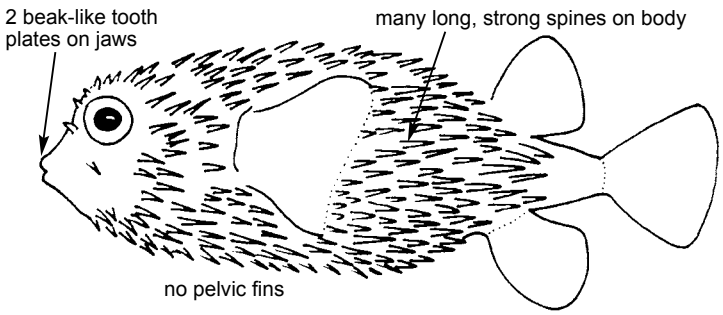
D 8−9; A 6−7; P_1 15−16. Body relatively elongate, rounded dorsally and flattened ventrally. Chin distinct. Nasal organ a short, erect papilla with 2 openings. Ventro-lateral skin fold running from behind chin to caudal-fin base. Spinules on back from level of nasal organ to immediately before dorsal-fin origin; 7−9 spinules across back just behind mid-dorsal branch of lateral lines. **Color:** back and side of body pale yellowish white covered with irregularly shaped brown circles and spots, belly white; dorsal, anal and pectoral fins pale; caudal-fin rays yellowish with dark brown margin. **Size:** 20 cm. **Distribution:** Indonesia, Malaysia and Vietnam. **Remarks:** caught by trawl in shallow waters on sandy-muddy bottom; probably toxic.

DIODONTIDAE

Porcupinefishes

By Keiichi Matsuura

Small to medium-sized fishes (up to 100 cm). Body capable of great inflations, covered with strong spines which may be quite long. Mouth large, wide, and terminal; teeth fused to form a strong, beak-like plate without a median suture dividing left and right halves. Gill opening a relatively small, vertical slit just in front of pectoral-fin base. Dorsal and anal fins without spines, placed far back on body; most fin rays branched; no pelvic fins. Lateral line inconspicuous. No normal scales. **Color:** background color light tan to brown, but frequently gray; usually overlain with dark brown to black spots, bars and/or blotches; belly white, frequently with yellow overtone.

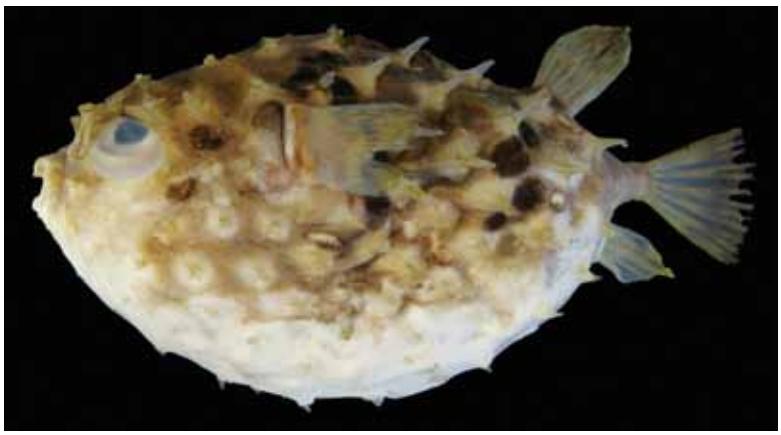


Remarks: found in shallow coral and rocky reefs, seagrass beds, and sandy-muddy bottoms in depths of 10 to over 200 m. Feed on coral polyps, epiphytes attached to seagrass, or other marine invertebrates. Marketed fresh.

Similar families occurring in the area: no other families having the following combination of characters: large spines on body, no pelvic fins, inflatable body, teeth fused into a single beak-like plate.

Cyclichthys orbicularis (Bloch, 1785)

Birdbeak Burrfish

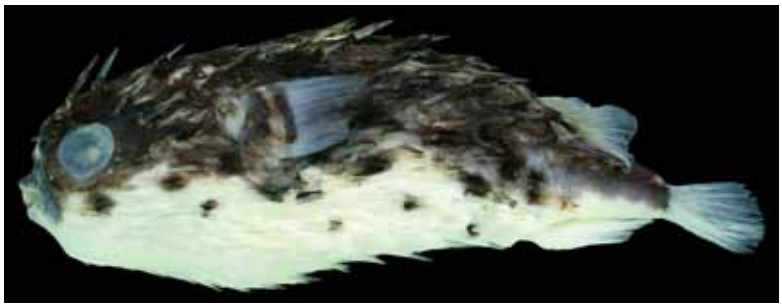


Cyclichthys orbicularis, KAUM–I. 17031, 7.7 cm SL
off Terengganu (KT), 17 Dec. 2008

D 11−13; A 10−12; P_1 18−21. Body rounded with many 3 rooted, non-erectile spines; a small movable spine below and behind corner of mouth. **Color:** head and body brown dorsally, white ventrally; black spots on back and side; all fins pale. **Size:** 16 cm. **Distribution:** tropical Indo-West Pacific from East Africa eastward to New Caledonia, southward to northern Australia, northward to southern Japan. **Remarks:** found in coral and rocky reefs and sandy bottom; usually occurring in depths shallower than 40 m.

Diodon holocanthus Linnaeus, 1758

Longspined Porcupinefish



Diodon holocanthus, KAUM–I. 41684, 7.5 cm SL
off Terengganu (KT), 10 Sept. 2011

D 14−16; A 14−16; P_1 21−25. Long erectile spines on head and body; 16–21 spines from top of snout to dorsal fin; frontal spines shorter than spines posterior to pectoral fin; no downward pointing spine below anterior margin of eye. Nasal organ a short hollow tube with two opening near tip. **Color:** dorsal side of body brown to gray, white ventrally; a vertical white-edged brown band across rear of head and another across middle of back; a short vertical white-edged brown bar in front of gill opening; a large oval white-edged brown blotch above pectoral-fin base, and another around dorsal-fin base; fins yellowish. **Size:** maximum total length 50 cm. **Distribution:** Indo-Pacific, from east Africa to Society Islands, north to southern Japan, south to New South Wales, Australia. **Remarks:** occurring mainly on coral reefs.

Scientific Name Index