



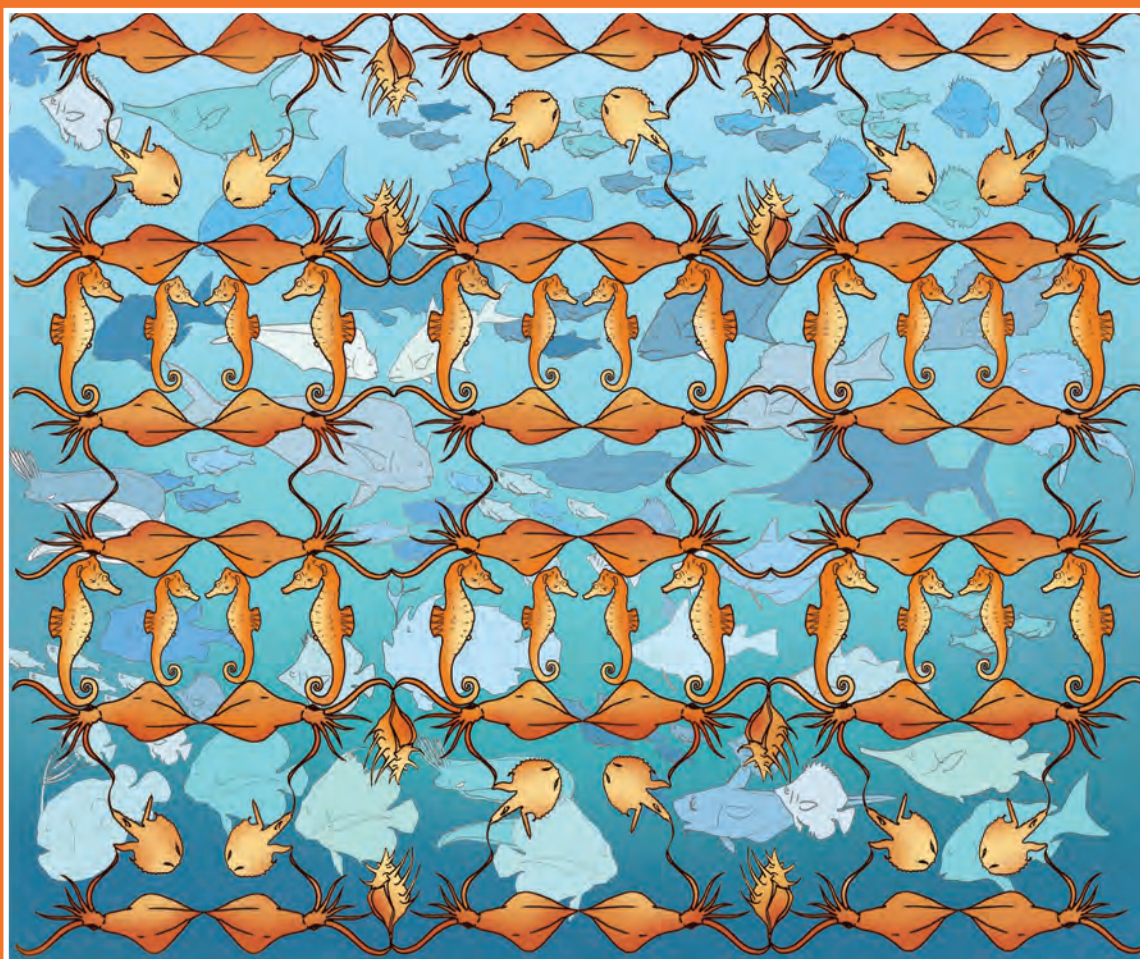
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FAO SPECIES IDENTIFICATION GUIDE FOR FISHERY PURPOSES

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THE LIVING MARINE RESOURCES OF THE
**EASTERN CENTRAL
ATLANTIC**

Volume 3 Bony fishes part 1 (Elopiformes to
Scorpaeniformes)



FAO SPECIES IDENTIFICATION GUIDE FOR FISHERY PURPOSES

THE LIVING MARINE RESOURCES OF THE EASTERN CENTRAL ATLANTIC

VOLUME 3

Bony fishes part 1 (Elopiformes to Scorpaeniformes)

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SUMMARY

This multivolume field guide covers the species of interest to fisheries of the major marine resource groups exploited in the Eastern Central Atlantic. The area of coverage includes FAO fishing area 34 and part of 47. The marine resource groups included are bivalves, gastropods, chitons, cephalopods, stomatopods, shrimps, lobsters, crabs, hagfishes, sharks, batoid fishes, chimaeras, bony fishes and sea turtles. The introductory chapter outlines the environmental, ecological, and biogeographical factors influencing the marine biota, and the basic components of the fisheries in the Eastern Central Atlantic. Within the field guide, the sections on the resource groups are arranged phylogenetically according to higher taxonomic levels such as class, order, and family. Each resource group is introduced by general remarks on the group, an illustrated section on technical terms and measurements, and a key or guide to orders or families. Each family generally has an account summarizing family diagnostic characters, biological and fisheries information, notes on similar families occurring in the area, a key to species, a checklist of species, and a short list of relevant literature. Families that are less important to fisheries include an abbreviated family account and no detailed species information. Species in the important families are treated in detail (arranged alphabetically by genus and species) and include the species name, frequent synonyms and names of similar species, an illustration, FAO common name(s), diagnostic characters, biology and fisheries information, notes on geographical distribution, and a distribution map. For less important species, abbreviated accounts are used. Generally, this includes the species name, FAO common name(s), an illustration, a distribution map, and notes on biology, fisheries, and distribution. Each volume concludes with its own index of scientific and common names.

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Editorial Notes

The editorial notes in Volume 1 included descriptions and notes on the geographical limits, institutional affiliations, objectives, history of the project, common and scientific names used, different levels of taxonomic coverage, sizes reported, distribution maps, citations styles, and recognition of scientists and personnel involved in the project. The following editorial notes are intended to supplement information specific to Volumes 2, 3, and 4.

Taxonomy and Systematics of Fishes

This guide has been in production for an unusually long time. This period coincides with many advances in our understanding of the systematics of fishes and subsequent recommendations in the changes in higher taxonomy of fishes (Wiley & Johnson, 2010; Helfman & Collette, 2011; Betancur *et al.*, 2013, Near *et al.*, 2013). These volumes were originally 'typeset' prior to these advances and based primarily on the taxonomy of Nelson (2006). Fortunately, the familial composition of fishes has not changed as dramatically as some of the higher taxonomic levels that have been suggested. We retained Nelson's (2006) taxonomy because of constraints on changing the format of the book and because much of the newer taxonomy still needs to be reconciled more completely in terms of both morphological and molecular evidence. In fact, a recent book on fishes still does not fully incorporate these recommended changes (Hastings *et al.*, 2014). We have attempted to incorporate as many taxonomic updates as possible in the months preceding the publication of these volumes. We have also attempted to contact all of the authors although some original authors are deceased and others have retired or no longer respond to correspondence. We decided to go ahead and print these volumes with the most recent information from authors as possible although some recent taxonomic changes may not have been incorporated. We hope that our decision to print these volumes, together with potential imperfections, is a better alternative than having all the hard work that went into their production go to waste. If questions remain about taxonomy, we recommend consulting Eschmeyer's online Catalog of Fishes (<http://www.calacademy.org/scientists/projects/catalog-of-fishes>) for the most updated pronouncement on familial, genus and species assignments (although in rare cases some authors do not accept these assignments).

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Notes: As several changes in authorship and institutional affiliations have taken place since the printing of the first volume of this book, we have decided to reprint the list of contributing authors so as to present the most updated information. We would like to also take this opportunity to remember our valued contributors who have passed away since the inception of this project, and denote those authors with (†) both here and in their chapters.

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TABLE OF CONTENTS

	Page
BONY FISHES	1511
General Remarks	1512
Technical Terms and Measurements	1513
Glossary of Technical Terms Used for Bony Fishes	1517
Guide to Orders and Families Occurring in the Area	1522
Order ELOPIFORMES	1584
ELOPIDAE	1584
MEGALOPIDAE	1588
Order ALBULIFORMES	1590
ALBULIDAE	1590
PTEROTHRISIDAE	1592
HALOSAURIDAE	1594
NOTACANTHIDAE	1601
Order ANGUILLIFORMES	1605
ANGUILLIDAE	1605
HETERENCHELYIDAE	1607
CHLOPSIDAE	1611
MURAENIDAE	1614
MYROCONGRIDAE	1643
SYNAPHOBRANCHIDAE	1645
OPHICHTHIDAE	1654
COLOCONGRIDAE	1667
DERICHTHYIDAE	1669
MURAENESOCIDAE	1673
NEMICHTHYIDAE	1675
CONGRIDAE	1680
NETTASTOMATIDAE	1695
SERRIVOMERIDAE	1700
Order SACCOPHARYNGIFORMES	1704
CYEMATIDAE	1704
SACCOPHARYNGIDAE	1705
EURYPHARYNGIDAE	1708
MONOGNATHIDAE	1710
Order CLUPEIFORMES	1715
ENGRAULIDAE	1715
PRISTIGASTERIDAE	1719
CLUPEIDAE	1722
Order GONORHYNCHIFORMES	1740
GONORYNCHIDAE	1740

Order SILURIFORMES	1742
ARIIDAE	1742
Order ARGENTINIFORMES	1751
ARGENTINIDAE	1751
MICROSTOMATIDAE	1754
BATHYLAGIDAE	1756
OPISTHOPROCTIDAE	1759
LEPTOCHILICHTHYIDAE	1762
ALEPOCEPHALIDAE	1765
PLATYTROCTIDAE	1771
Order STOMIIFORMES	1783
GONOSTOMATIDAE	1783
PHOSICHTHYIDAE	1788
STERNOPTYCHIDAE	1792
ASTRONESTHIDAE	1797
CHAULIODONTIDAE	1801
IDIACANTHIDAE	1804
MALACOSTEIDAE	1806
MELANOSTOMIIDAE	1809
STOMIIDAE	1816
Order ATELEOPODIFORMES	1819
ATELEOPODIDAE	1819
Order AULOPIFORMES	1820
AULOPIDAE	1820
SYNODONTIDAE	1824
CHLOROPHTHALMIDAE	1829
NOTOSUDIDAE	1831
IPNOPIDAE	1833
SCOPELARCHIDAE	1836
EVERMANNELLIDAE	1838
ALEPISAUROIDAE	1840
OMOSUDIDAE	1842
PARALEPIDIDAE	1844
ANOPTERIDAE	1849
BATHYSAURIDAE	1851
GIGANTURIDAE	1853
Order MYCTOPHIFORMES	1855
NEOSCOPELIDAE	1855
MYCTOPHIDAE	1860
Order LAMPRIFORMES	1929
LAMPRIDAE	1929
STYLEPHORIDAE	1931

RADIICEPHALIDAE	1933
LOPHOTIDAE	1935
TRACHIPTERIDAE	1937
REGALECIDAE	1939
Order POLYMIXIIFORMES	1942
POLYMIXIIDAE	1942
Order OPHIDIIFORMES	1944
CARAPIDAE	1944
OPHIDIIDAE	1946
BYTHITIDAE	1953
APHYONIDAE	1955
Order GADIFORMES	1957
BREGMACEROTIDAE	1957
BATHYGADIDAE	1959
MACROUROIDIDAE	1964
TRACHYRINCIDAE	1966
MACROURIDAE	1968
MORIDAE	1991
MELANONIDAE	2005
MERLUCCIIDAE	2007
GAIDROPSARIDAE	2015
PHYCIDAE	2023
LOTIDAE	2027
GADIDAE	2029
Order BATRACHOIDIFORMES	2036
BATRACHOIDIDAE	2036
Order LOPHIIFORMES	2044
LOPHIIDAE	2044
ANTENNARIIDAE	2051
CHAUNACIDAE	2054
OGCOCEPHALIDAE	2056
CAULOPHRYNIDAE	2059
NEOCERATIIDAE	2060
MELANOCETIDAE	2061
HIMANTOLOPHIDAE	2062
DICERATIIDAE	2064
ONEIRODIDAE	2066
THAUMATICHTHYIDAE	2069
CENTROPHRYNIDAE	2070
CERATIIDAE	2071
GIGANTACTINIDAE	2073
LINOPHRYNIDAE	2075

Order MUGILIFORMES	2077
MUGILIDAE	2077
Order ATHERINIFORMES	2111
ATHERINIDAE	2111
Order BELONIFORMES	2118
BELONIDAE	2118
SCOMBERESOCIDAE	2127
EXOCOETIDAE	2131
HEMIRAMPHIDAE	2156
Order STEPHANOBERYCIFORMES	2163
MELAMPHAIDAE	2163
STEPHANOBERYCIDAE	2166
RONDELETIIDAE	2168
BARBOURISIIDAE	2171
CETOMIMIDAE	2173
Order BERYCIFORMES	2182
ANOLOGASTRIDAE	2182
DIRETMIDAE	2184
TRACHICHTHYIDAE	2186
BERYCIDAE	2192
HOLOCENTRIDAE	2195
Order ZEIFORMES	2202
CYTTIDAE	2202
OREOSOMATIDAE	2205
ZENIONTIDAE	2215
GRAMMICOLEPIDIDAE	2218
ZEIDAE	2223
Order GASTEROSTEIFORMES	2230
SYNGNATHIDAE	2230
AULOSTOMIDAE	2239
FISTULARIIDAE	2241
MACRORAMPHOSIDAE	2245
Order SCORPAENIFORMES	2248
DACTYLOPTERIDAE	2248
SCORPAENIDAE	2250
PLATYCEPHALIDAE	2288
PSYCHROLUTIDAE	2290
LIPARIDAE	2292
PERISTEDIIDAE	2296
TRIGLIDAE	2298
INDEX	2315

BONY FISHES

GENERAL REMARKS

by K.E. Carpenter and E.E. Biesack, Old Dominion University, Virginia, USA.

Bony fishes constitute the bulk, by far, of both the diversity and total landings of marine organisms encountered in fisheries of the eastern central Atlantic. They are found in all macrofaunal marine and estuarine habitats and exhibit a lavish array of adaptations to these environments. This extreme diversity of form and taxa presents an exceptional challenge for identification. There are 29 orders and 230 families of bony fishes presented in this guide, representing all families known from the area. Each order and family presents a unique suite of taxonomic problems and relevant characters. The purpose of this preliminary section on technical terms and guide to orders and families is to serve as an introduction and initial identification guide to this taxonomic diversity. It should also serve as a general reference for those features most commonly used in identification of bony fishes throughout the remaining volumes. However, we cannot begin to introduce the many facets of fish biology relevant to understanding the diversity of fishes in a few pages. For this, the reader is directed to one of the several general texts on fish biology such as the ones by Bond (1996), Moyle and Cech (1996), and Helfman *et al.* (1997) listed below. A general introduction to the fisheries of bony fishes in this region is given in the introduction to these volumes. Taxonomic details relevant to a specific family are explained under each of the appropriate family sections.

The classification of bony fishes continues to transform as our knowledge of their evolutionary relationships improves. Many changes have been proposed in fish classification since the initiation of this project in 1993. At the time, Eschmeyer's (1990) classification was the most widely accepted in its general form and it served as a basis for planning the taxonomic assignments for these volumes. Since then, Nelson's (2006) fourth edition of "Fishes of the World" appeared with some changes to Eschmeyer's classification and some reassignments in these volumes were made to adjust for improvements. In addition, some authors made a special case for a deviation from our acceptance of Nelson's classification and these were mostly incorporated. The classification in Eschmeyer's (1998) more recent monumental "Catalog of Fishes" largely follows Nelson (1995) and further supports the basis for the classification used here. There have been a number of notable advances in our knowledge of the phylogenetic relationships of bony fishes in recent years. Many of these are found in Johnson and Anderson (1993) and Stiassny *et al.* (1996). However, much of the comparative morphology with implications to changes in classifications in these volumes needs to be further corroborated before these changes will become commonly used. An alternative classification with modifications to Nelson's (1994) classification, particularly with respect to suborders of perciform fishes, can be found in Paxton and Eschmeyer (1994).

The common English names of orders and families varies widely from place to place. To help standardize common family names, we asked the authors to choose the single most representative name. In cases where there was ambiguity, we tended to choose the one listed in Nelson (2006). This recommended common family name is given in the guide to orders and families section. In separate family accounts, the preferred name is given first and followed by secondary frequent common names listed in parentheses.

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TECHNICAL TERMS AND MEASUREMENTS

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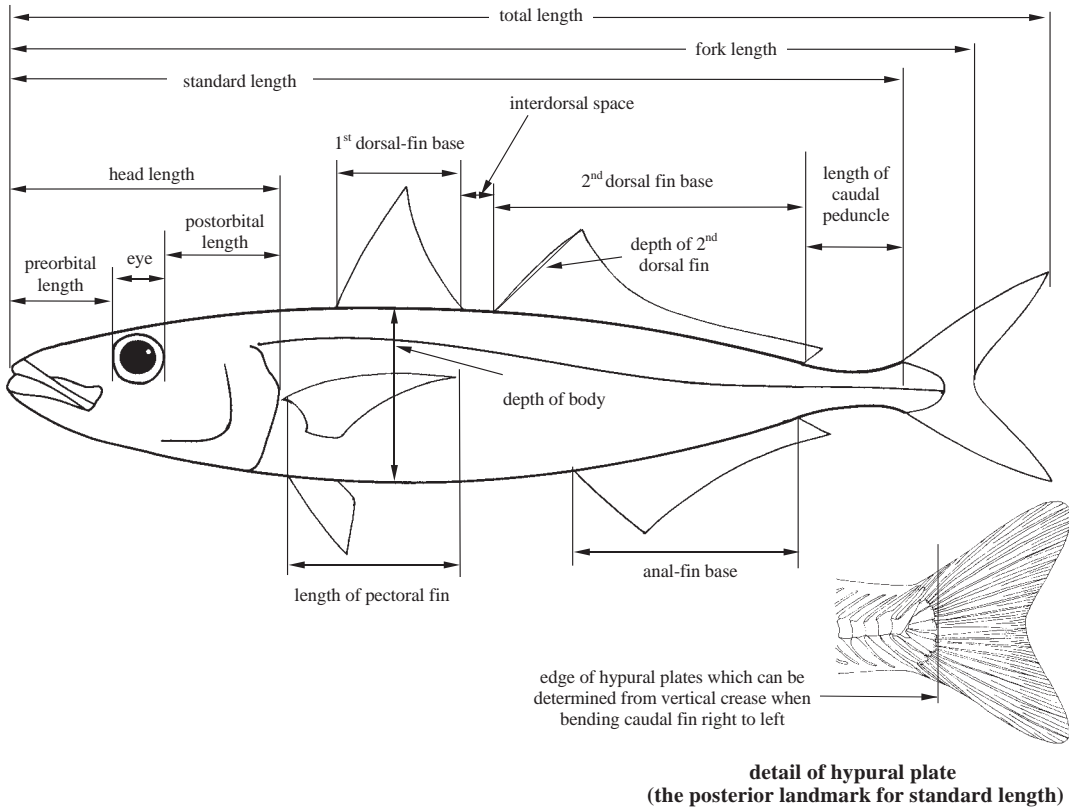


Fig. 1 common external measurements

NOTE: although all measurements are shown vertical and horizontal, all distances are measured as the straight line, shortest distance between the 2 points

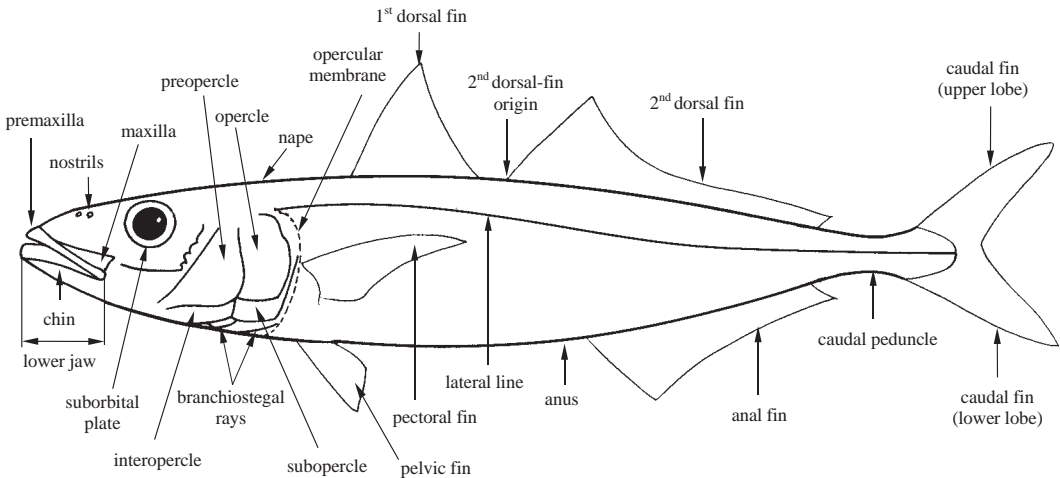


Fig. 2 common external features

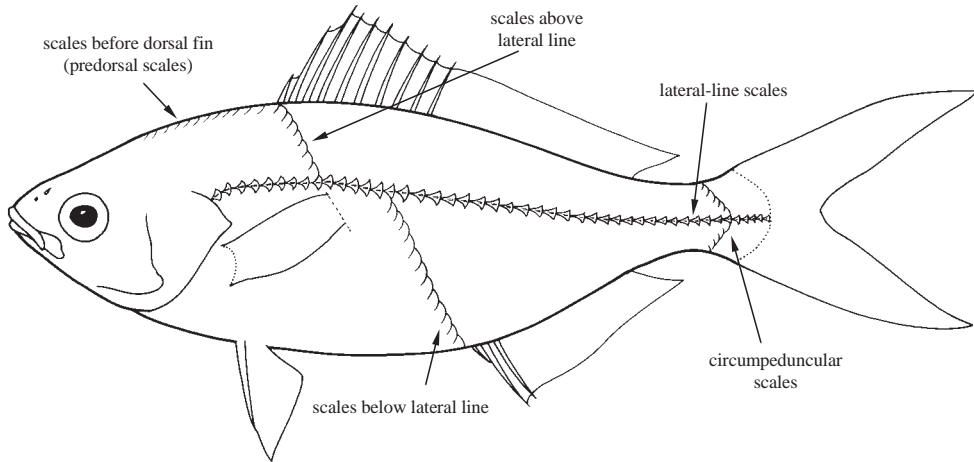


Fig. 3 common scale counts

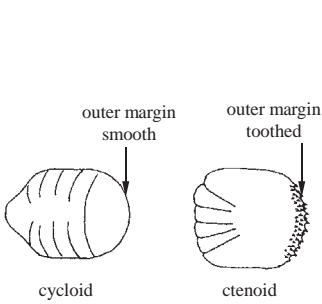


Fig. 4 schematic examples of typical scales

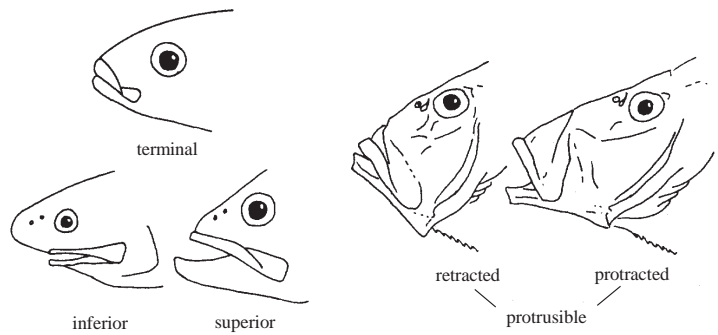


Fig. 5 mouth position and protrusibility

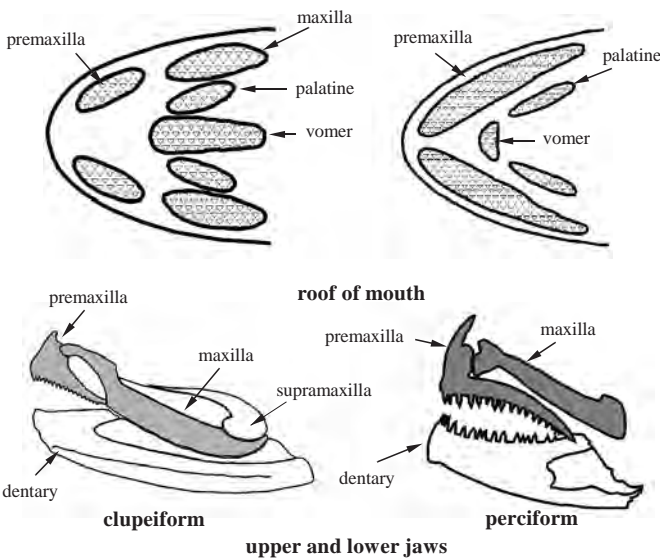


Fig. 6 teeth-bearing bones in the roof of the mouth and upper jaw, and alternative positions of premaxilla and maxilla in ancestral (clupeiform) versus derived (perciform) fishes

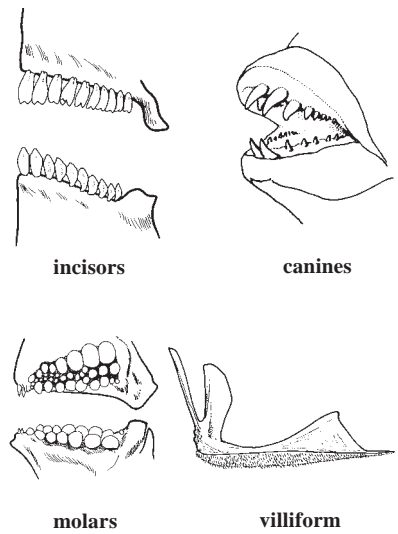


Fig. 7 common types of teeth

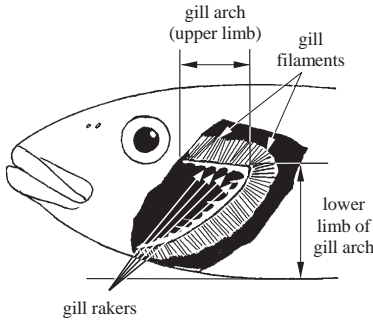


Fig. 8 position of 1st left gill arch with gill cover removed

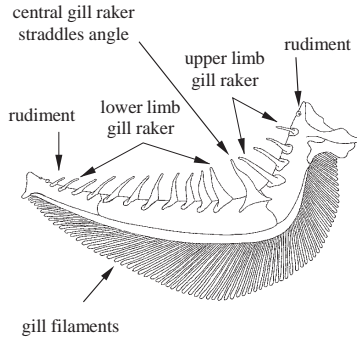


Fig. 9 structures of 1st left gill arch

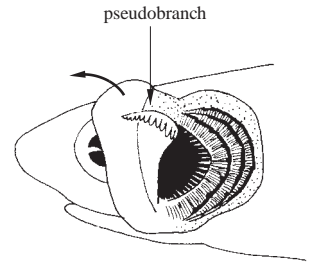


Fig. 10 position of pseudobranch with left gill cover folded forward

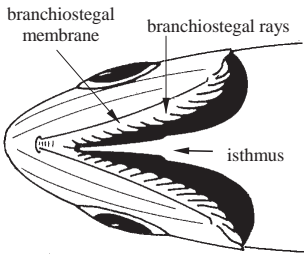


Fig. 11 structures on ventral side of head

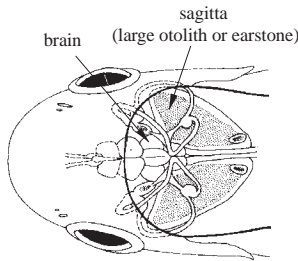


Fig. 12 position of sagittal otolith inside head (dorsal view)

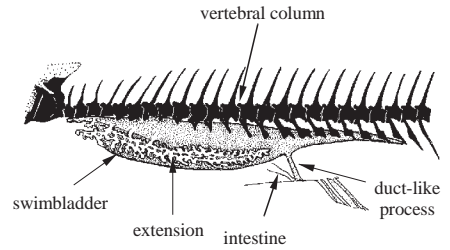


Fig. 13 position of swimbladder inside body cavity

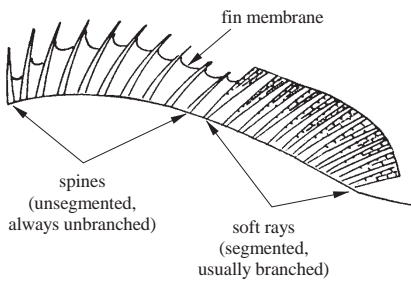


Fig. 14 example of a continuous dorsal fin of a spiny-rayed fish

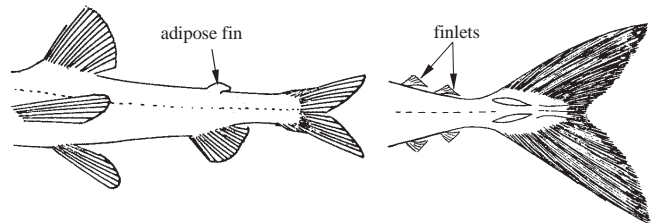


Fig. 15 accessory dorsal and anal fins: adipose fin and finlets

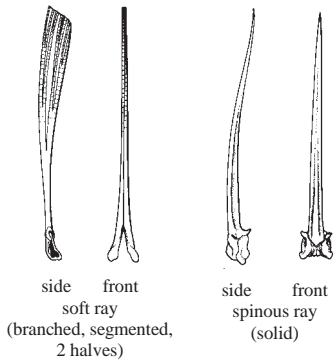


Fig. 16 construction of fin rays

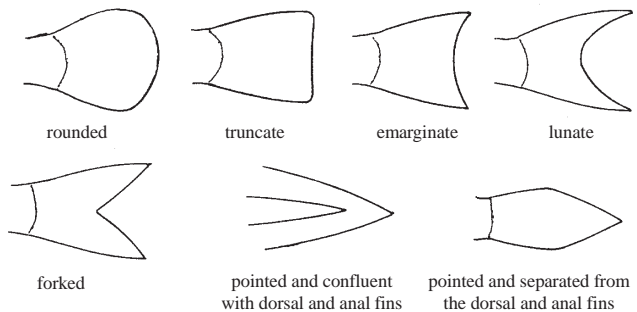


Fig. 17 most common types of caudal fins

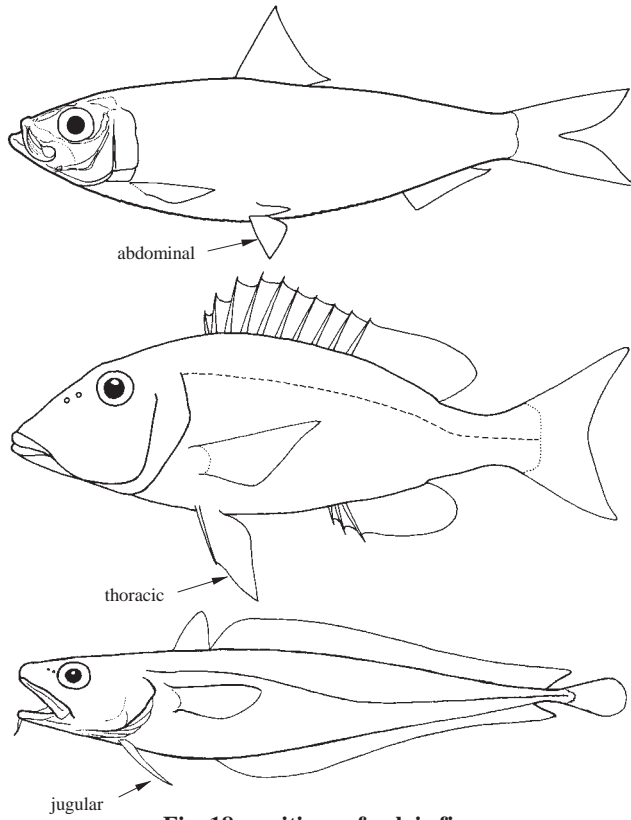


Fig. 18 positions of pelvic fins

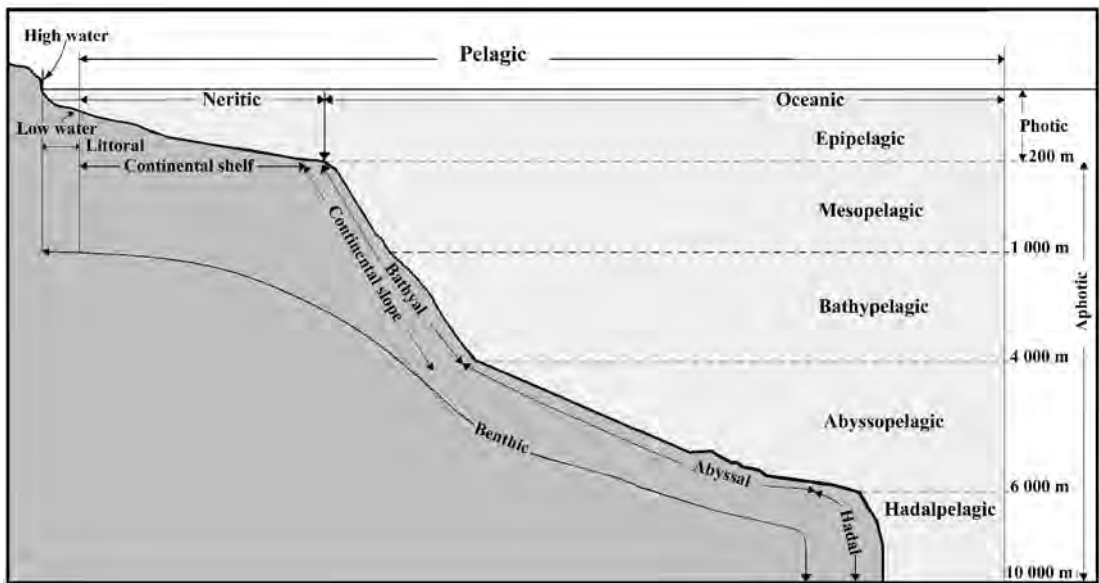


Fig. 19 marine habitat divisions

GLOSSARY OF TECHNICAL TERMS USED FOR BONY FISHES

by K.E. Carpenter, Old Dominion University, Virginia, USA.

- Abdomen** – The belly; ventral area between breast and anus.
- Abyssal** – Region of the ocean floor between the depths of 4 000 and 6 000 m (Fig. 19).
- Abyssopelagic** – Pelagic zone between the depths of 4 000 and 6 000 m (Fig. 19).
- Acute** – Pointed or sharp.
- Adipose eyelid** – Transparent fleshy tissue covering part or all of the eye in some fishes.
- Adipose fin** – Small, fleshy fin without rays or spines on the dorsal midline between the dorsal and caudal fins of some fishes (Fig. 15).
- Air bladder** – See **swimbladder**.
- Anadromous** – Living mostly in sea water and migrating to fresh water to spawn.
- Anal fin** – Unpaired median fin supported by rays on the tail behind the anus (Fig. 2).
- Anterior** – Pertaining to the front portion.
- Antrorse** – Turned forward.
- Anus** – Posterior opening of the intestine through which wastes are excreted; vent (Fig. 1).
- Attenuate** – Elongate; extended or drawn out.
- Axil** – Angular area between pectoral fin and body, equivalent to arm-pit.
- Axillary scale** – An elongate or modified scale at the insertion of the pelvic or pectoral fins in some fishes.
- Band** – Usually refers to an oblique or irregular marking.
- Bar** – Elongate nearly straight vertical marking.
- Barbel** – Elongate fleshy tentacle-like sensory projection, usually about the mouth or head.
- Base of fin** – Part of the fin that attaches to the body (Fig. 1).
- Bathyl zone** – Region of the ocean floor from the edge of the continental shelf (at around 200 m) down to a depth of about 4 000 m (Fig. 19).
- Bathypelagic** – Pelagic zone between the depths of about 1 000 and 4 000 m (Fig. 19).
- Benthic** – Referring to the ocean bottom; benthic species are closely associated with and often attached to the ocean bottom (Fig. 19).
- Benthopelagic** – Inhabiting waters above but near the bottom or, spending part of the time on the bottom and part of the time further up in the pelagic zone.
- Bifed, bifurcate** – Separated or divided into 2 branches (forked).
- Branchiostegal membranes** – Membranes on the ventral interior surface of the gill cover supported by branchiostegal rays.
- Branchiostegal rays, branchiostegals** – Bony rays supporting the membranes inside the lower part of the gill cover (Fig. 11).
- Breast** – Ventral surface of body between the isthmus and pectoral or pelvic fins.
- Canine** – Slender conical tooth, often enlarged and elongate (Fig. 7).
- Carapace** – A hardened encasing covering all or part of the body.
- Cardiform** – Small short conical outgrowths in a close-set patch or band; usually refers to a band of close-set small conical teeth.
- Catadromous** – Living in fresh water and migrating to the sea to spawn.
- Caudal fin** – The tail fin (Fig. 1).
- Caudal peduncle** – Posterior part of body between the rear parts of the dorsal and anal fins, and the caudal fin (Fig. 1).
- Cheek** – Side of head below and slightly behind the eye.
- Cirrus** – Small, fleshy protuberance.
- Cleithral** – Pertaining to the cleithrum or area of the cleithrum which is typically the largest bone of a series of bones that support the pectoral fin (pectoral-girdle bones).
- Compressed** – Flattened laterally; a body shape much deeper than wide.
- Continental rise** – The gentle slope at the base of the continental slope.

Continental shelf – The flattened edge of the continental land mass between the coast and the continental slope (generally, the continental subtidal zone down to a depth of about 200 m).

Continental slope – The sloping edge of the continental land mass, generally beginning at a depth of around 200 m.

Crenate – Having a notched edge.

Crenulate – Scalloped or wavy edge.

Ctenoid scale – Scale with a spiny posterior margin (Fig. 4).

Cycloid scale – Scales with smooth posterior margin, without spines on posterior margin (Fig. 4).

Deciduous – Easily shed or rubbed off; refers to scales.

Demersal – Free living close to the sea bottom.

Dentary – The main tooth bearing bone of the lower jaw (Fig. 6).

Denticle – Small tooth-like structures.

Depressed – Flattened from top to bottom; body shape much wider than deep.

Dimorphism – Having 2 different morphological forms.

Distal – Near outer edge; far end from point of attachment or centre of body.

Dorsal – Back or upper body.

Dorsal fin – Median fin supported by spines and/or rays; sometimes separated into 2 or more fins with the anteriormost fin designated the first (Fig. 2).

Ectopterygoid – One of the series of bones that suspends the jaw.

Edentulous – Without teeth.

Emarginate – Margin slightly concave; pertains to a caudal-fin shape (Fig. 17).

Entire – Smooth or straight margin.

Epaxial – Referring to the main body muscles (myomeres) of the upper sides.

Estuary – Partly enclosed body of sea water that is measurably diluted with fresh water.

Falcate – Sickle-shaped.

Finlets – Small separate dorsal and anal fins (Fig. 15).

Forked – Branched; caudal fin shape with distinct upper and lower lobes and the posterior margin of each lobe relatively straight or gently curved (Fig. 17).

Furcate – Forked.

Fusiform – Spindle-shaped; body shape that is cylindrical and tapering at both ends.

Gas bladder – See **swimbladder**.

Gill – Organ for exchange of dissolved gasses between water and the blood stream; gill tissues are supported by a gill arch in fishes (Figs 8 and 9).

Gill arch – Bony angular skeleton that supports the gill filaments and gill rakers (Figs 8 and 9).

Gill filaments – Principal site of gas exchange in the gill (Fig. 9).

Gill membrane – Membranes along the posterior and ventral margin of the gill cover.

Gill rakers – Bony projections along the front edge of the gill arch that help prevent food from escaping through the gill opening (Figs 8 and 9); gill-raker counts are typically taken on the outermost (first) gill arch and are often separated into upper limb and lower limb counts; if a raker straddles the angle of the arch, the count is included in the lower limb; rudiments are included in counts unless otherwise noted.

Gular plate – Bony plate covering the underside of the head as exemplified in elopiform fishes.

Hadal zone – Region of the ocean floor between the depths of 6 000 and 10 300 m (Fig. 19).

Herbivore – Feeding on plants.

Heterocercal – Asymmetrical caudal fin with the upper lobe larger than the lower lobe.

Hyoid – Referring to the series of bones behind the gill cover that suspends the branchiostegal rays and connects to the gill arches.

Hypural plates – Series of bones that support the caudal-fin rays (Fig. 1b).

Illicium – Modified isolated first ray of the dorsal fin that forms the “fishing gear” (rod and lure) in anglerfishes.

Incised – Notched, cut into; see Dorsal fin.

Incisor – Flattened chisel-shaped tooth (Fig. 7).

Inferior – Mouth position on underside of head with snout projecting in front of mouth (Fig. 5).

Infraorbital – Another term for suborbitals (see **lacrimal**).

Insertion – The anterior or posterior point of attachment of a fin to the body.

Integument – Referring to the skin.

Interdorsal – The space on the back between the bases of the first and second dorsal fins (Fig. 1).

Interopercle – The lower anterior bone of the gill cover (Fig. 2).

Interorbital – The space on top of the head between the eyes.

Intertidal – The area of the shore covered at high tide and exposed at low tide.

Isthmus – The part of the underside of the head separating the gill openings (Fig. 11).

Jugular – Pertaining to the throat region; pelvic fins are jugular when positioned on the underside of the head in front of the pectoral fins (Fig. 18).

Lacrimal (lachrymal) – The most anterior or the series of 6 or fewer bones around the lower margin of the eye that are referred to as suborbital bones; the lacrimal is sometimes also referred to as preorbital.

Lanceolate – Spear- or lance-shaped.

Lateral – The side or toward the side.

Lateral line – A vibration sensory canal along the side of the body with a series of pores that communicate to the outside of the body, often through specialized pored lateral-line scales (Figs 2 and 3).

Littoral – The intertidal area of the shore.

Lunate – Crescent-shaped; caudal-fin shape that is deeply emarginate with narrow lobes (Fig. 16).

Mandible – Lower jaw.

Maxilla – The bone in the upper jaw behind the premaxilla. In ancestral fishes the maxilla is the principal bone of the upper jaw that bears teeth; in derived fishes it generally does not bear teeth and serves more to support the premaxilla (Fig. 6).

Median – The middle or toward the midline.

Median fins – Fins that lie on the midline; the dorsal, anal, and caudal fins.

Melanophore – Cell carrying black or greyish pigments.

Membrane – A thin sheet of tissue; often refers to thin sheet of tissue between fin (Fig. 14) and branchiostegal (Fig. 11) rays.

Mesopelagic – Pelagic zone between the depths of about 200 and 1 000 m (Fig. 19).

Molar – A low, blunt, rounded tooth for crushing and grinding (Fig. 7).

Nape – The dorsal part of the body just behind the occiput or hard dorsal region of the skull (Fig. 2).

Neritic – Nearshore; the zone of water above the continental shelves.

Nuchal – Pertaining to the neck; the nape of the neck.

Occiput – Upper back part of the head or skull.

Ocellus – A round eye-like spot or marking with a marginal ring.

Opercle – The large posterior upper bone of the gill cover (Fig. 2).

Operculum – The gill cover composed of the preopercle, opercle, interopercle, and subopercle.

Orbital – Referring to the eye, particularly the bones surrounding the eye.

Origin – The anterior point of attachment of fins to the body (anterior insertion) (Fig. 2).

Otolith – A small bone or earstone in the inner ear of fishes (Fig. 12).

Oviparous – Egg laying, development of the embryo occurs externally and nourishment comes from the egg.

Ovoviviparous – Eggs are retained in the female and the embryo develops partially or wholly internally but nourishment is still derived from the egg.

Paired fin – Fins found on both sides of the body; the pectoral and pelvic fins (Fig. 2).

Palate – Roof of the mouth.

Palatine – Paired bones on each side of the roof of mouth, behind and lateral to the vomer, often bearing teeth (Fig. 6).

Papilla – A small fleshy projection.

Parietal – A bone of the upper posterior part of the skull.

Pectoral fins – Paired fins on the sides behind the gill cover (Fig. 2).

Peduncle – A stalk-like process (see **caudal peduncle**).

Pelagic – The division of the marine environment composed of all the ocean's water; living in the open seas or oceans (Fig. 18).

Pelvic fins – Paired fins in front of the anus (Fig. 2), sometimes called the ventral fins. Ancestral fishes generally have the pelvic fins in the abdominal position while derived fishes generally have the pelvic fins in the thoracic or jugular position (Fig. 18).

Peritoneum – A thin membrane that lines the body cavity, covers the heart, and forms the mesenteries.

Pharyngeal teeth – Teeth on the elements of the last gill arch or pharyngeal arch.

Photophore – Light-emitting organ or luminous spot.

Physoclistous – The advanced condition wherein the pneumatic duct is closed in the adult (see **physostomous**).

Physostomus – The primitive condition wherein a connection via the pneumatic duct between the swimbladder and the gut is retained in adults potentially allowing gas to enter the swimbladder through gulping air.

Posterior – Pertaining to the rear portion.

Postmaxillary process – A broad or finger-like extension of the premaxilla along the upper edge of the lower arm of this bone.

Postorbital – One or more of the suborbital bones, starting with the third suborbital bone and possibly referring also to the fourth, fifth and sixth suborbital bone (see **lacrimal**).

Premaxilla – Anterior bone in the upper jaw (see **maxilla**) (Fig. 6).

Preopercle – The upper anterior bone of the gill cover (Fig. 2).

Preorbital – Referring to the region before the eye; a suborbital bone in front and below the eye.

Principal caudal-fin ray – The branched and unbranched caudal-fin rays that reach the rear margin of the fin.

Procurrent caudal-fin ray – Small ray at the insertions of the fin that do not reach the rear margin.

Proximal – Part nearest the centre of the body.

Pseudobranchium – A small patch of gill-like filaments on the upper inner surface of the gill cover (Fig. 10).

Pyloric caeca – Finger-like projections of the digestive system near the juncture of the stomach and the small intestine.

Ray – Supporting element of fins (Fig. 16). Ray is sometimes used as a collective term to designate both soft rays (see below) and spines (see below). It is also sometimes used to designate exclusively, soft rays.

Rostral/rostrum – Towards the front of the fish/ the area of the snout.

Rounded – A caudal-fin shape with the terminal border smoothly convex (Fig. 17).

Rudiment – A poorly developed structure, usually small and minimally functional at best. These include small unbranched soft rays and small gill rakers at the ends of a gill arch.

Scapula/scapular – A flat bone on the upper part of the pectoral girdle/pertaining to the shoulder region.

Scute – A modified scale that can be enlarged, hardened, ridged, keeled, or spiny.

Serrate – With saw-like teeth along a margin.

Setae – Bristles or hardened hair-like projections.

Soft dorsal fin – The portion of the dorsal fin supported by soft rays (Fig. 14).

Soft ray – A fin support element that is composed of 2 halves (paired laterally), segmented, and usually flexible and branched (Fig. 16). Rarely, soft rays can be pointed and stiff and appear to be a spine.

Sphenotic – A bone of the skull and above and behind the orbit.

Spine – A fin support element that is unpaired laterally, unsegmented, unbranched and usually stiff and pointed (Fig. 16); also refers to slender sharply pointed bony processes not associated with fins.

Spinous dorsal fin – The anterior portion of the dorsal fin that is supported by spines (Fig. 14).

Spinule – A small spine.

Standard length – The distance from the anteriormost point on the fish to the posterior end of the vertebral column that is generally equivalent to the end of the hypural plates (and recognized externally by the crease between the tail and caudal fin when the caudal fin is bent laterally); sometimes abbreviated as SL (Fig. 1).

Stripe – Generally refers to a horizontal nearly straight side marking.

Subopercle – The lower rear bone in the gill cover (Fig. 2).

Suborbital bones – See **lacrimal**.

Subtidal – The ocean floor below the low tide mark.

Sulcus – A groove or fissure.

Superior – Above or on the upper surface; a mouth position with the snout behind the anterior opening of the mouth (Fig. 5).

Supramaxilla – One or 2 bones above the maxilla; found in primitive bony fishes (Fig. 6).

Swimbladder – A gas-filled sac lying under the backbone in the abdominal cavity, used in buoyancy; also referred to as airbladder or gasbladder (Fig. 12).

Symphysis – The articulation between 2 bones; often refers to the anterior juncture between the 2 halves of either jaw.

Terminal – Pertaining to at the end, or situated at the end; a mouth position with the opening of the mouth even with the tip of the snout (Fig. 5).

Terete – Cylindrical, typically tapering at both ends, circular in cross-section, and smooth.

Thoracic – Referring to the breast region; pelvic fins are thoracic in position when directly below the pectoral fins (Fig. 17).

Truncate – Terminating abruptly in a square end; a caudal-fin shape with a vertically straight terminal border (Fig. 16).

Vent – See **anus**.

Ventral – The bottom, lower surface, or abdominal part of the body.

Ventral fins – See **pelvic fins**.

Vertebrae – Bones of the vertebral column or back bone; vertebral counts are often given as a formula; precaudal vertebrae + caudal vertebrae, where precaudal vertebrae typically have paired ventrolateral extensions that support ribs and caudal vertebrae have a single ventrally directed spine (haemal spine) and do not support ribs.

Vertical fins – The median fins; the dorsal, caudal, and anal fins.

Vestige – Small or underdeveloped structure, as in a rudiment.

Villiform – Many small slender outgrowths, usually in a close-set patch or carpet; often refers to slender teeth forming velvety bands (Fig. 7).

Viviparous – Development of embryo internally with nourishment from the mother.

Vomer – An unpaired median bone on the roof of the mouth (Fig. 6).

GUIDE TO ORDERS AND FAMILIES OCCURRING IN THE AREA

by K.E. Carpenter and E.E Biesack, Old Dominion University, Virginia, USA

This guide is designed to help find the family identity of a fish in 2 steps. First, the appropriate order should be found by comparing the characters listed under each order until a match is found. Second, the characters listed to distinguish the families within the order should be compared with the fish in hand until a match is found. Volume and page numbers for the family account are listed after each family to refer to further information about the family and its species. The volume number is listed first, followed by the page number in the volume. The orders and families are listed in phylogenetic order. Key characters for the order are presented only on the first family listed in the order but are generally applicable to all families in the order. These order-specific characters are presented in capital letters and highlighted in grey. This will help distinguish the ordinal characters from the unhighlighted, uncapitalized characters useful in distinguishing among the families within the order. These family characters are presented with a general diagram representing the family and point to the area on the fish where the character can be found, if appropriate. The diagram representing the family can, in most cases, help with identification through its generalized shape. However, in some families, the general shape of particular genera and species varies widely within the family and therefore particular care should be paid to examination of the characters. In some cases, additional diagrams of morphological details are presented to help clarify the use of the character. Characters used are not only key characters but also those characters most useful in distinguishing the family from similar looking families. This guide is specifically designed to work for those orders and families found in the eastern central Atlantic area and may not work well for identification to this level outside the area. The taxonomic placement of the included orders and families follows the designation by the authors at the time of writing for the sake of organization. Taxonomic remarks are included where this designation differs from that recognized under Eschmeyer's Catalog of Fishes at the time of publication (2015).

Identification hints: The orders and families are listed in phylogenetic sequence. Therefore, it is helpful to be able to distinguish a primitive or ancestral fish from an advanced or derived fish to quickly find the appropriate order. This is not always an easy task but certain characters can be examined to give a general impression. For example, more ancestral fishes generally have the position of the pelvic fin more abdominal while advanced fishes usually have them thoracic or jugular (Fig.18 above). Primitive fishes also tend to lack true spines (Fig. 16), have the maxilla with teeth and a prominent part of the gape (Fig. 6), and have non-protrusible mouths (Fig. 5). There are some exceptions to this, however, and these characters should be used cautiously. An example are the barracudas (family Sphyrnidae) that have true spines and the premaxilla predominant in the gape but that have abdominal pelvic fins and non-protrusible jaws. Since barracudas are considered advanced fishes, the primitive characteristics are thought to have evolved secondarily from more advanced character states.

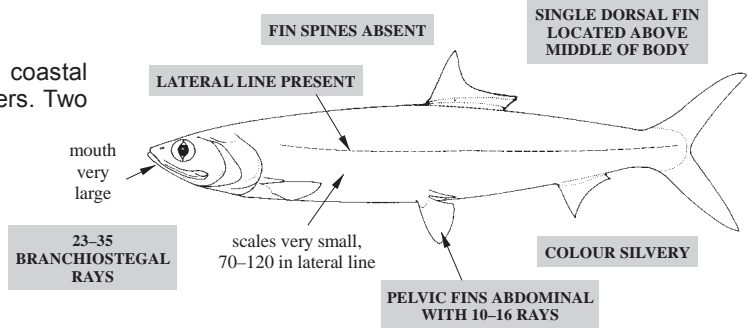
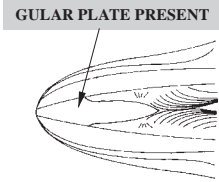
Order ELOPIFORMES – Tarpons and allies

ELOPIDAE

Vol. 3, p. 1584

Tenpounders (ladyfishes)

To 90 cm. Mostly midwater in coastal marine waters and brackish waters. Two species in the area.

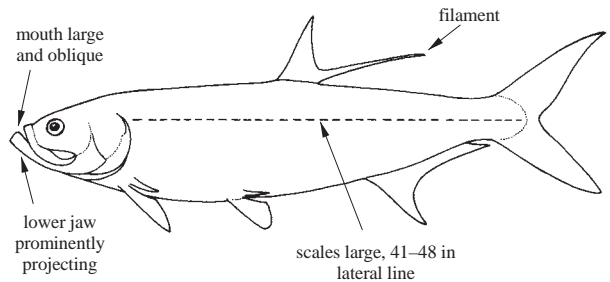


MEGALOPIDAE

Vol. 3, p. 1588

Tarpons

To 250 cm. Mostly pelagic in coastal marine waters, but also brackish, hypersaline, and fresh waters. A single species in the area.



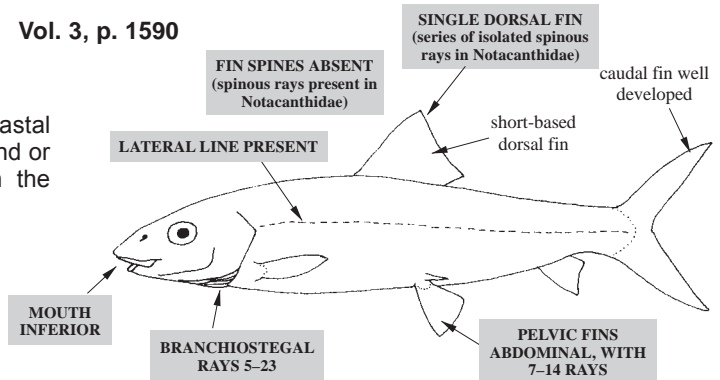
Order ALBULIFORMES – Bonefishes and allies

ALBULIDAE

Vol. 3, p. 1590

Bonefishes

To 77 cm. Found in shallow coastal waters, estuaries and bays, over sand or mud bottoms. A single species in the area.



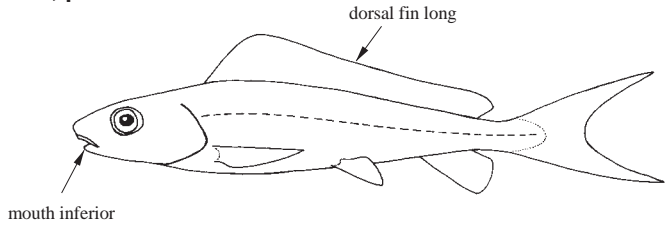
PTEROTHRISSIDAE

Vol. 3, p. 1592

Longfin bonefishes

To 40 cm. Bathydemersal at depths between 50 and 500 m. A single species in the area.

Taxonomic remarks: Eschmeyer's Catalog of Fishes currently places this group in family Albulidae, subfamily Pterothrissinae.

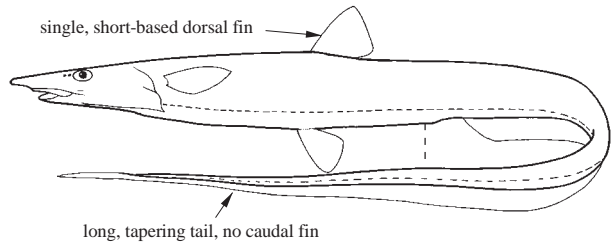


HALOSAURIDAE

Vol. 3, p. 1594

Halosaurs

To 100 cm. demersal from depths between 500 and 3 000 m. Ten species in the area.

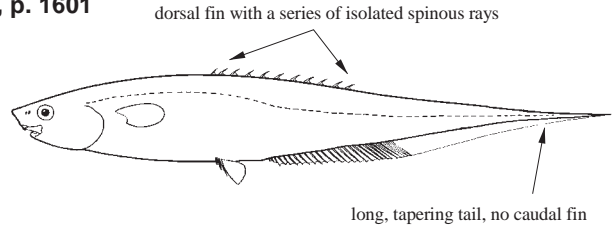


NOTACANTHIDAE

Vol. 3, p. 1601

Spiny eels

To about 120 cm. Demersal at depths between 200 and 3 500 m. Four species in the area.



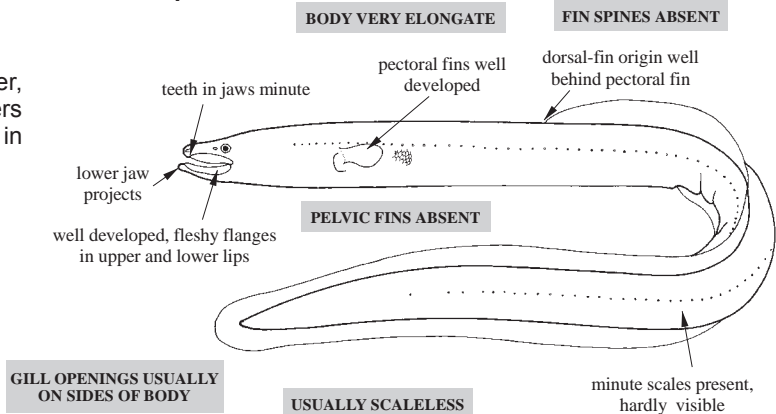
Order ANGUILLIFORMES – Eels

ANGUILLIDAE

Vol. 3, p. 1605

Freshwater eels

To 150 cm. Mainly in fresh water, but migrating to oceanic waters for spawning. A single species in the area.

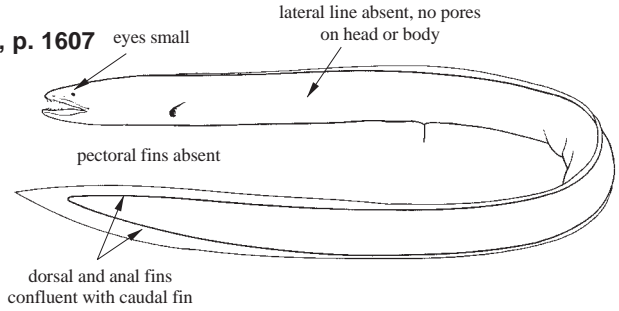


HETERENCHELYIDAE

Vol. 3, p. 1607

Shortfaced eels

To 1 m. Shallow waters over sandy or muddy bottoms. Five species in the area.

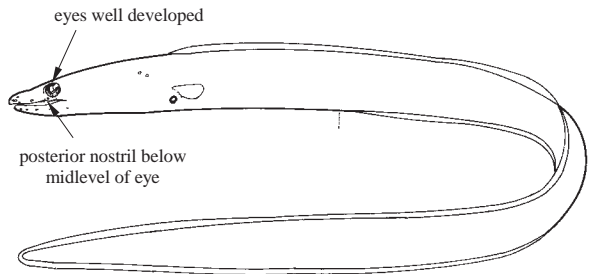


CHLOPSIDAE

Vol. 3, p. 1611

False morays

To 30 cm. Shallow water, cryptic in coral reefs, seagrass beds, and rubble. Two species in the area.

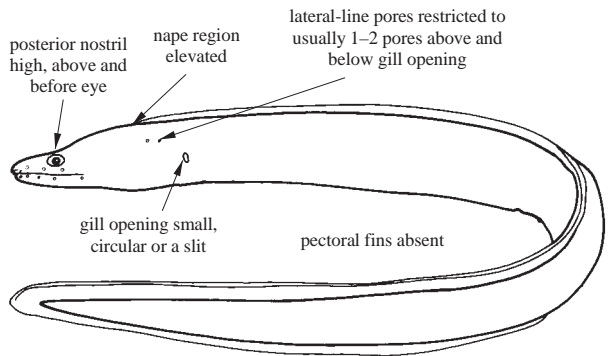


MURAENIDAE

Vol. 3, p. 1614

Morays

To 375 cm. Either in shallow coral reefs and rocks or to 500 m over sand or mud bottoms.. Twenty-six species in the area.

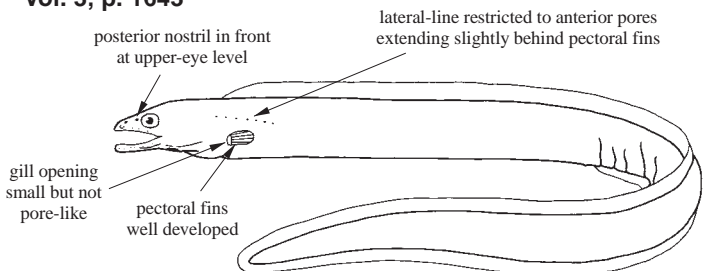


MYROCONGRIDAE

Vol. 3, p. 1643

Thin morays

To 54 cm. Habitat information not known. A single species in the area.

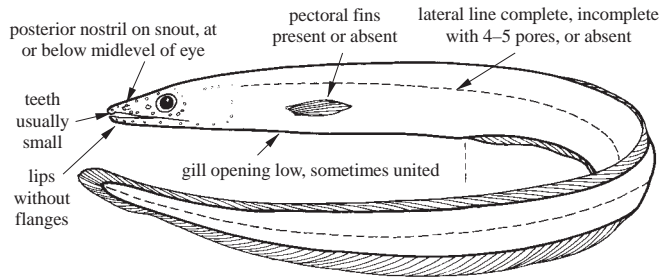


SYNAPHOBRANCHIDAE

Vol. 3, p. 1645

Cutthroat eels

To 1.8 m. Benthic to 4 700 m. Ten species in the area.



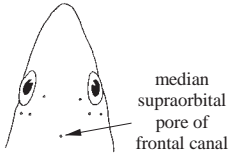
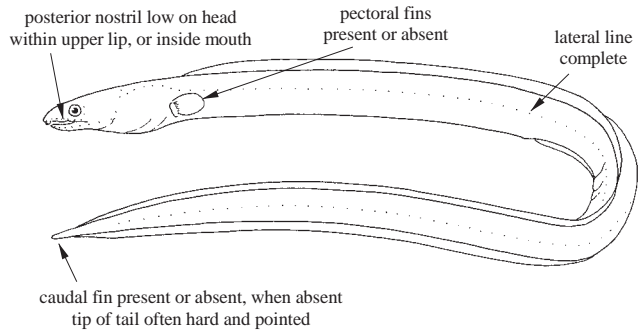
embedded scales in some species

OPHICHTHIDAE

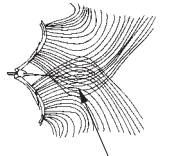
Vol. 3, p. 1654

Snake eels

To 250 cm. Freshwater, brackish, and marine habitats to 1 000 m over sand and mud bottoms. Forty species in the area.



dorsal view of head



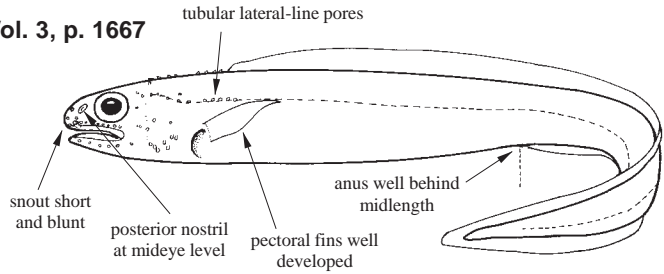
numerous overlapping branchiostegal rays

COLOCONGRIDAE

Vol. 3, p. 1667

Short-tailed eels

To 60 cm. Over muddy bottoms to 600 m. A single species in the area.

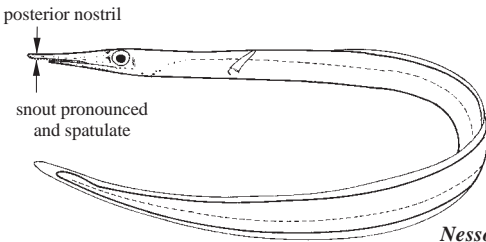


DERICHTHYIDAE

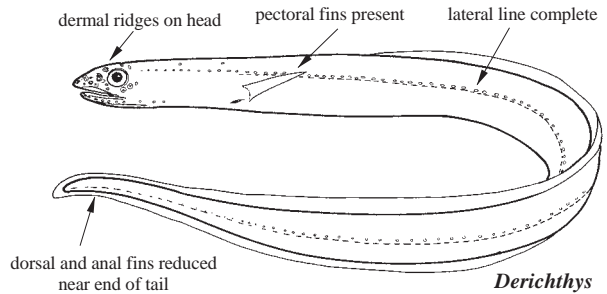
Vol. 3, p. 1669

Longneck eels

To 60 cm. Midwater to several hundred metres. Three species in the area.



Nessorhamphus



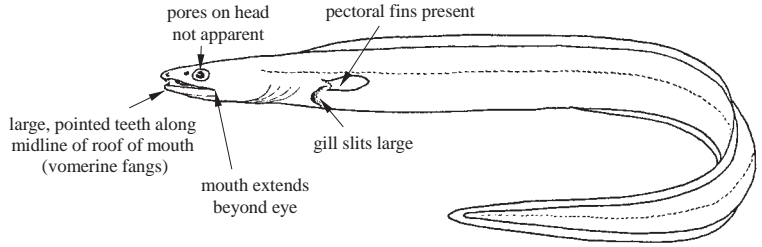
Derichthys

MURAENESOCIDAE

Pike congers

To 2 m. Demersal on sandy and muddy bottoms to 100 m. A single species in the area.

Vol. 3, p. 1673

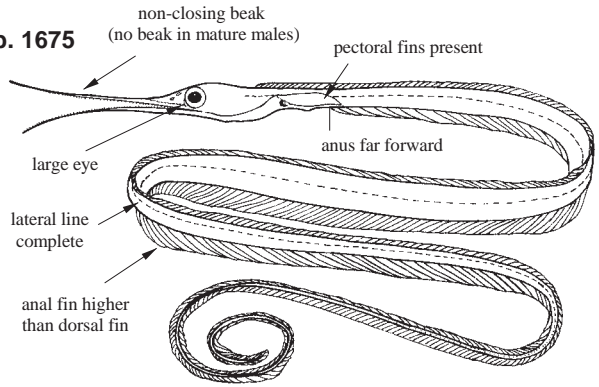


NEMICHTHYIDAE

Snipe eels

To 1 m. Midwater to 2 000 m, undergoing diel vertical migrations. Five species in the area.

Vol. 3, p. 1675

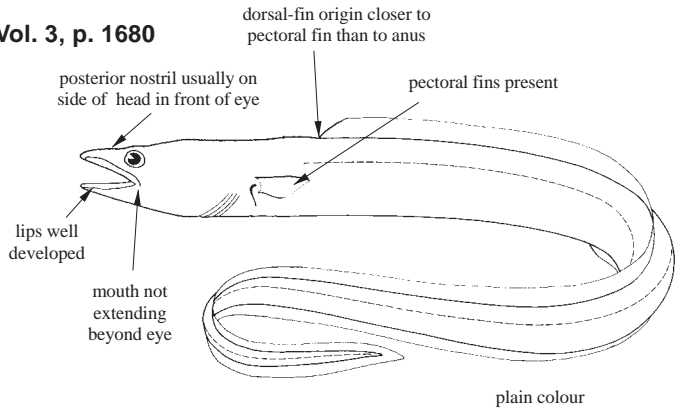


CONGRIDAE

Conger eels

To 2 m. Demersal on sand or mud bottoms to 2 000 m. Eighteen species in the area.

Vol. 3, p. 1680

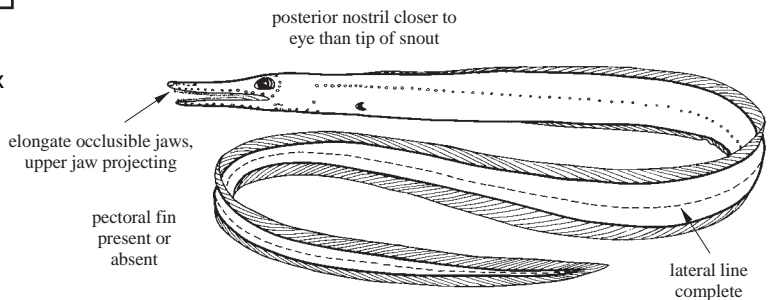


NETTASTOMATIDAE

Duckbill eels

To 1 m. Benthic to 2 000 m. Six species in the area.

Vol. 3, p. 1695

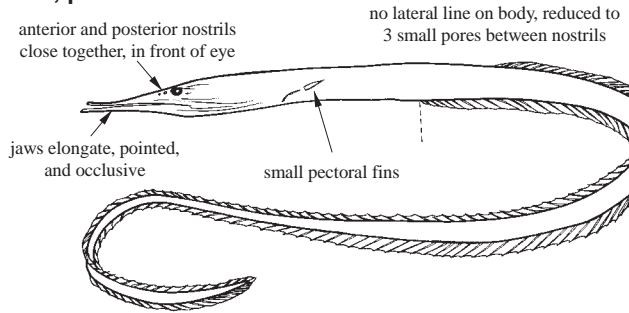


SERRIVOMERIDAE

Sawtooth eels

To 75 cm. Midwater to 1 000 m. Three species in the area.

Vol. 3, p. 1700



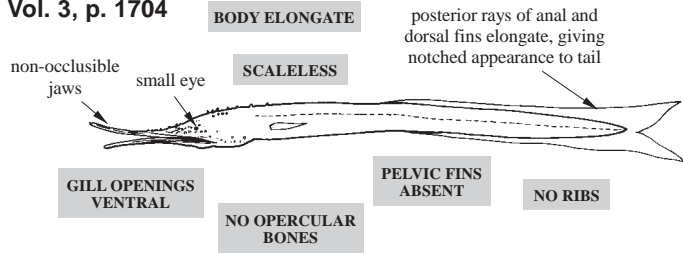
Order SACCOPHARYNGIFORMES – Gulpers and allies

CYEMATIDAE

Bobtail eels

To 15 cm. Midwater to 3 000 m. A single species in the area.

Vol. 3, p. 1704

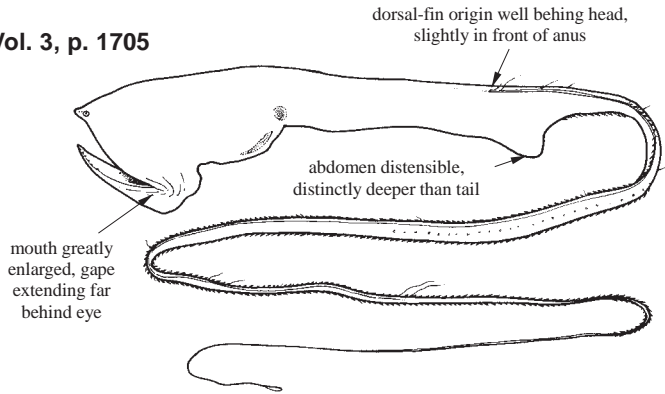


SACCOPHARYNGIDAE

Swallower eels

To 2 m. Pelagic to 3 000 m. Three species in the area.

Vol. 3, p. 1705

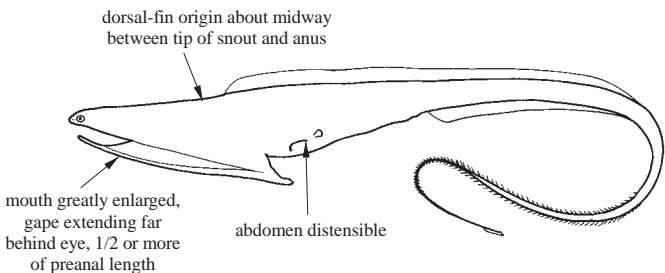


EURYPHARYNGIDAE

Pelican eels

To 75 cm. Midwater to 3 000 m. A single species in the area.

Vol. 3, p. 1708

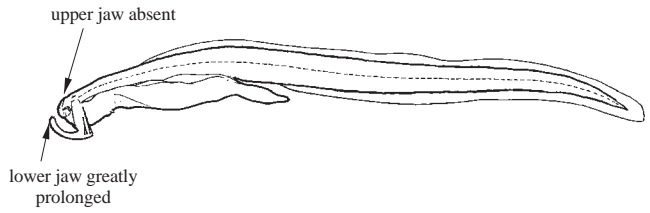


MONOGNATHIDAE

Vol. 3, p. 1710

One-jawed eels

To 16 cm. Pelagic to 5 400 m. Six species in the area.



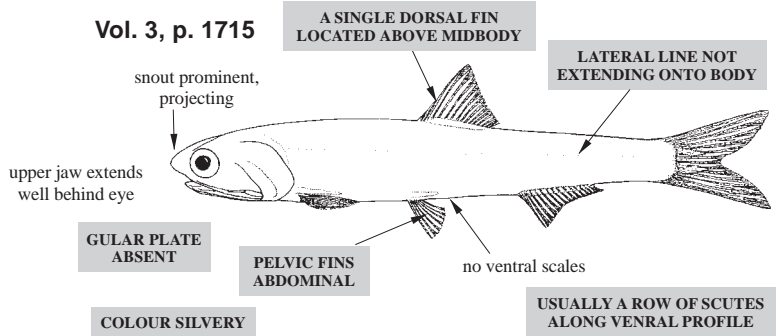
Order CLUPEIFORMES – Herrings and allies

ENGRAULIDAE

Vol. 3, p. 1715

Anchovies

To 20 cm. Coastal, pelagic to 400 m. A single species in the area, possibly another.

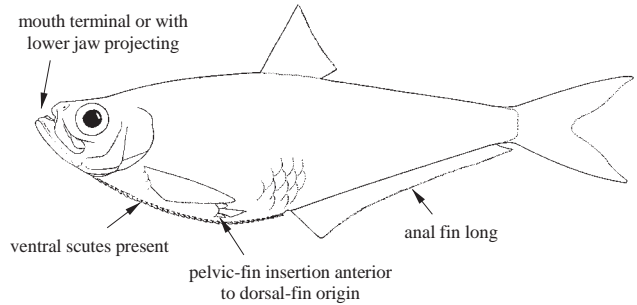


PRISTIGASTERIDAE

Vol. 3, p. 1719

Pristigasterids

To 22 cm. Coasts and estuaries to 25 m. A single species in the area.

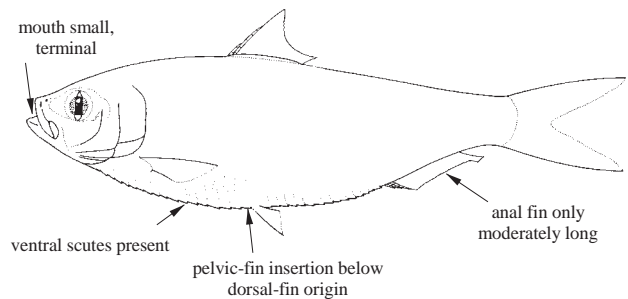


CLUPEIDAE

Vol. 3, p. 1722

Herrings

To 70 cm. Upper estuaries to marine coasts to 400 m. Twelve species in the area.



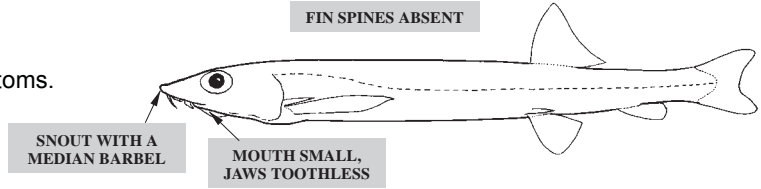
Order GONORYNCHIFORMES – Sandfishes

GONORYNCHIDAE

Vol. 3, p. 1740

Beaked sandfishes

To 50 cm. Demersal on soft bottoms. A single species in the area.



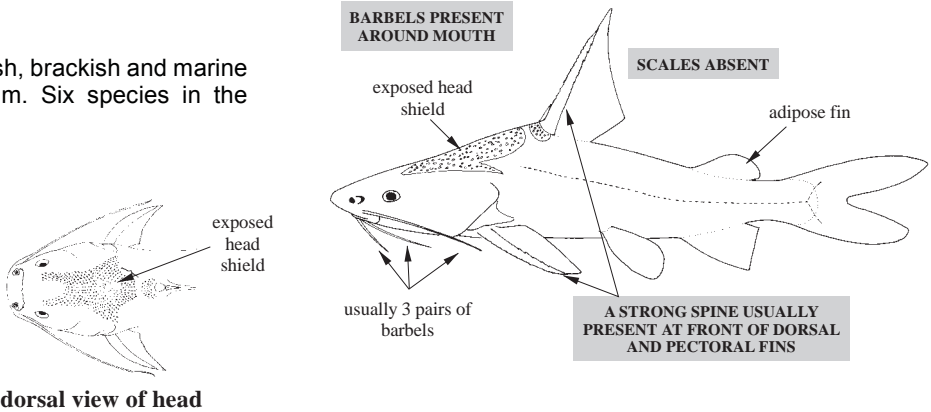
Order SILURIFORMES – Catfishes

ARIIDAE

Vol. 3, p. 1742

Sea catfishes

To 165 cm. Fresh, brackish and marine waters to 126 m. Six species in the area.



dorsal view of head

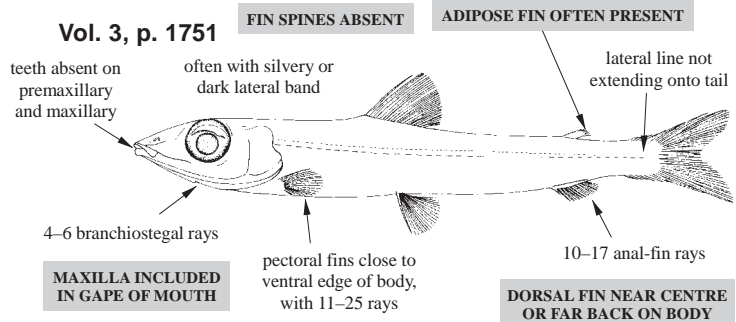
Order ARGENTINIFORMES – Marine smelts

ARGENTINIDAE

Vol. 3, p. 1751

Argentines

To 32 cm. Pelagic near bottom to 500 m. Three species in the area.

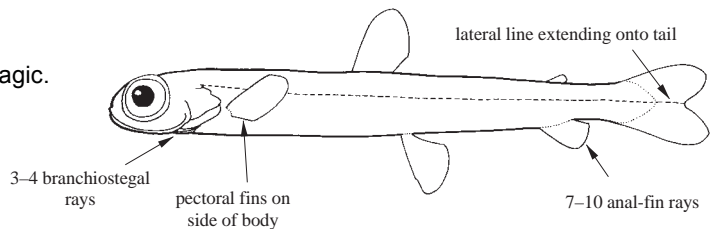


MICROSTOMATIDAE

Vol. 3, p. 1754

Pencilsmelts

To 21 cm. Mesopelagic and bathypelagic. Eight species in area.

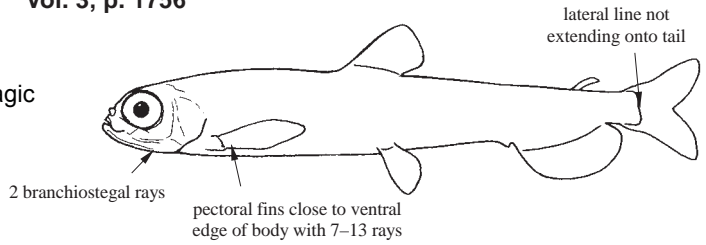


BATHYLAGIDAE

Vol. 3, p. 1756

Deepsea smelts

To 20 cm. Mesopelagic or bathypelagic to 1 400 m. Six species in the area.

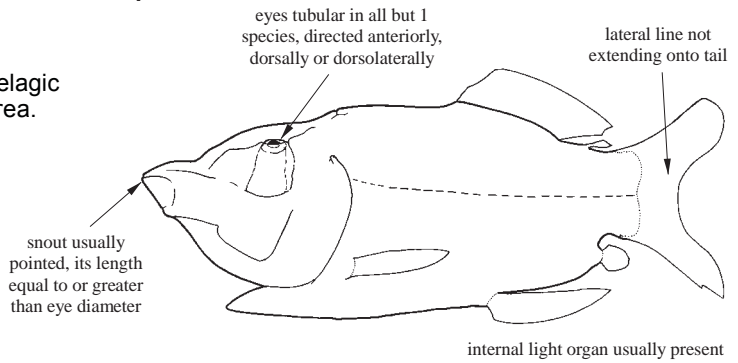


OPISTHOPROCTIDAE

Vol. 3, p. 1759

Barreleyes

To 30 cm. Mesopelagic or bathypelagic to 2 000 m. Eight species in the area.

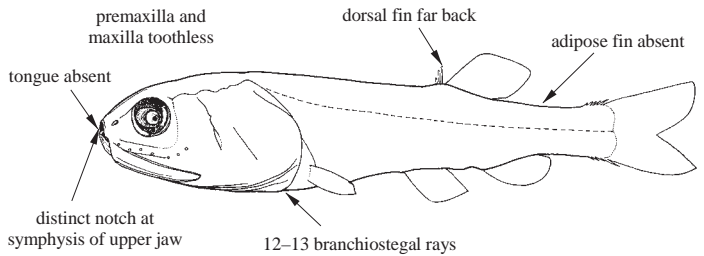


LEPTOCHILICHTHYIDAE

Vol. 3, p. 1762

Tongueless smooth-heads

To 31 cm. Mesopelagic or bathypelagic to 3 100 m. Two species in the area

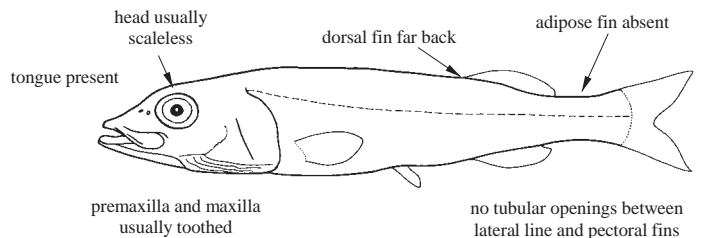


ALEPOCEPHALIDAE

Vol. 3, p. 1765

Slickheads

To 10 cm. Benthic or midwater to 5 000 m. Forty-one species in the area.

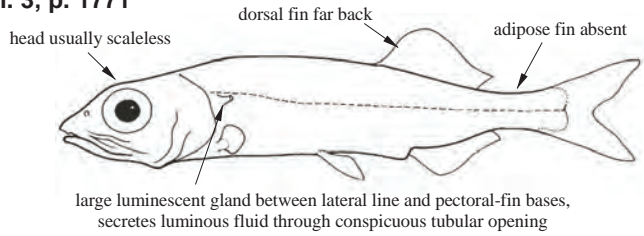


PLATYTROCTIDAE

Tubeshoulders

To 30 cm. Meso-, bathy-, or benthopelagic to 2 000 m. Twenty species in the area.

Vol. 3, p. 1771



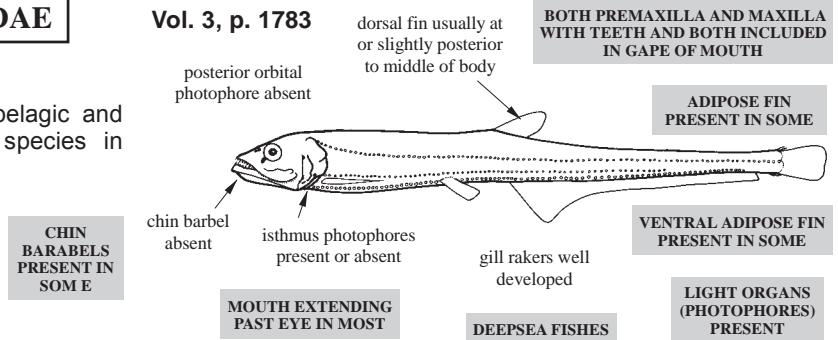
Order STOMIIFORMES – Bristlemouths and allies

GONOSTOMATIDAE

Bristlemouths

To about 36 cm. Mesopelagic and bathypelagic. Nineteen species in the area.

Vol. 3, p. 1783

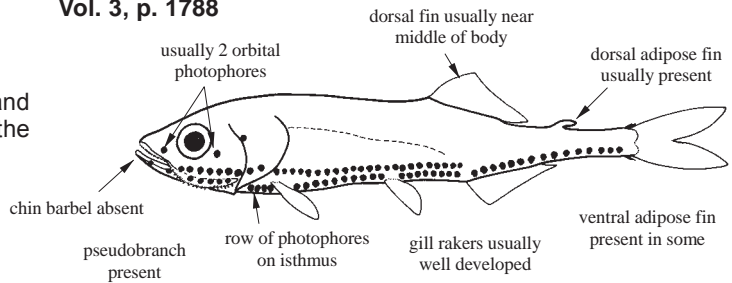


PHOSICHTHYIDAE

Lightfishes

To about 32 cm. Mesopelagic and bathypelagic. Ten species in the area.

Vol. 3, p. 1788

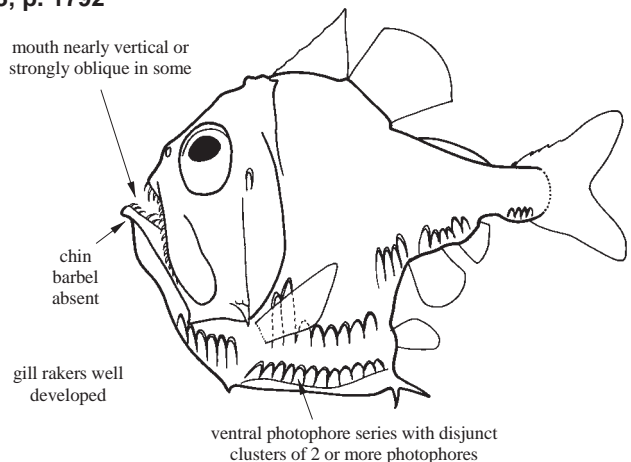


STERNOPTYCHIDAE

Hatchetfishes

To about 10 cm. Mostly mesopelagic, occasionally bathypelagic or benthopelagic. Fourteen species in the area.

Vol. 3, p. 1792



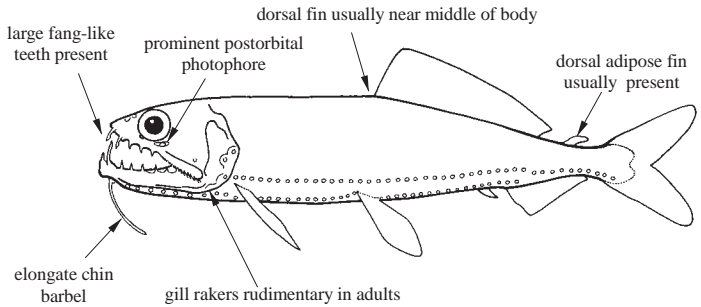
ASTRONESTHIDAE

Snaggletooths

Maximum size to about 36 cm. Mesopelagic and benthopelagic. Twenty-two species in the area.

Taxonomic remarks: Eschmeyer's Catalog of Fishes currently places this group in family Stomiidae, subfamily Astronesthinae.

Vol. 3, p. 1797



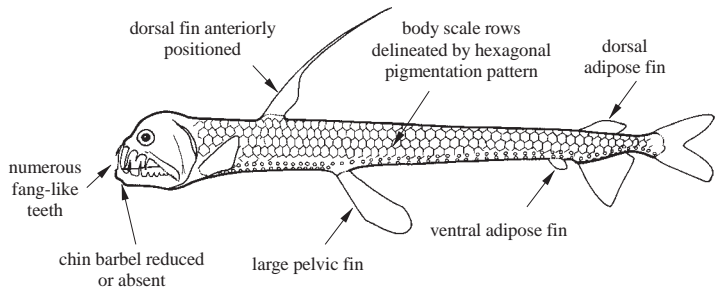
CHAULIODONTIDAE

Viperfishes

To about 30 cm. Mesopelagic and bathypelagic, to a maximum depth of about 2 800 m. Four species in the area.

Taxonomic remarks: Eschmeyer's Catalog of Fishes currently places this group in family Stomiidae, subfamily Chauliodontinae.

Vol. 3, p. 1801



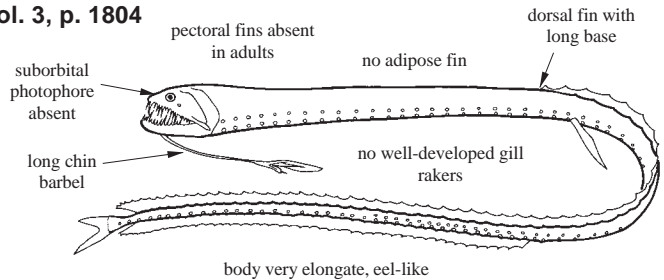
IDIACANTHIDAE

Black dragonfishes

To about 48 cm. Mesopelagic and bathypelagic to a maximum depth of about 2 000 m. Two species in the area.

Taxonomic remarks: Eschmeyer's Catalog of Fishes currently places this group in family Stomiidae, subfamily Idiacanthinae.

Vol. 3, p. 1804



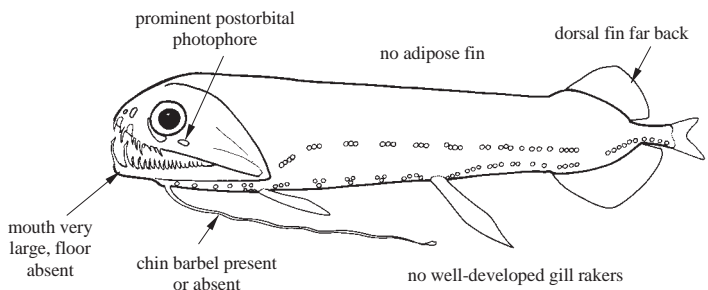
MALACOSTEIDAE

Loosejaws

To about 24 cm. Mesopelagic and bathypelagic to a maximum depth of about 4 000 m. Nine species in the area.

Taxonomic remarks: Eschmeyer's Catalog of Fishes currently places this group in family Stomiidae, subfamily Malacosteinae.

Vol. 3, p. 1806



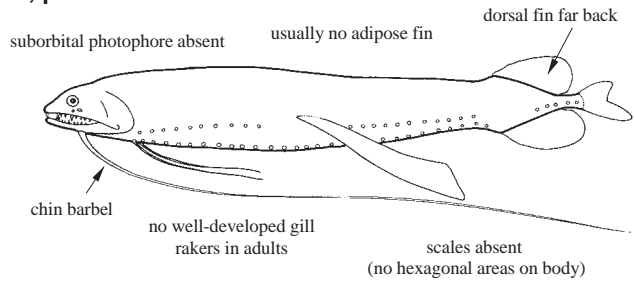
MELANOSTOMIIDAE

Vol. 3, p. 1809

Scaleless black dragonfishes

To about 50 cm. Mostly mesopelagic to depths of 1 000 m, although some reported to be bathypelagic to 4 500 m; some species migrate to surface at night. Around 80 species in the area.

Taxonomic remarks: Eschmeyer's Catalog of Fishes currently places this group in family Stomiidae, subfamily Melanostomiinae.

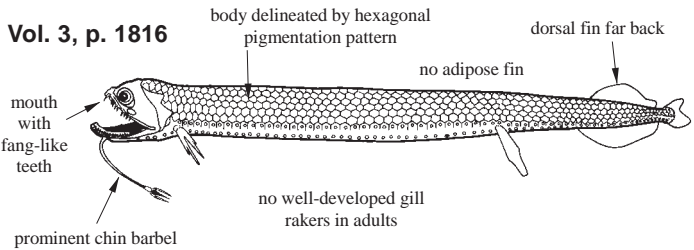


STOMIIDAE

Vol. 3, p. 1816

Scaly dragonfishes

Maximum size to about 43 cm. Mostly mesopelagic to a depth of 1 000 m, but some species bathypelagic to 2 000 m. Five species in the area.



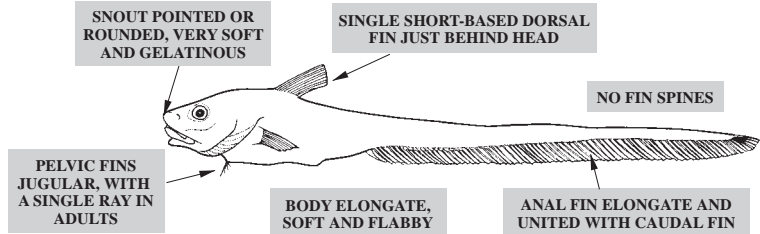
Order ATELEOPODIFORMES – Jellynose fishes

ATELEOPODIDAE

Vol. 3, p. 1819

Jellynoses

To 200 cm. Demersal or benthopelagic, usually between 200 and 800 m. Two species in the area.



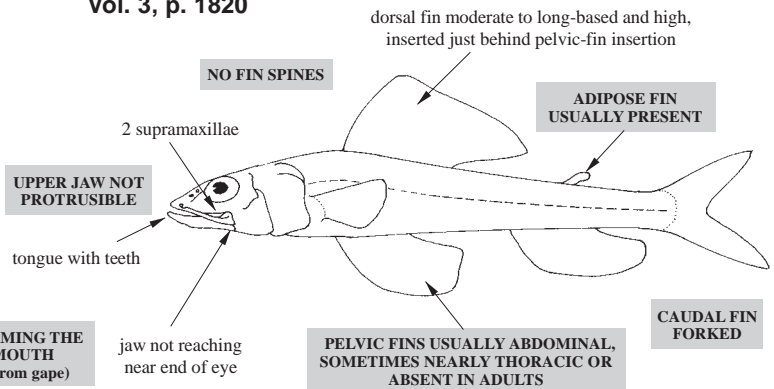
Order AULOPIFORMES – Lizardfishes

AULOPIDAE

Vol. 3, p. 1820

Flagfins

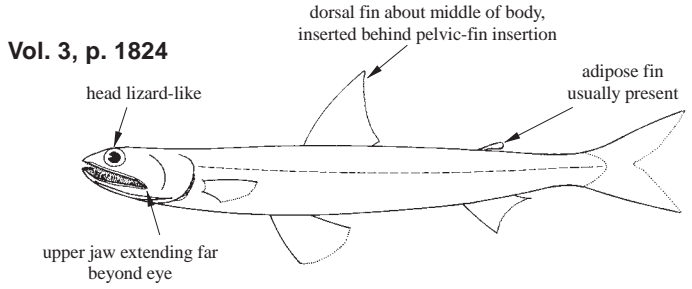
To 40 cm. Demersal on the continental shelf bottom between 50 and 1 000 m. Two species in the area.



SYNODONTIDAE

Lizardfishes

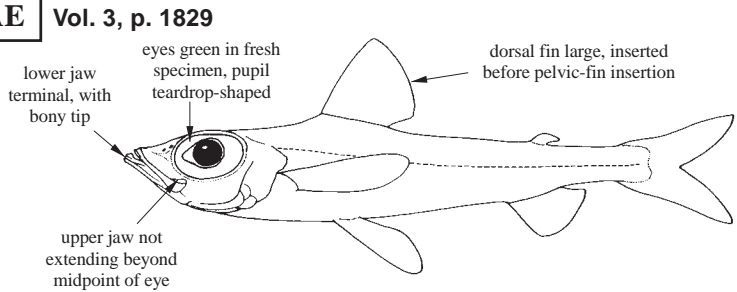
To 45 cm. Demersal on both hard and soft substrates generally in shallow water but recorded down to 545 m. Four species in the area.



CHLOROPHTHALMIDAE

Greeneyes

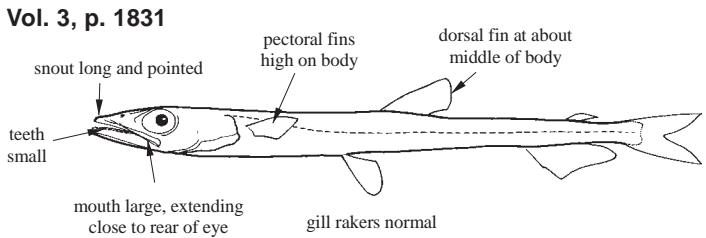
To 23 cm. Demersal at depths from 50 to 1 000 m. Two species in the area.



NOTOSUDIDAE

Waryfishes

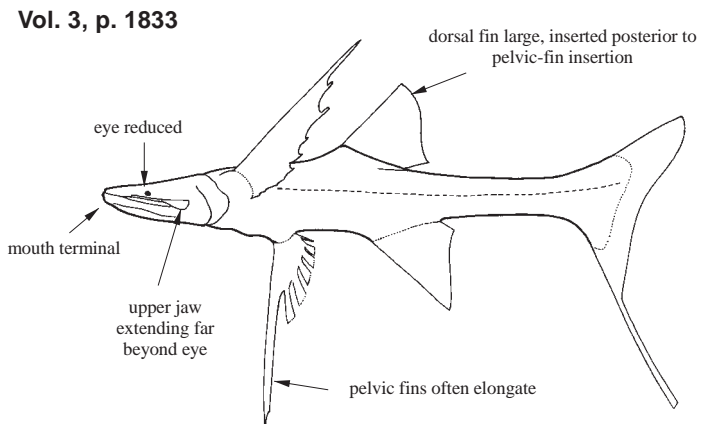
To 50 cm. Epi- to bathypelagic, some species benthopelagic. Six species in the area.



IPNOPIDAE

Tripod fishes

To 30 cm. Demersal in deep water from 500 to 6 000 m. Fourteen species in the area.

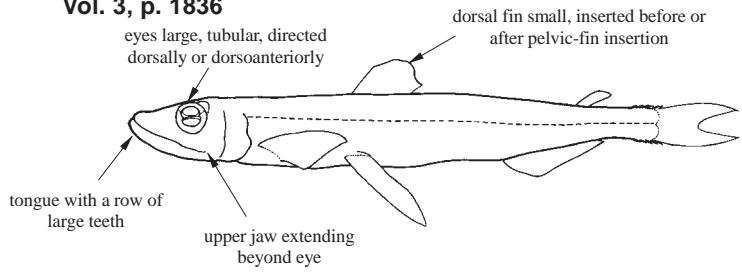


SCOPELARCHIDAE

Pearleyes

To 15 cm. Meso- and bathypelagic between 500 and 1 000 m. Six species in the area.

Vol. 3, p. 1836

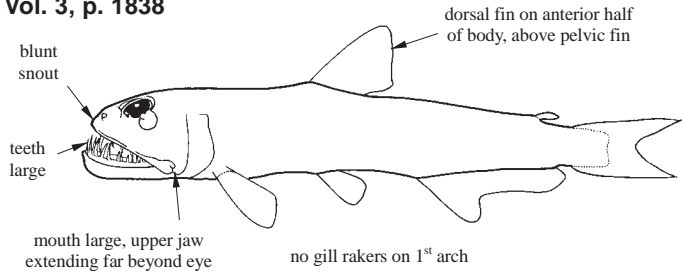


EVERMANNELLIDAE

Sabertooth fishes

To 19 cm. Mesopelagic usually at around 800 to 1 000 m. Four species in the area.

Vol. 3, p. 1838

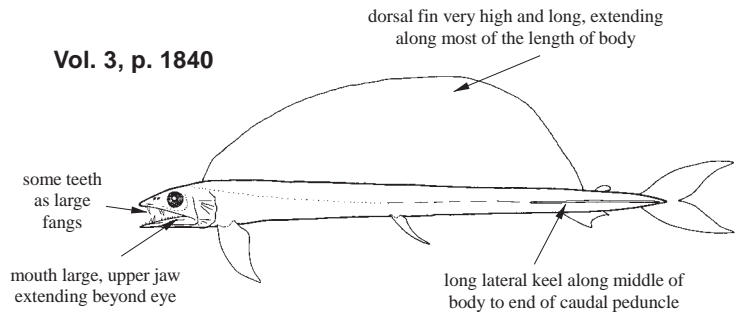


ALEPISAUROIDAE

Lancetfishes

To 200 cm. Pelagic in oceanic waters, from about 40 m from the surface down to 1 000 m. Two species in the area.

Vol. 3, p. 1840

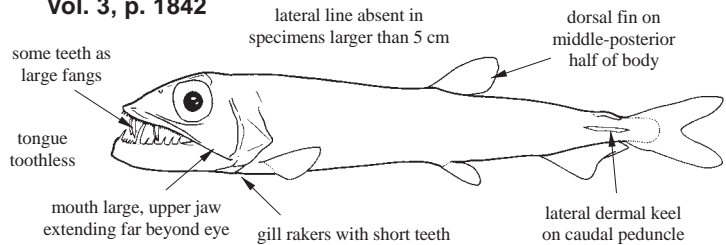


OMOSUDIDAE

Hammerjaws

To 25 cm. Mesopelagic and bathypelagic from 700 to 1 650 m. A single species worldwide.

Vol. 3, p. 1842

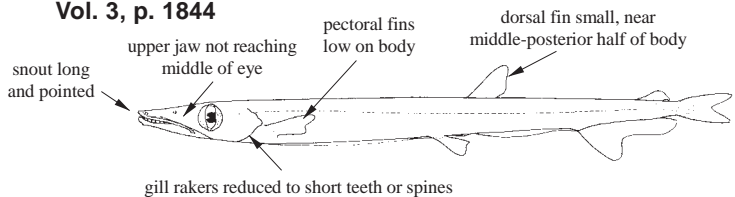


PARALEPIDIDAE

Barracudinas

To 56 cm. Meso- to bathypelagic, to depths of about 800 m. Twenty-four species in the area.

Vol. 3, p. 1844

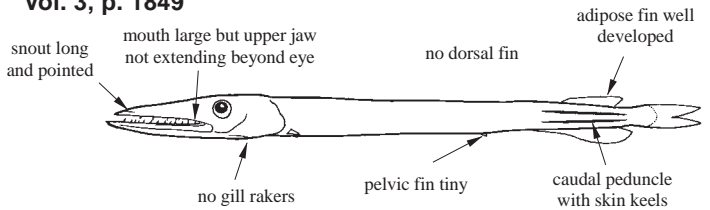


ANOPTERIDAE

Daggertooths

To about 100 cm. Epi- to mesopelagic. A single species in the area.

Vol. 3, p. 1849

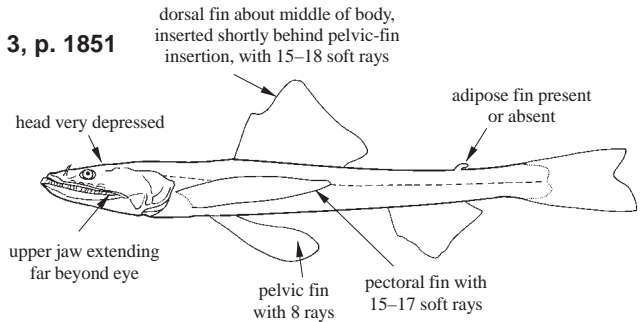


BATHYSAURIDAE

Deepsea lizardfishes

To 70 cm. Demersal at depths below 1 000 m. Two species in the area.

Vol. 3, p. 1851

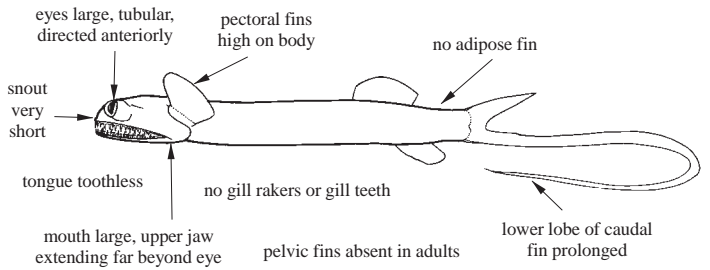


GIGANTURIDAE

Telescope fishes

To 23 cm. Mesopelagic and bathypelagic. Two species in the area.

Vol. 3, p. 1853



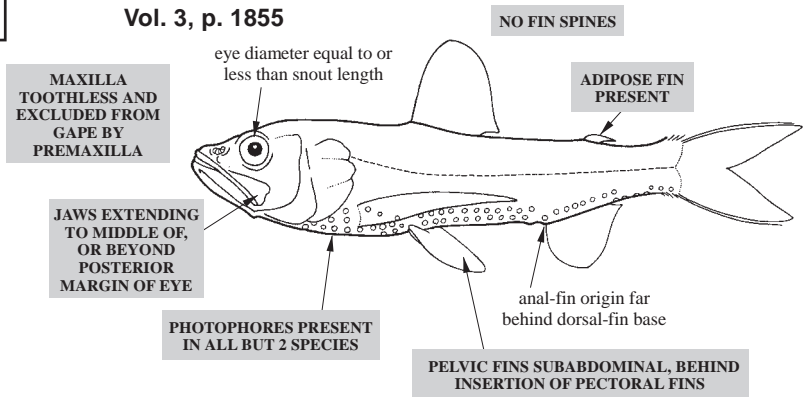
Order MYCTOPHIFORMES – Lanternfishes and allies

NEOSCOPELIDAE

Blackchins

To 30 cm. Meso- and bathypelagic, benthopelagic slope from 250 to 800 m. Three species in the area.

Vol. 3, p. 1855



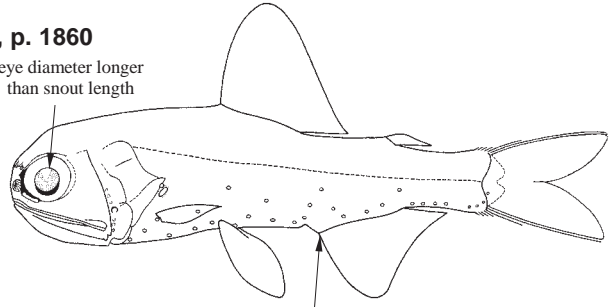
MYCTOPHIDAE

Lanternfishes

To 28 cm, but generally smaller than 12 cm. Meso- to bathypelagic migrating to surface waters at night. Around 96 species in the area.

Vol. 3, p. 1860

eye diameter longer than snout length



anal-fin origin under or close behind dorsal-fin base

Order LAMPRIFORMES – Opahs and allies

LAMPRIDAE

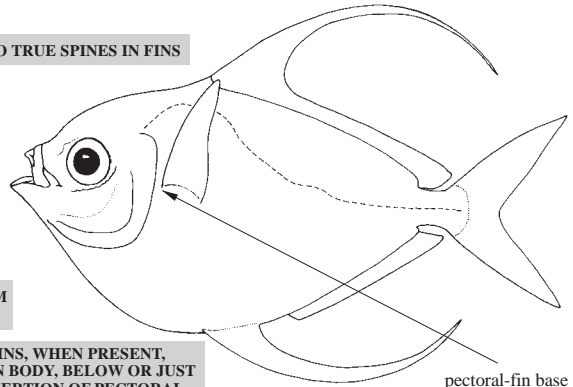
Opahs

To 185 cm. Pelagic oceanic, from the surface to a depth of about 200 m. A single species in the area.

Vol. 3, p. 1929

dorsal and anal fins retractable in deep grooves

NO TRUE SPINES IN FINS



UPPER JAW PROTRUSIBLE, BOTH MAXILLA AND PREMAXILLA EXTEND COMPLETELY AWAY FROM SNOUT

MAXILLA EXCLUDED FROM GAPE BY PREMAXILLA

PELVIC FINS, WHEN PRESENT, FORWARD ON BODY, BELOW OR JUST BEHIND INSERTION OF PECTORAL

pectoral-fin base high on sides, horizontal

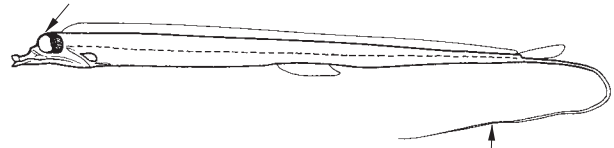
STYLEPHORIDAE

Tube-eyes

To 30 cm. Meso- or bathypelagic usually between 300 and 800 m. A single species worldwide.

Vol. 3, p. 1931

eyes tubular, directed forward and slightly upward



bottom 2 caudal-fin rays extremely elongate

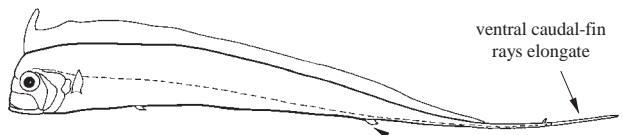
RADIICEPHALIDAE

Tapertails

To 80 cm. Meso- or bathypelagic. Very rare. A single species in the family.

Vol. 3, p. 1933

ventral caudal-fin rays elongate



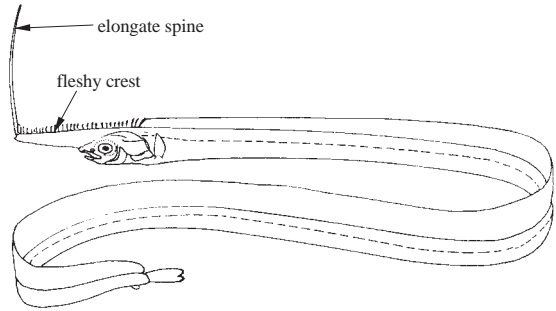
short anal fin

LOPHOTIDAE

Crestfishes

To 200 cm. Mesopelagic. Two species in the area.

Vol. 3, p. 1935

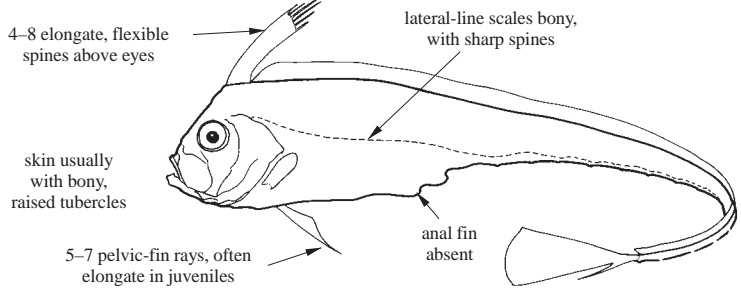


TRACHIPTERIDAE

Ribbonfishes

To 200 cm. Mesopelagic. Rare. Four species in the area.

Vol. 3, p. 1937

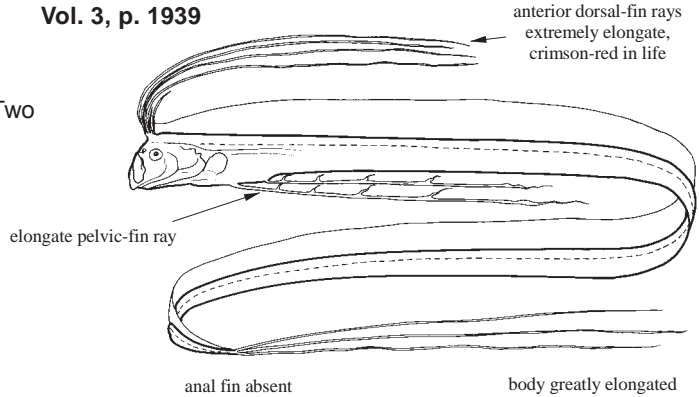


REGALECIDAE

Oarfishes

To 800 cm. Mesopelagic. Rare. Two species in the area.

Vol. 3, p. 1939



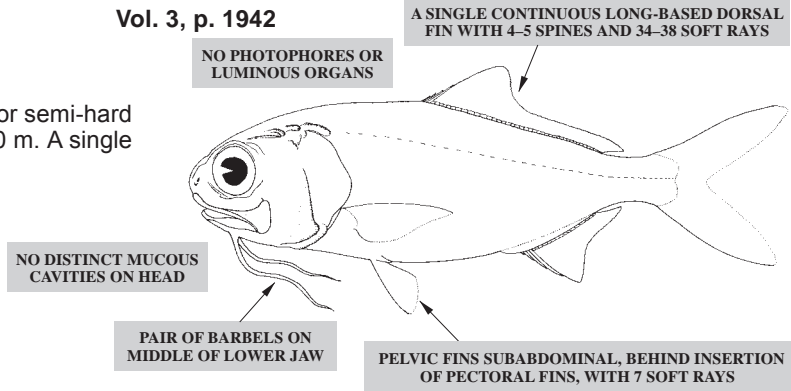
Order POLYMIXIIFORMES – Beardfishes

POLYMIXIIDAE

Beardfishes

To 40 cm. Demersal on soft or semi-hard bottoms between 70 and 800 m. A single species in the area.

Vol. 3, p. 1942



Order OPHIDIIFORMES – Cusk eels

CARAPIDAE

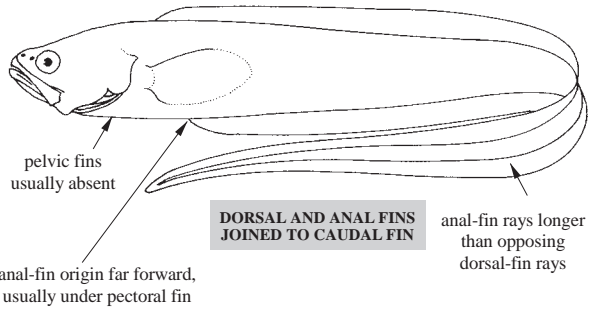
Vol. 3, p. 1944

NO SHARP FIN SPINES

Pearlfishes

To 27 cm. Demersal. Four species in the area.

PELVIC FINS ABSENT OR FAR FORWARD, CLOSE TOGETHER, AND FILAMENTOUS WITH NO MORE THAN 2 RAYS

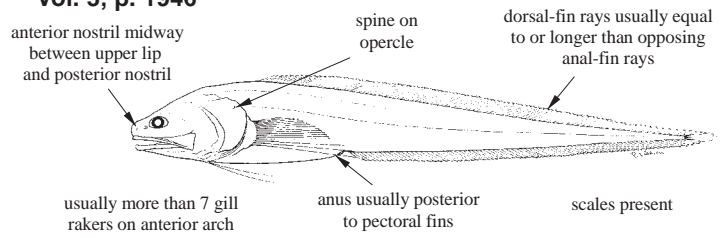


OPHIDIIDAE

Vol. 3, p. 1946

Cusk eels

To 200 cm. Typically demersal, swallow water down to 8 370 m. Thirty-seven species in the area.

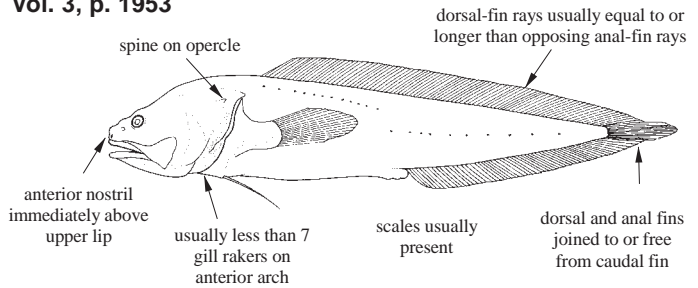


BYTHITIDAE

Vol. 3, p. 1953

Viviparous brotulas

To 36 cm. In caves and demersal down to 2 000 m. Seven species in the area.

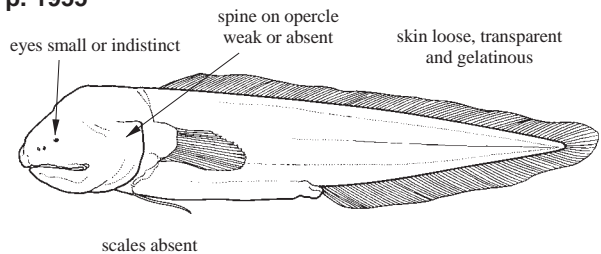


APHYONIDAE

Vol. 3, p. 1955

Aphyonids

To 25 cm. Demersal usually between 250 and 5 600 m. Seven species in the area.



Order GADIFORMES – Hakes, cods and allies

BREGMACEROTIDAE

Vol. 3, p. 1957

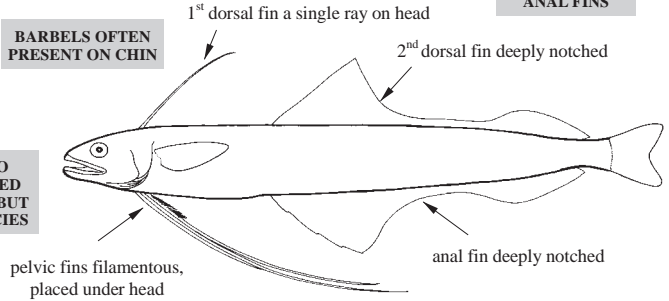
ALL SPECIES WITH LONG DORSAL AND ANAL FINS

Codlets

To 10 cm, but usually 5 to 6 cm. Epipelagic and mesopelagic in coastal and oceanic waters. Four species in the area.

PELVIC FINS BELOW OR ANTERIOR TO PECTORAL FINS AND WIDELY SEPARATED FROM EACH OTHER, USUALLY ENTIRE, BUT REDUCED TO FILAMENTS IN SOME SPECIES

BARBELS OFTEN PRESENT ON CHIN



NO TRUE SPINES IN FINS (ALTHOUGH SPINOUS RAYS PRESENT IN DORSAL FIN OF MOST MACROURIDS)

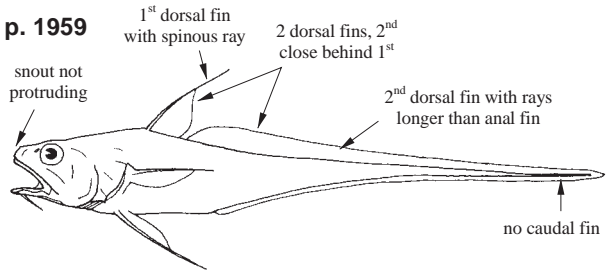
BATHYGADIDAE

Vol. 3, p. 1959

Bathygadids

To 60 cm. Benthopelagic on continental slope from 300 to 2 700 m. Six species in the area.

Taxonomic remarks: Eschmeyer's Catalog of Fishes currently places this group in family Macrouridae, subfamily Bathygadinae.



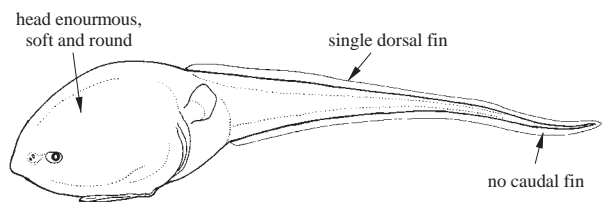
MACROUROIDIDAE

Vol. 3, p. 1964

Macrouroids

To 46 cm. Benth- to bathypelagic. Two species in the area.

Taxonomic remarks: Eschmeyer's Catalog of Fishes currently places this group in family Macrouridae, subfamily Macrouroirinae.



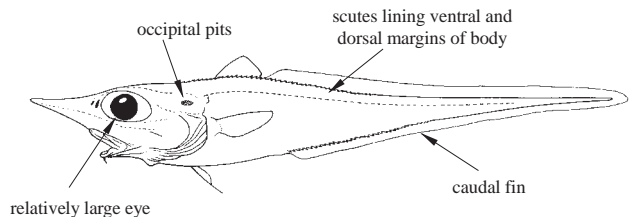
TRACHYRINCHIDAE

Vol. 3, p. 1966

Trachyrinchids

To 55 cm. Benthopelagic in midslope waters from depths of about 300 to 1 700 m. A single species in the area.

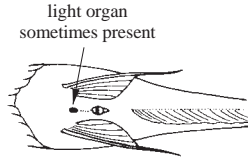
Taxonomic remarks: Eschmeyer's Catalog of Fishes currently places this group in family Macrouridae, subfamily Trachyrhinciinae.



MACROURIDAE

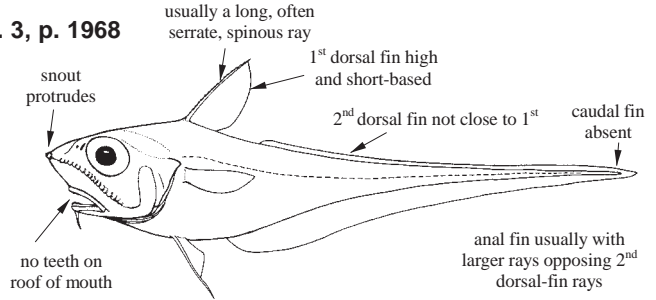
Grenadiers

To 120 cm. Benthopelagic from depth of about 250 to below 4 000 m. Thirty-eight species in the area.



underside of body

Vol. 3, p. 1968

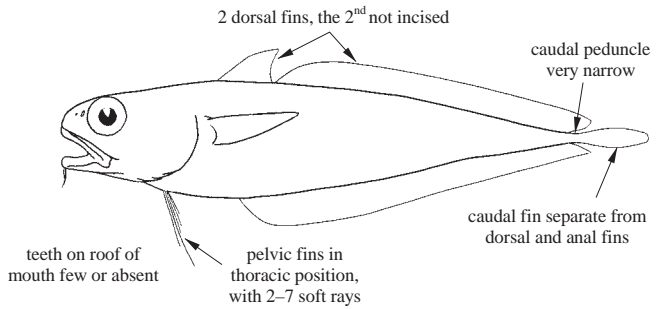


MORIDAE

Moras

To 65 cm, usually 20 to 30 cm. Benthopelagic on deep continental shelf and slope in 40 to 3 000 m, commonly between 100 and 600 m. Seventeen species in the area.

Vol. 3, p. 1991

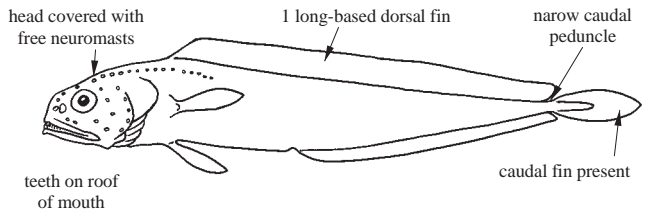


MELANONIDAE

Pelagic cods

To 25 cm, commonly 10 to 15 cm. Meso- to bathypelagic. Two species in the area.

Vol. 3, p. 2005

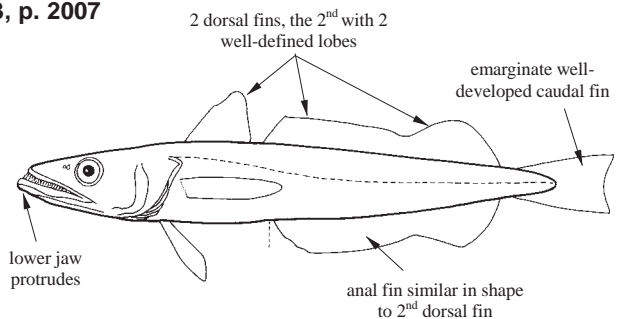


MERLUCCIIDAE

Merluccid

Greater than 100 cm, commonly 30 to 60 cm. Demersal and benthopelagic. Seven species in the area.

Vol. 3, p. 2007



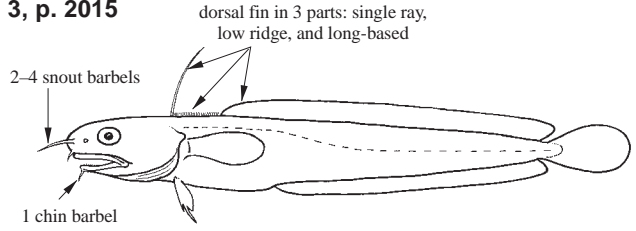
GAIIDROPSARIDAE

Vol. 3, p. 2015

Rocklings

To 60 cm, usually 20 to 40 cm. Demersal on soft bottoms or over rocks, from intertidal to the deep sea. Seven species in the area.

Taxonomic remarks: Eschmeyer's Catalog of Fishes currently places this group in family Lotidae.

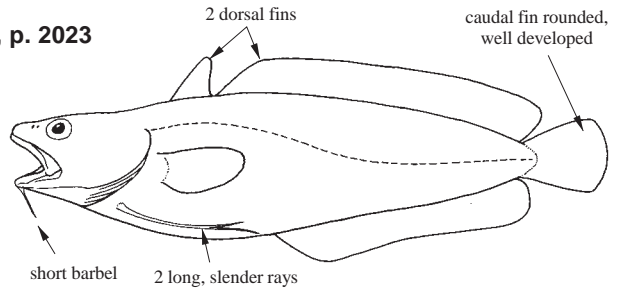


PHYCIDAE

Vol. 3, p. 2023

Phycid hakes

To 110 cm, usually 20 to 40 cm. Demersal on soft bottoms from shallow areas to upper continental slope. Two species in the area.

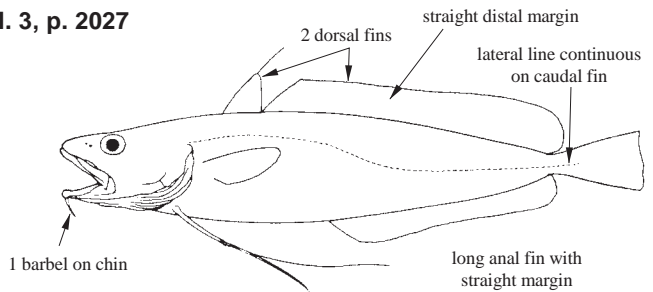


LOTIDAE

Vol. 3, p. 2027

Lings

To about 155 cm. Deep water at edge of shelf to continental slope depths of 60 to 1 000 m. A single species in the area.

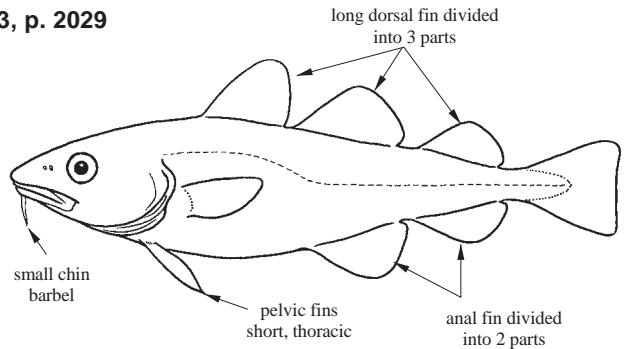


GADIDAE

Vol. 3, p. 2029

True cods

To 50 cm. Demersal, benthopelagic, and pelagic. Four species in the area.



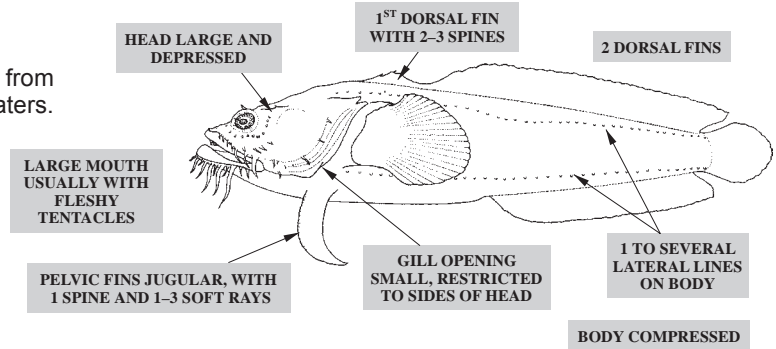
Order BATRACHOIDIFORMES – Toadfishes

BATRACHOIDIDAE

Vol. 3, p. 2036

Toadfishes

To about 30 cm. Demersal, from littoral areas to rather deep waters. Five species in the area.



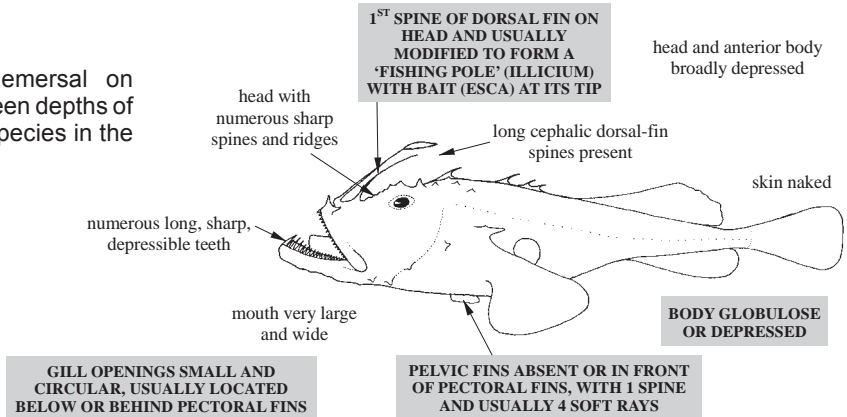
Order LOPHIIFORMES – Anglerfishes and allies

LOPHIIDAE

Vol. 3, p. 2044

Goosefishes

To about 200 cm. demersal on continental slope, between depths of 200 and 1 000 m. Six species in the area.

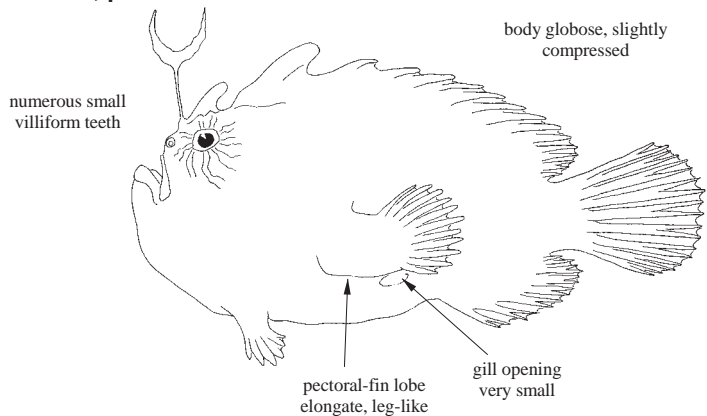


ANTENNARIIDAE

Vol. 3, p. 2051

Frogfishes

To 28 cm. Mostly demersal shallow waters. Six species in the area.



CHAUNACIDAE

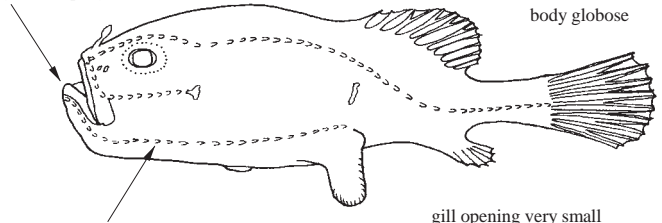
Vol. 3, p. 2054

skin loose and flacid, densely covered with minute spine-like scales

Sea toads

To 35 cm. Demersal on continental slope between 90 and 2 600 m. Two species in the area.

mouth large, opening dorsally or obliquely



body globose

gill opening very small

conspicuous network of sensory canals on head and body

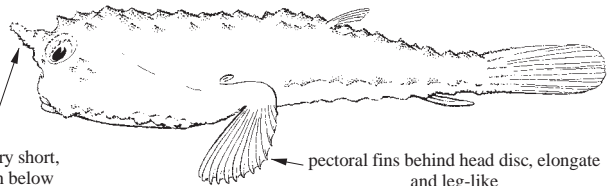
OGCOCEPHALIDAE

Vol. 3, p. 2056

Batfishes

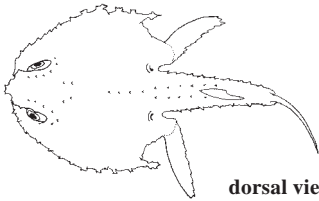
To 20 cm. Demersal, typically in less than 200 m, some species to over 1 000 m. Two species in the area.

head strongly depressed into a circular or triangular disc



lure very short, hidden below pointed snout

pectoral fins behind head disc, elongate and leg-like



dorsal view

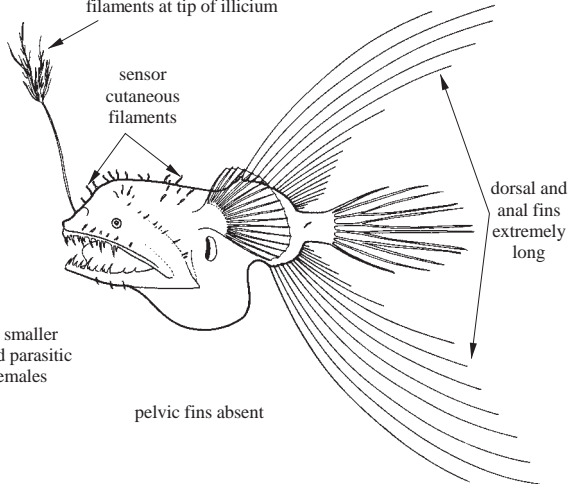
CAULOPHRYNIDAE

Vol. 3, p. 2059

Fanfin anglerfishes

To 18 cm. Mesopelagic and bathypelagic. Three species in the area.

numerous branched filaments at tip of illicium



sensor cutaneous filaments

dorsal and anal fins extremely long

males smaller than and parasitic on females

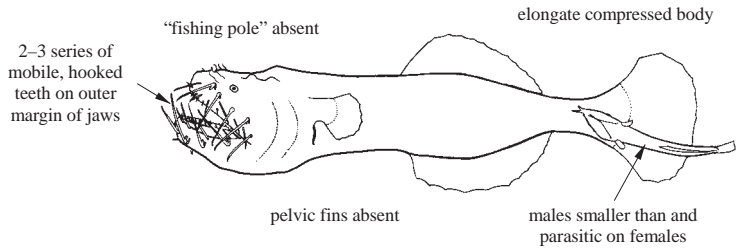
pelvic fins absent

NEOCERATIIDAE

Bristlemouth anglerfishes

To 11 cm. Meso- and bathypelagic. One species worldwide.

Vol. 3, p. 2060

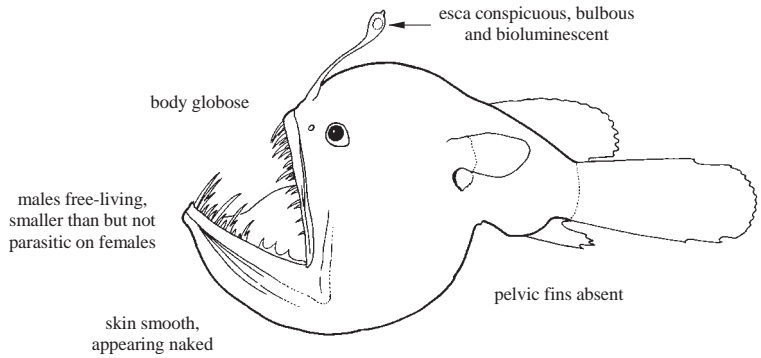


MELANOCETIDAE

Blackdevils

To 13 cm. Meso- and bathypelagic. Two species in the area.

Vol. 3, p.2061

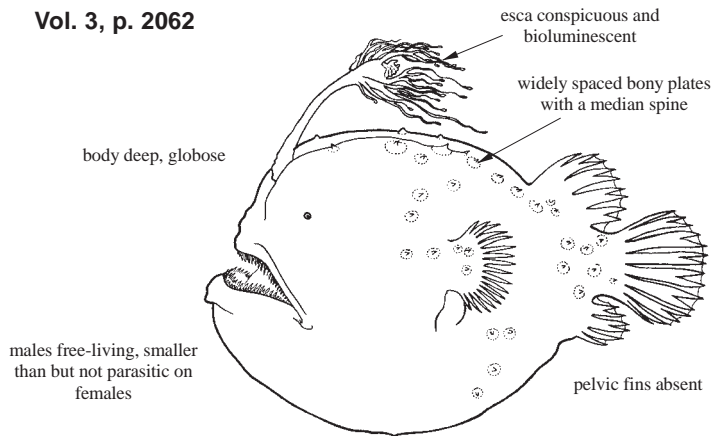


HIMANTOLOPHIDAE

Footballfishes

To 46 cm. Meso- and bathypelagic. Twelve species in the area.

Vol. 3, p. 2062

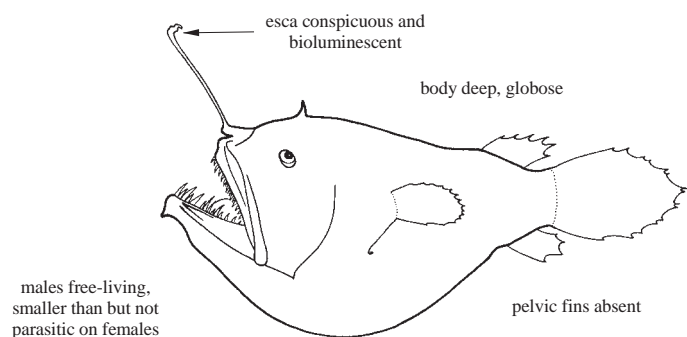


DICERATIIDAE

Double-spine seadevils

To 27 cm. Meso- and bathypelagic. Two species in the area.

Vol. 3, p. 2064

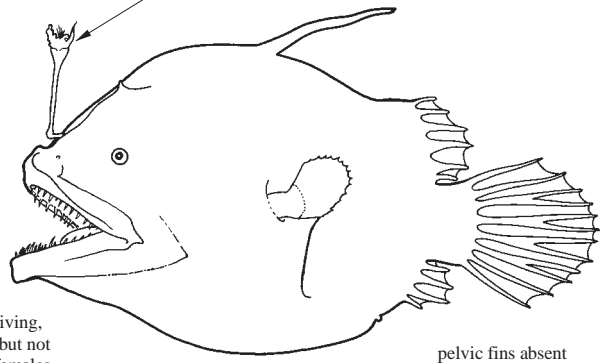


ONEIRODIDAE

Dreamers

To 21 cm. Meso- and bathypelagic.
Twenty-six species in the area.

Vol. 3, p. 2066 1st dorsal-fin spine emerging well behind tip of snout, esca conspicuous and bioluminescent



males free-living, smaller than but not parasitic on females

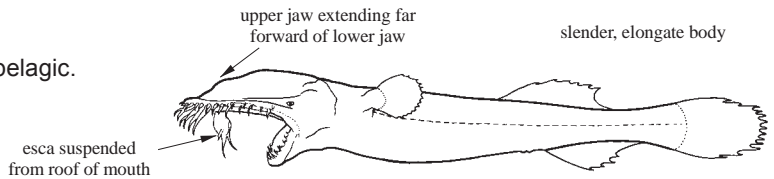
pelvic fins absent

THAUMATICHTHYIDAE

Wonderfishes

To 11 cm. Meso- and bathypelagic.
Two species in the area.

Vol. 3, p. 2069



males free-living, smaller than but not parasitic on females

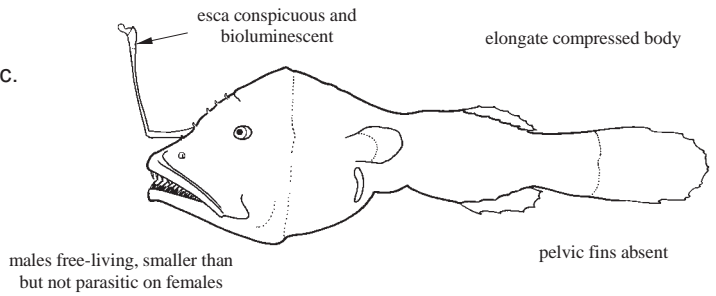
pelvic fins absent

CENTROPHRYNIDAE

Hollowcheek seadevils

To 25 cm. Meso- and bathypelagic.
One species worldwide.

Vol. 3, p. 2070



males free-living, smaller than but not parasitic on females

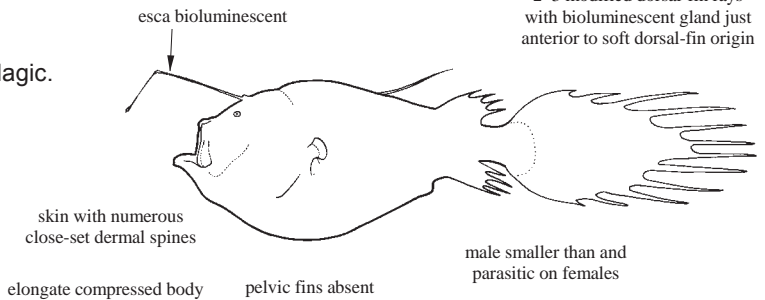
pelvic fins absent

CERATIIDAE

Seadevils

To 77 cm. Meso- and bathypelagic.
Three species in the area.

Vol. 3, p. 2071



skin with numerous close-set dermal spines

elongate compressed body

pelvic fins absent

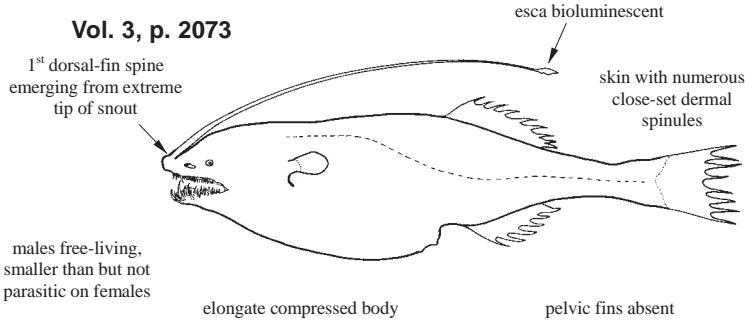
male smaller than and parasitic on females

2-3 modified dorsal-fin rays with bioluminescent gland just anterior to soft dorsal-fin origin

GIGANTACTINIDAE

Whipnose anglerfishes

To 43 cm. Meso- and bathypelagic. Ten species in the area.

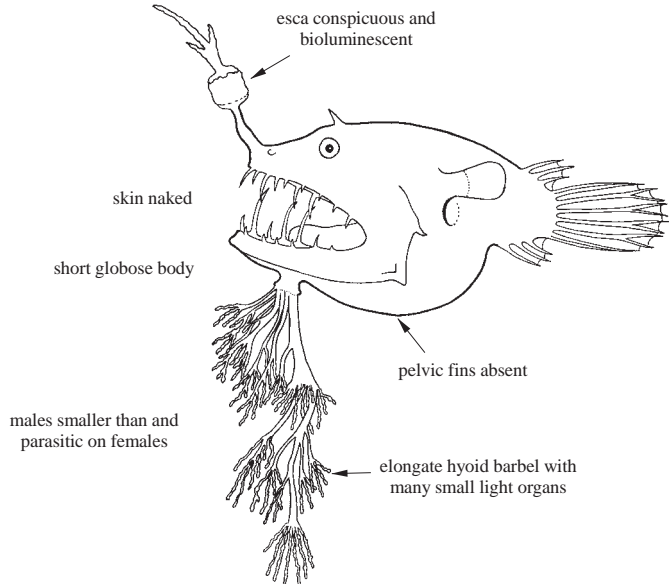


LINOPHRYNIDAE

Netdevils

To 23 cm. Meso- and bathypelagic. Twelve species in the area.

Vol. 3, p. 2075



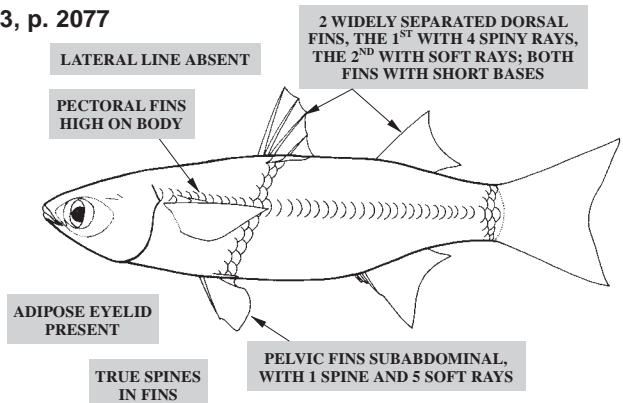
Order MUGILIFORMES – Mulletts

MUGILIDAE

Mulletts

To 120 cm. Usually demersal in coastal waters, but also in brackish and fresh water. Seventeen species in the area.

Vol. 3, p. 2077

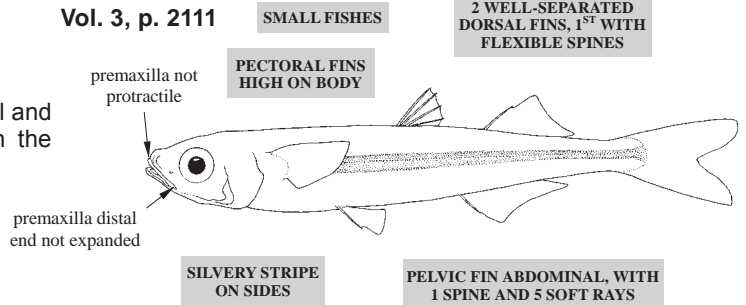


Order ATHERINIFORMES – Silversides

ATHERINIDAE

Daggertoths

To about 10 cm. Pelagic in coastal and brackish waters. Four species in the area.

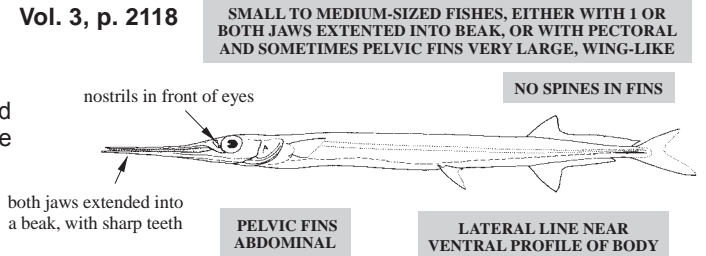


Order BELONIFORMES – Needlefishes, flyingfishes and allies

BELONIDAE

Needlefishes

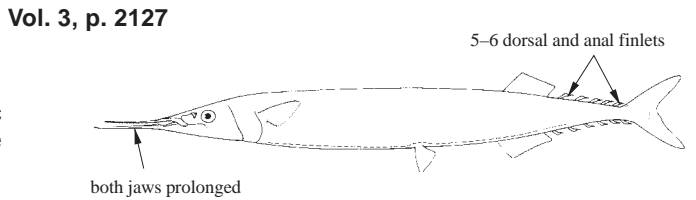
To 200 cm. Epipelagic in coastal and oceanic waters. Nine species in the area.



SCOMBERESOCIDAE

Sauries

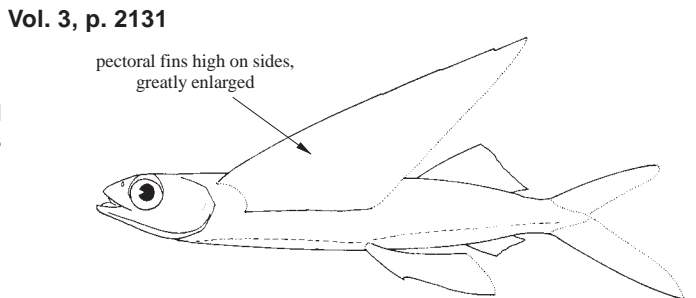
To about 50 cm. Epipelagic in oceanic surface waters. Two species in the area.



EXOCOETIDAE

Flyingfishes

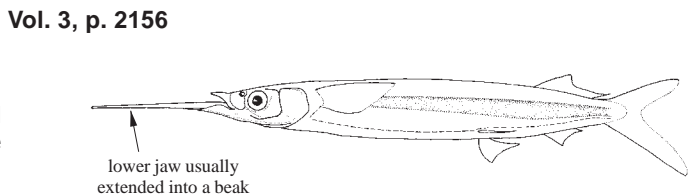
To about 45 cm. Epipelagic in coastal and oceanic waters. Nineteen species in the area.



HEMIRAMPHIDAE

Halfbeaks

To 40 cm. Epipelagic in coastal and offshore waters. Five species in the area.



Order STEPHANOBERYCIFORMES – Whalefishes and allies

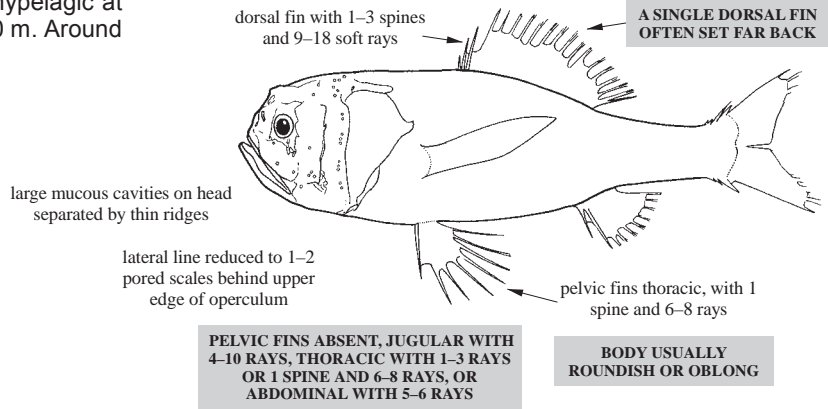
MELAMPHAIDAE

Vol. 3, p. 2163

MOSTLY MESO-, BATHY, AND BENTHOPELAGIC FISHES: AN ILL-DEFINED ORDER CLOSELY RELATED TO THE BERYCIFORMES, BASED CHIEFLY ON OSTEOLOGICAL CHARACTERS

Big scales

To 18 cm. Meso- to bathypelagic at depths from 200 to 2 000 m. Around 24 species in the areas.

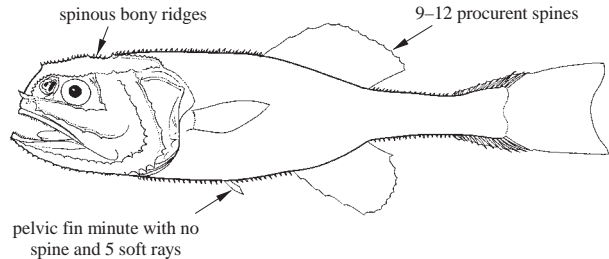


STEPHANOBERYCIDAE

Vol. 3, p. 2166

Pricklefishes

To 17 cm. Benthopelagic or abyssal benthic at depths of 945 to 5 308 m. Two species in the area.

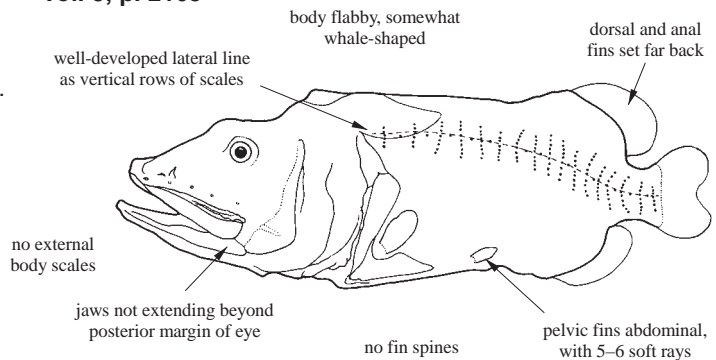


RONDELETIIDAE

Vol. 3, p. 2168

Redmouth whalefishes

To 11 cm. Meso- and bathypelagic. Two species in the area.

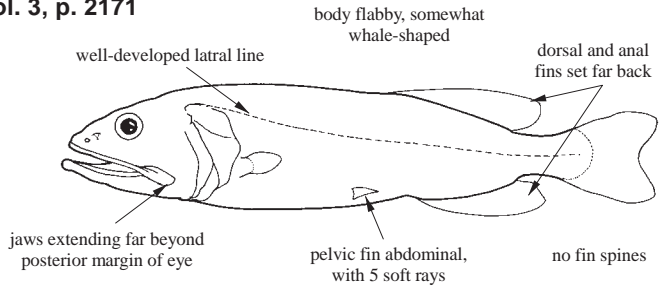


BARBOURISIDAE

Vol. 3, p. 2171

Redvelvet whalefishes

To 38 cm. Mesopelagic as juveniles and benthopelagic as adults. A single species in the area.

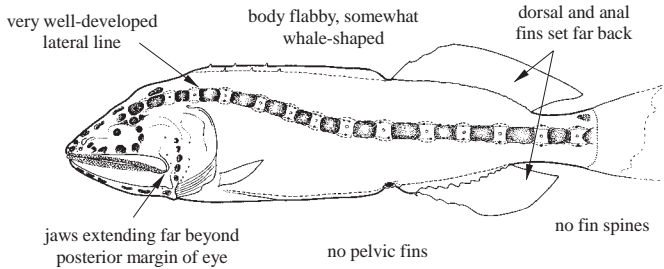


CETOMIMIDAE

Vol. 3, p. 2173

Whalefishes

To 30 cm. Bathy- and benthopelagic. Around 10 species in the area.



Order BERYCIFORMES – Squirrelfishes and allies

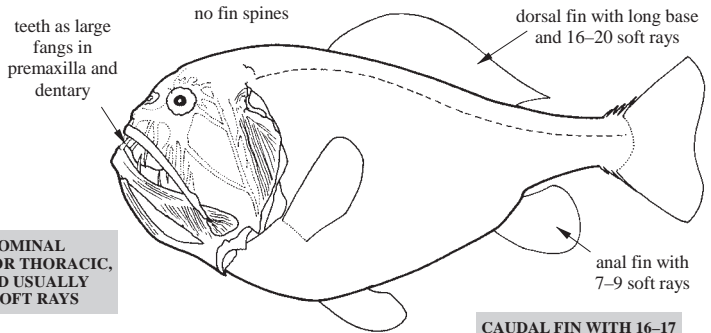
ANOPLOGASTRIDAE

Vol. 3, p. 2182

TRUE FIN SPINES IN ALL FAMILIES EXCEPT ANOPLOGASTRIDAE AND DIRETMIDAE

Fangtooths

To 16 cm. Meso- and bathypelagic, at depths of 75 to 5 000 m. A single species in the area.



PELVIC FINS ABDOMINAL (ANOPLOGASTRIDAE) OR THORACIC, WITH 0-1 SPINES AND USUALLY GREATER THAN 6 SOFT RAYS

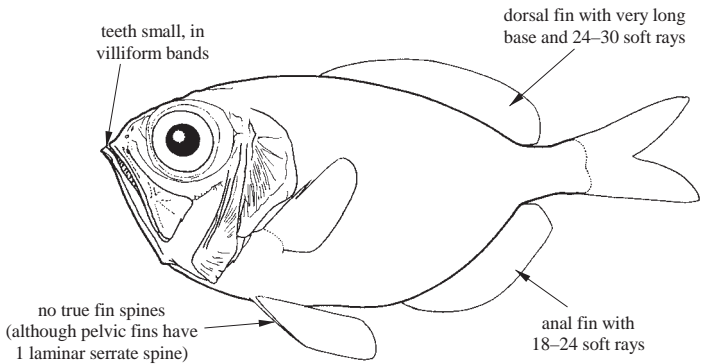
CAUDAL FIN WITH 16-17 BRANCHED OR 18-19 PRINCIPAL RAYS

DIRETMIDAE

Vol. 3, p. 2184

Spinyfins

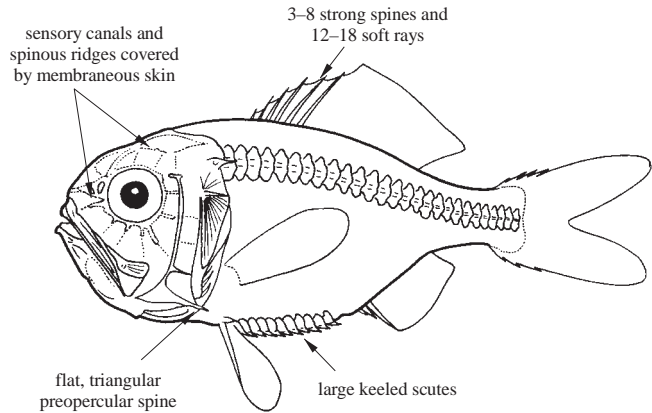
To 37 cm. Meso-, bathy-, and benthopelagic. Three species in the area.



TRACHICHTHYIDAE**Slimeheads**

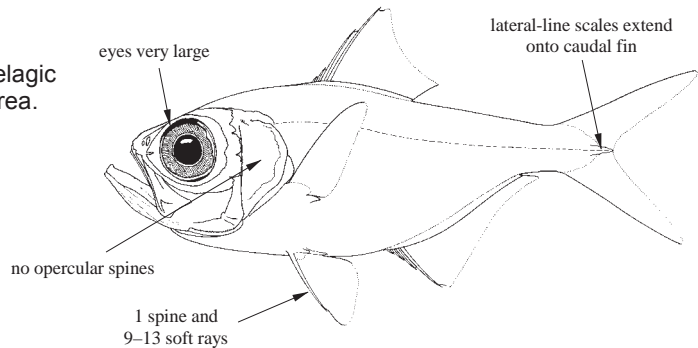
To about 60 cm. Benthopelagic from a depth of about 70 to 1 800 m. Six species in the area.

Vol. 3, p. 2186

**BERYCIDAE****Alfonsinos**

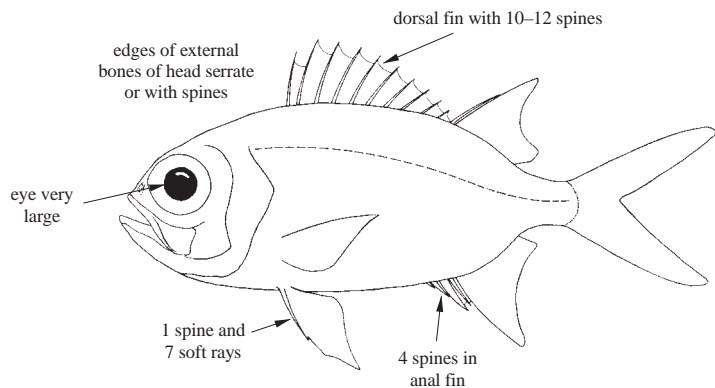
To 55 cm. Demersal or benthopelagic down to 1 300 m. Two species in the area.

Vol. 3, p. 2192

**HOLOCENTRIDAE****Squirrelfishes**

To 35 cm. Demersal, mostly on shallow coral reef or rocky bottoms but some species in depths of 200 m or more. Four species in the area.

Vol. 3, p. 2195



Order ZEIFORMES – Dories and allies

CYTTIDAE

Vol. 3, p. 2202

5–10 PROMINENT SPINES IN ANTERIOR PART OF DORSAL FIN

Zipper dories

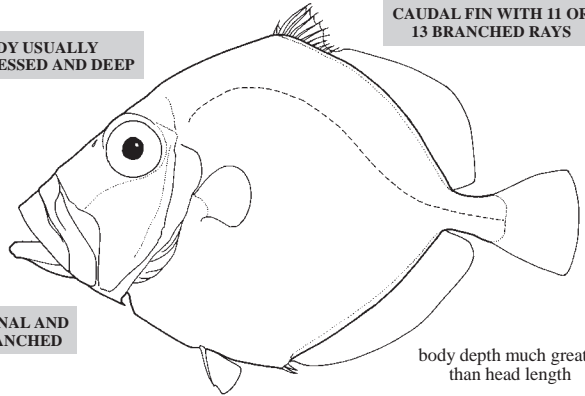
To 50 cm. Demersal in 360 to 460 m. A single species in the area.

BODY USUALLY COMPRESSED AND DEEP

CAUDAL FIN WITH 11 OR 13 BRANCHED RAYS

JAWS GREATLY PROTRUSIBLE

SOFT RAYS OF DORSAL, ANAL AND PECTORAL FINS NOT BRANCHED



body depth much greater than head length

pelvic fins with well developed spine, 6 branched rays

PELVIC FINS SUBTHORACIC OR THORACIC WITH OR WITHOUT A SPINE AND 5–10 SOFT RAYS

OREOSOMATIDAE

Vol. 3, p. 2205

Oreos

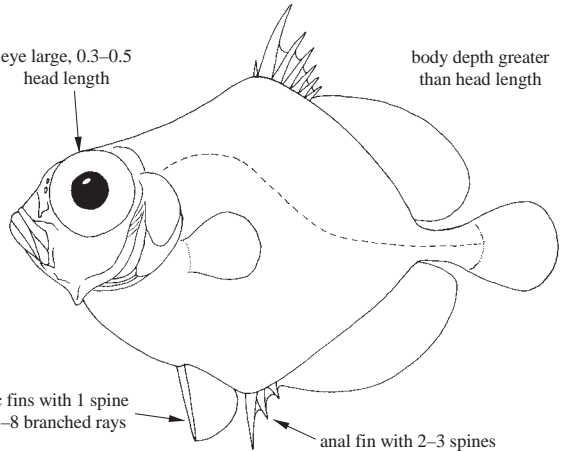
To 60 cm. Meso-, bathypelagic or demersal on continental slope in 220 to 1 900 m. Six species in the area.

eye large, 0.3–0.5 head length

body depth greater than head length

pelvic fins with 1 spine and 5–8 branched rays

anal fin with 2–3 spines



ZENIONTIDAE

Vol. 3, p. 2215

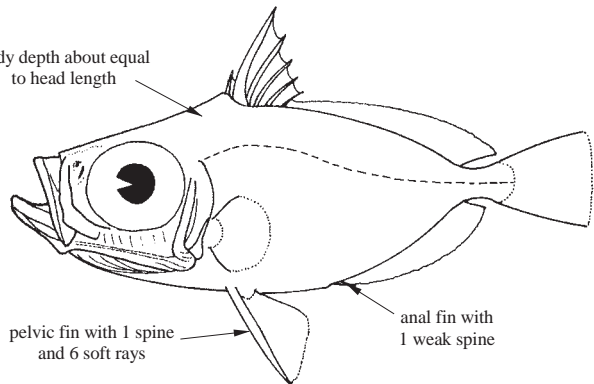
Zeniontids

To 16 cm. Demersal at depths between 300 and 600 cm. A single species in the area.

body depth about equal to head length

pelvic fin with 1 spine and 6 soft rays

anal fin with 1 weak spine

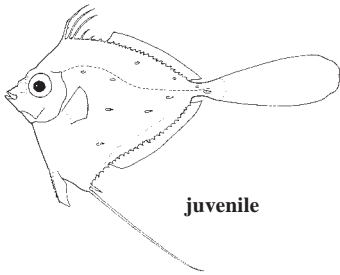


GRAMMICOLEPIDIDAE

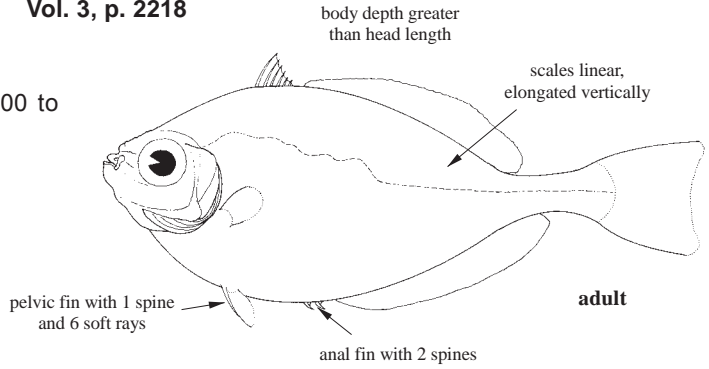
Vol. 3, p. 2218

Tinselifishes

To 64 cm. Demersal at depths of 100 to 800 m. Two species in the area.



juvenile



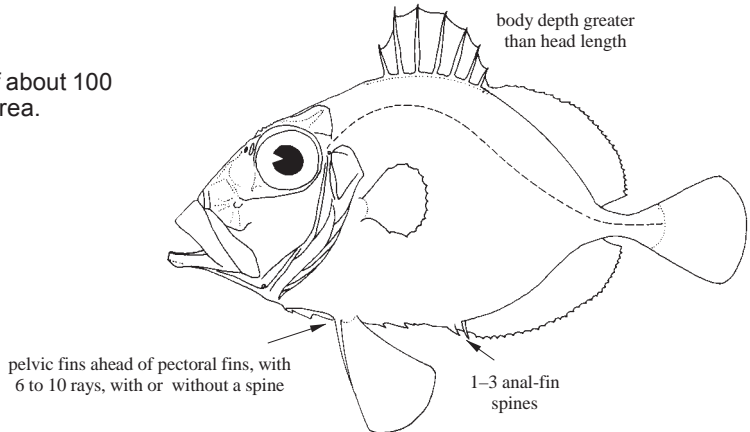
adult

ZEIDAE

Vol. 3, p. 2223

Dories

To 90 cm. Demersal at depths of about 100 to 600 m. Four species in the area.



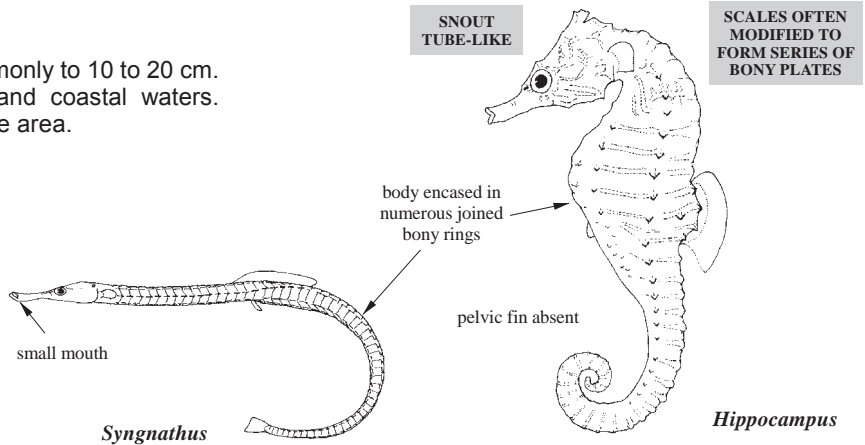
Order GASTEROSTEIFORMES – Pipefishes and allies

SYNGNATHIDAE

Vol. 3, p. 2230

Pipefishes

To about 46 cm, commonly to 10 to 20 cm. Demersal in littoral and coastal waters. Thirteen species in the area.



Syngnathus

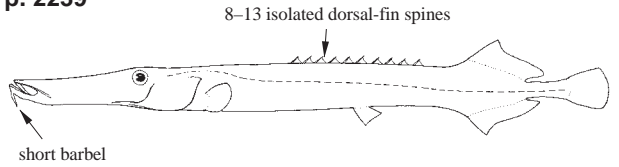
Hippocampus

AULOSTOMIDAE

Trumpetfishes

To 75 cm. Demersal in coastal waters. A single species in the area.

Vol. 3, p. 2239

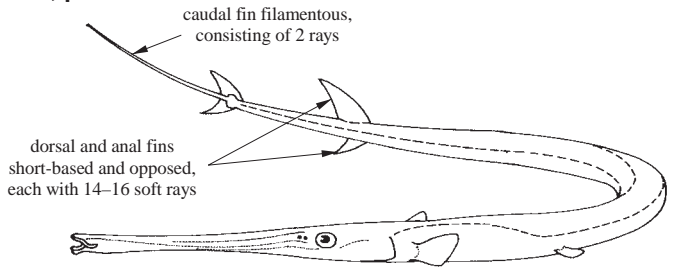


FISTULARIIDAE

Cornetfishes

To about 200 cm. Demersal from shallow seagrass beds and coral reefs and to depths over 10 m on soft bottoms. Two species in the area.

Vol. 3, p. 2241

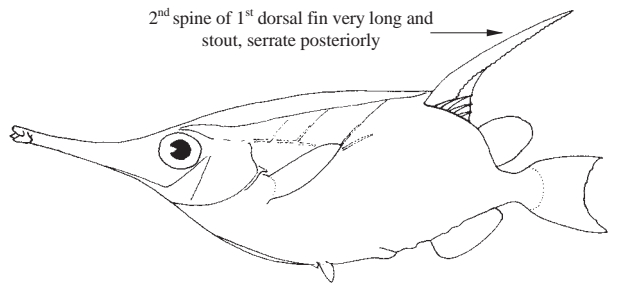


MACRORAMPHOSIDAE

Snipefishes

To 33 cm. Demersal between depths of 50 to 500 m. Two species in the area.

Vol. 3, p. 2245



Order SCORPAENIFORMES – Scorpionfishes, searobins and allies

DACTYLOPTERIDAE

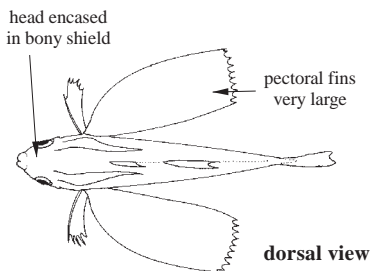
Vol. 3, p. 2248

USUALLY WELL-DEVELOPED SPINES ON HEAD

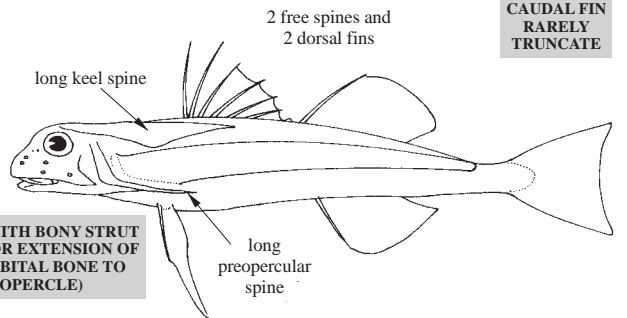
Flying gurnards

To 45 cm. Demersal on sandy or muddy bottoms to depths of about 80 m. A single species in the area.

CAUDAL FIN RARELY TRUNCATE



CHIEKS WITH BONY STRUT (POSTERIOR EXTENSION OF INFRAORBITAL BONE TO PREOPERCLE)



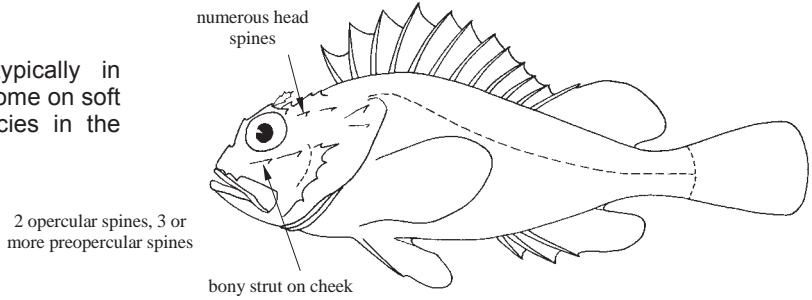
PECTORAL FINS USUALLY ROUNDED, MEMBRANES BETWEEN LOWER RAYS OFTEN REDUCED OR ABSENT

SCORPAENIDAE

Vol. 3, p. 2250

Scorpionfishes

To 45 cm. Demersal, typically in shallow hard bottoms but some on soft bottoms. Twenty-nine species in the area.

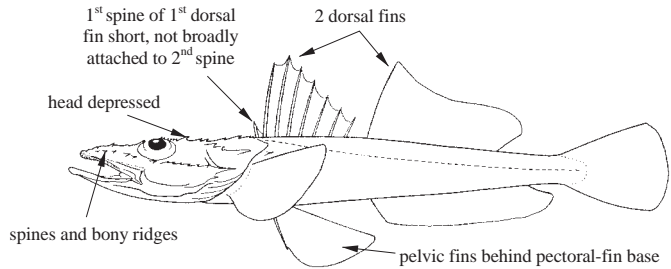


PLATYCEPHALIDAE

Vol. 3, p. 2288

Flatheads

To 20 cm. Demersal from 20 to 200 m depth. A single species in the area.

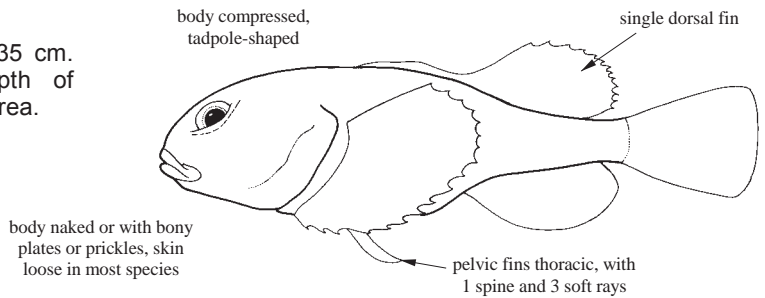


PSYCHROLUTIDAE

Vol. 3, p. 2290

Fathead sculpins

To about 65 cm, most under 35 cm. Demersal, inshore to a depth of 2 800 m. Three species in the area.

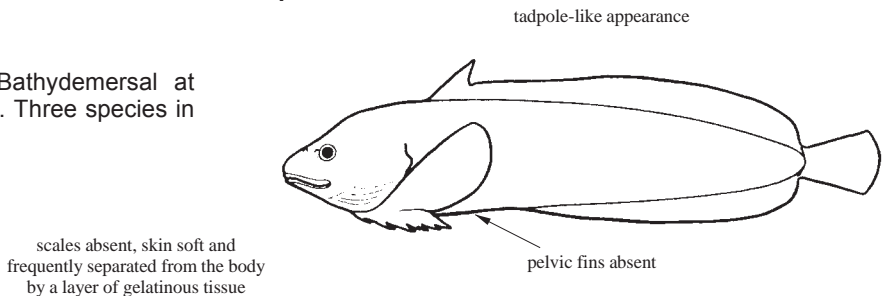


LIPARIDAE

Vol. 3, p. 2292

Snailfishes

To about 80 cm. Bathydemersal at depths below 500 m. Three species in the area.

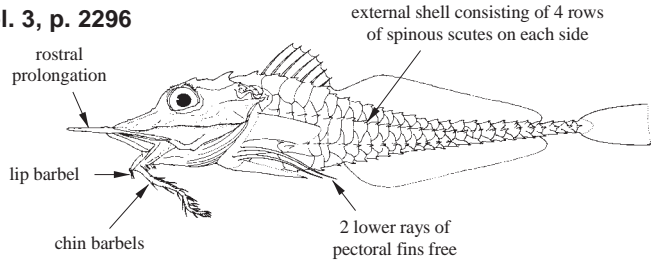


PERISTEDIIDAE

Armoured searobins

To 25 cm. Demersal on mud and rock bottoms from 50 to 500 cm. A single species in the area.

Vol. 3, p. 2296

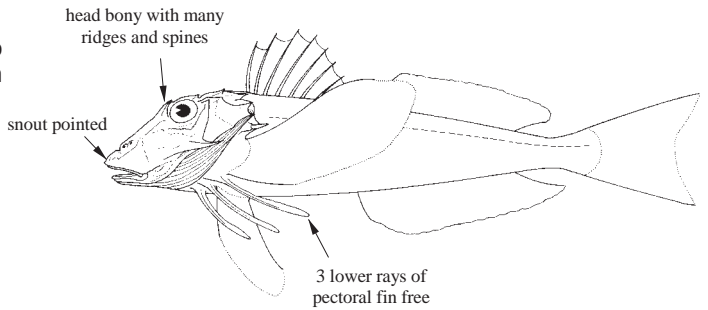


TRIGLIDAE

Gurnards

To about 45 cm. Demersal, usually to depths of 200 m. Fourteen species in the area.

Vol. 3, p. 2298



Order PERCIFORMES: Suborder PERCOIDEI – Perch-like fishes

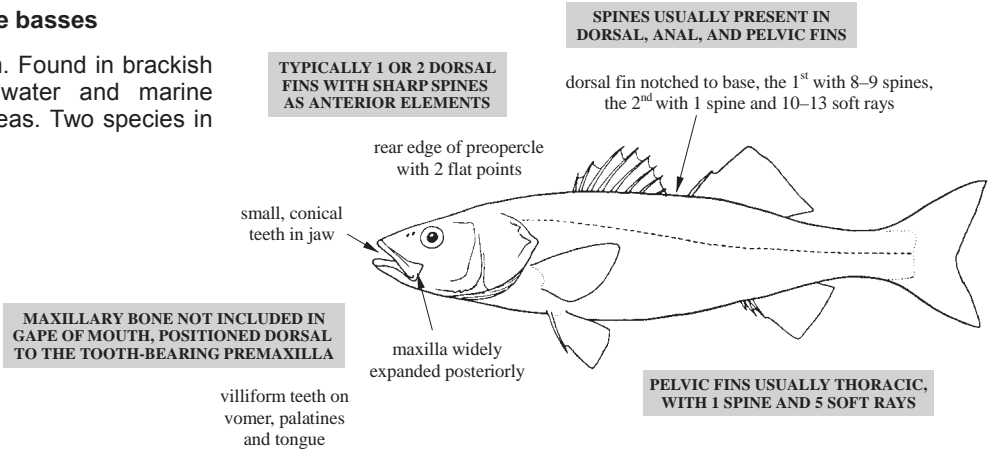
The order Perciformes is the most diverse order of fishes with a little over 68 families represented in the eastern central Atlantic. Therefore, the order is broken down into its component suborders to make this guide to families easier to use. The first suborder, the Percoidei, contains the bulk of the perciform diversity and includes around 39 families.

MORONIDAE

Temperate basses

To 100 cm. Found in brackish and freshwater and marine coastal areas. Two species in the area.

Vol. 4, p. 2343

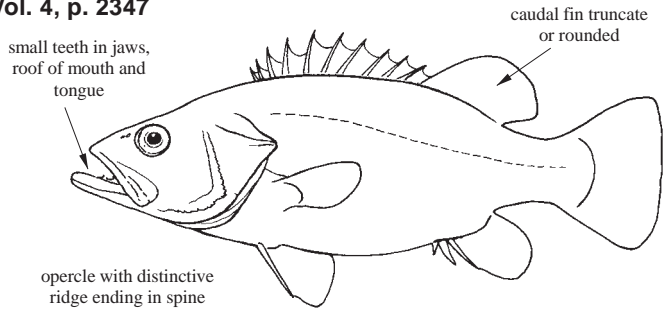


POLYPRIONIDAE

Wreckfishes

To 200 cm. Demersal on rocky and sandy bottoms between 100 and 1 000 m. A single species in the area.

Vol. 4, p. 2347

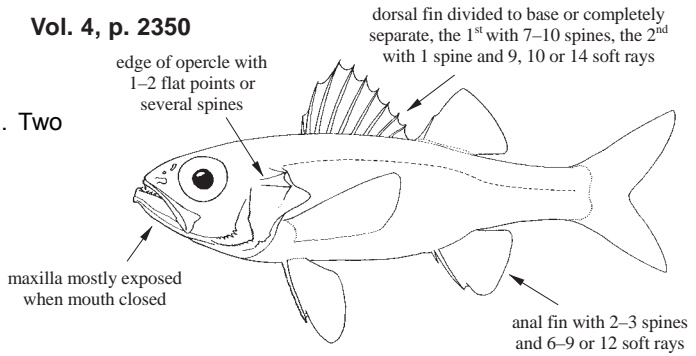


ACROPOMATIDAE

Acropomatids

To 38 cm. Near bottom to 2 200 m. Two species in the area.

Vol. 4, p. 2350

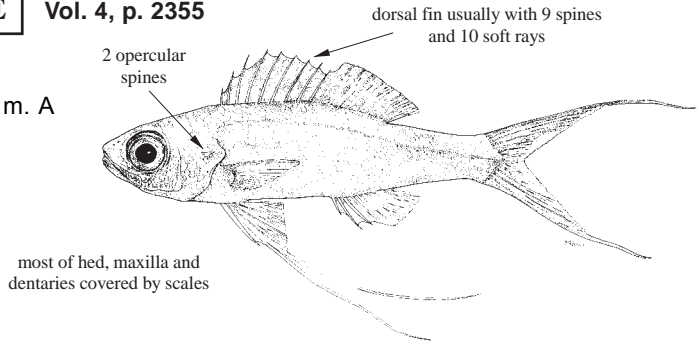


SYMPHYSANODONTIDAE

Bunguelovelies

To 16 cm. Bottom-associated to 476 m. A single species in the area.

Vol. 4, p. 2355

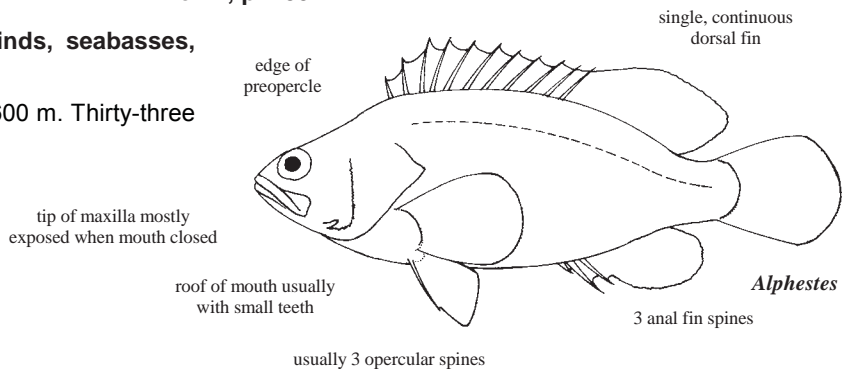


SERRANIDAE

Groupers, hamlets, hinds, seabasses, sand-perches, tatlley

To 2.5 m. Demersal to 600 m. Thirty-three species in the area.

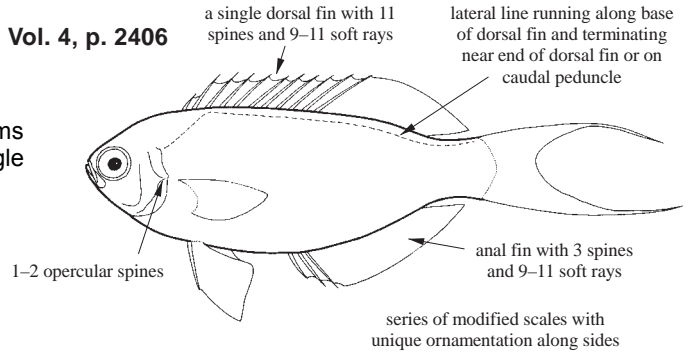
Vol. 4, p. 2357



CALLANTHIIDAE

Groppos

To 18 cm. Over rocky and muddy bottoms in submarine caves to 500 m. A single species in the area.

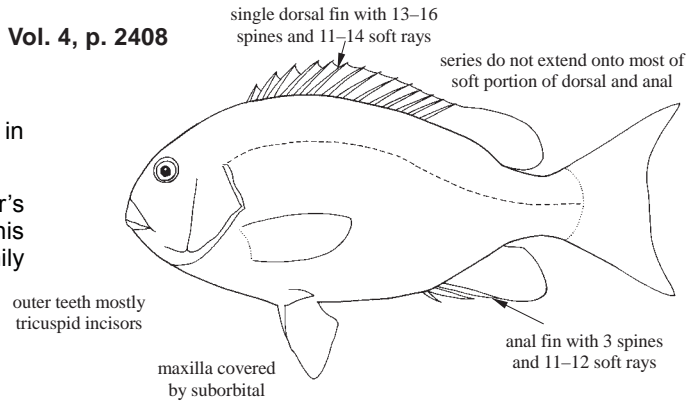


GIRELLIDAE

Nibbers

To 27 cm. Coastal to 60 m. Two species in the area.

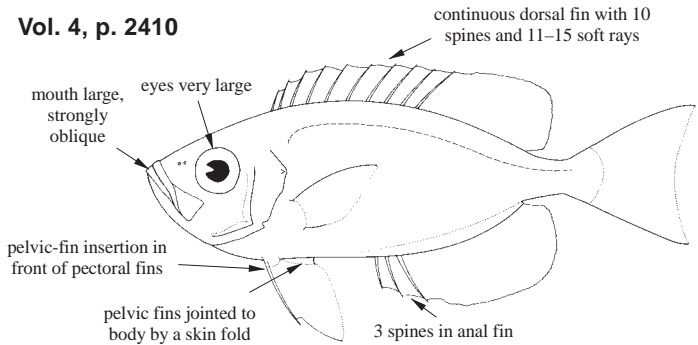
Taxonomic remarks: Eschmeyer's Catalog of Fishes currently places this group in family Kyphosidae, subfamily Girellinae.



PRIACANTHIDAE

Bigeyes

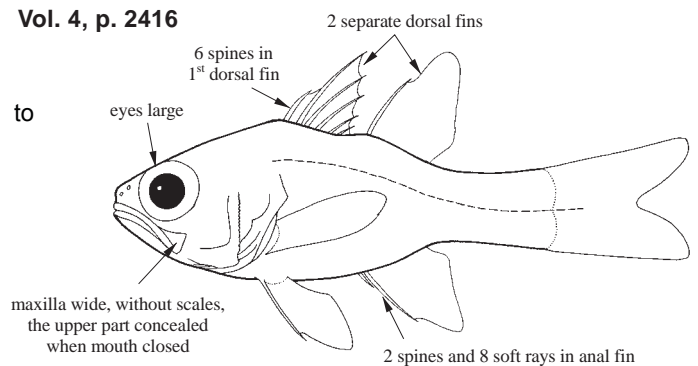
To 65 cm. Coral reef and rock formations to 400 m. Three species in the area.



APOGONIDAE

Cardinalfishes

To 150 mm. Coral and rocky reefs to 100 m. Four species in the area.

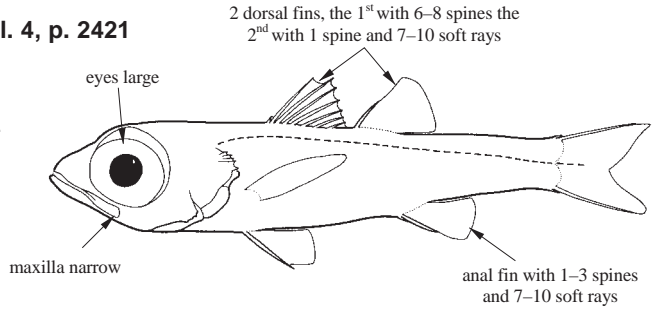


EPIGONIDAE

Vol. 4, p. 2421

Deepwater cardinalfishes

To 50 cm. Epibenthic or pelagic to 3 700 m. Six species in the area.



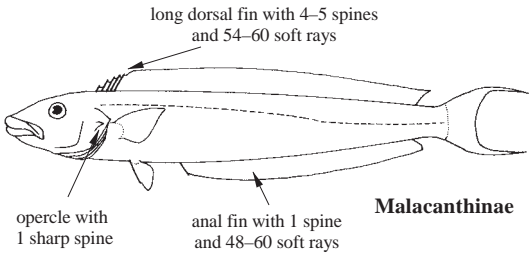
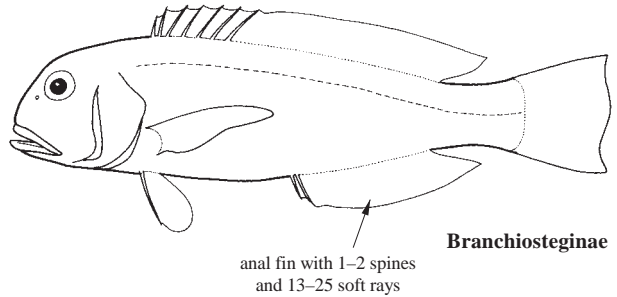
BRANCHIOSTEGIDAE

Vol. 4, p. 2427

Tilefishes

To 60 cm. Benthic to 200 m. Two species in the area.

Taxonomic remarks: Eschmeyer's Catalog of Fishes currently places these species in family Malacanthidae, subfamilies Malacanthinae and Latilinae.

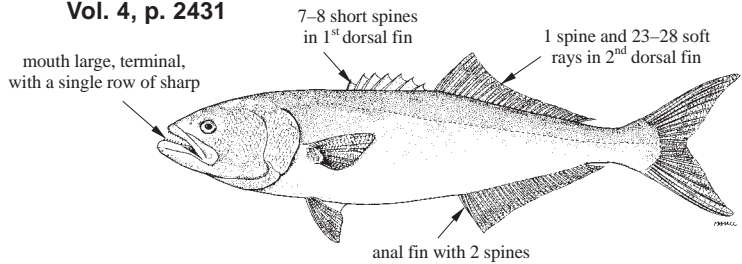


POMATOMIDAE

Vol. 4, p. 2431

Bluefishes

To 110 cm. Coastal, pelagic. A single species in the area.

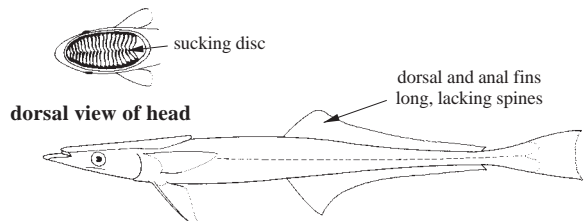


ECHENEIDAE

Vol. 4, p. 2433

Remoras

To 90 cm. Freeswimming species coastal, others attach to large pelagic hosts. Seven species in the area.

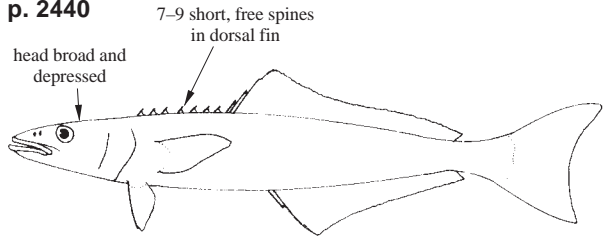


RACHYCENTRIDAE

Vol. 4, p. 2440

Cobia

To 2 m. Pelagic or at coral reefs or off rocky shores. A single species in the area.

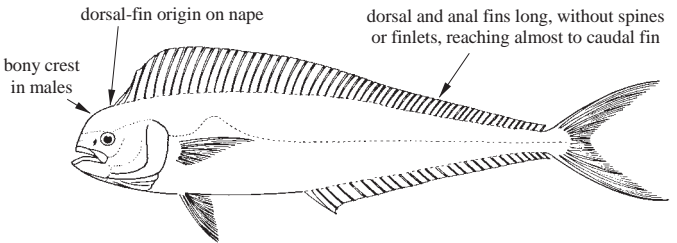


CORYPHAENIDAE

Vol. 4, p. 2442

Dolphinfishes

To 2 m. Epipelagic. Two species in the area.



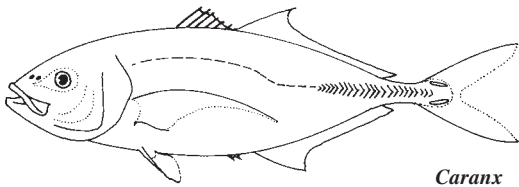
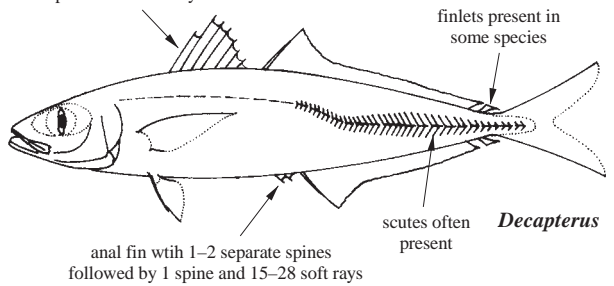
CARANGIDAE

Vol. 4, p. 2446

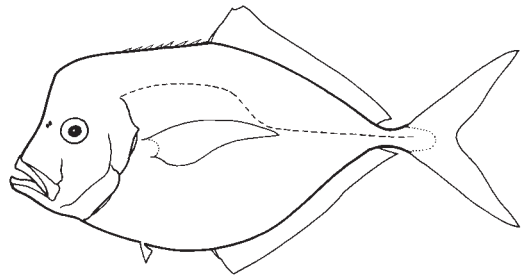
Jacks, scads and allies

To 180 cm. Epipelagic in marine or brackish waters. Thirty-nine species in the area.

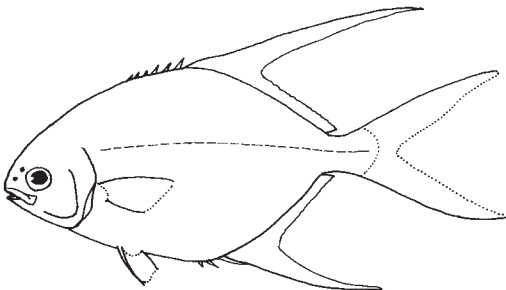
2 dorsal fins, sometimes separate, the 1st with 4-8 spines, the 2nd with 1 spine and 18-39 rays



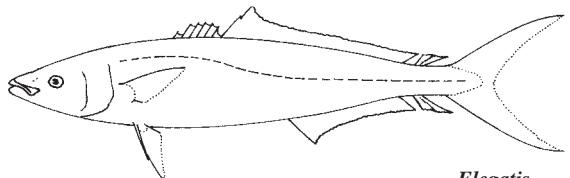
Caranx



Selene



Trachinotus



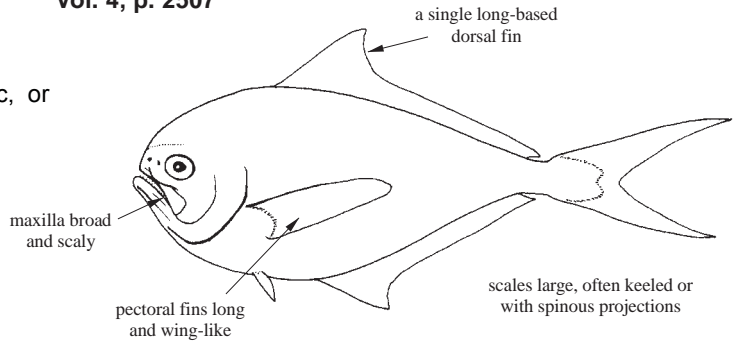
Elegatis

BRAMIDAE

Vol. 4, p. 2507

Pomfrets

To 1 m. Epipelagic, mesopelagic, or benthic. Eight species in the area.

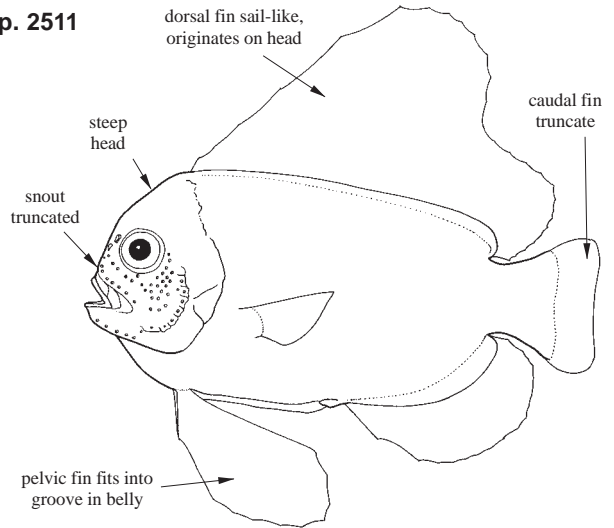


CARISTIIDAE

Vol. 4, p. 2511

Manefishes

To 40 cm. Mesopelagic or bathypelagic to 5 000 m. Seven species in the area.

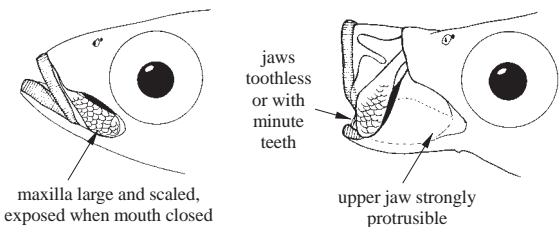
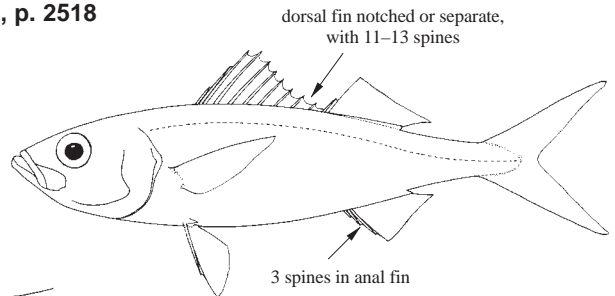


EMMELICHTHYIDAE

Vol. 4, p. 2518

Rubyfishes

To 55 cm. Demersal over sand or rocky bottoms to 200 m. Four species in the area.

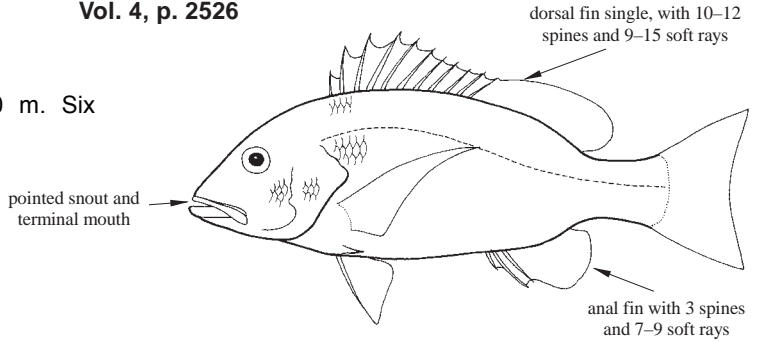


LUTJANIDAE

Vol. 4, p. 2526

Lutjanids

To 150 cm. Demersal to 300 m. Six species in the area.

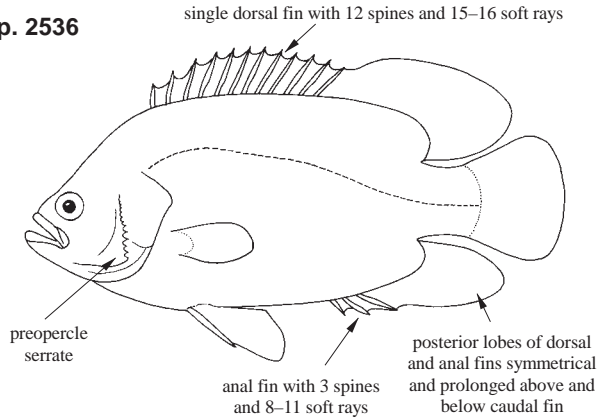


LOBOTIDAE

Vol. 4, p. 2536

Tripletails

To 110 cm. Offshore among floating objects and sargassum. A single species in the area.

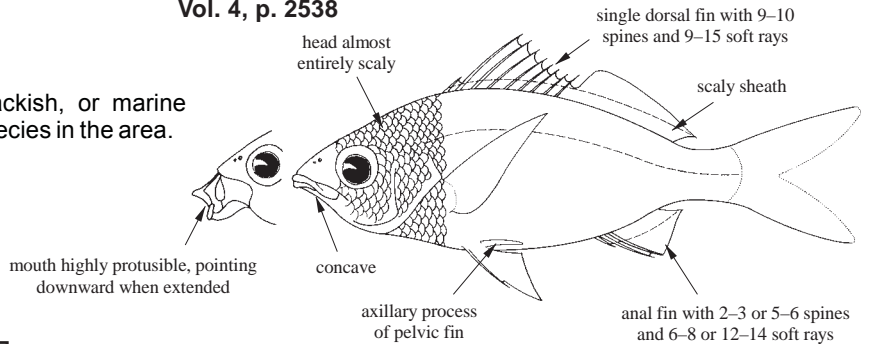


GERREIDAE

Vol. 4, p. 2538

Mojarras

To 40 cm. Fresh, brackish, or marine waters to 50 m. Two species in the area.

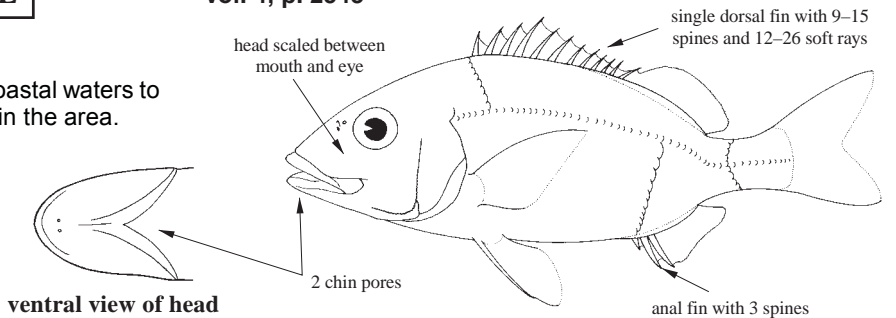


HAEMULIDAE

Vol. 4, p. 2543

Grunts

To 60 cm. Shallow coastal waters to 180 m. Ten species in the area.

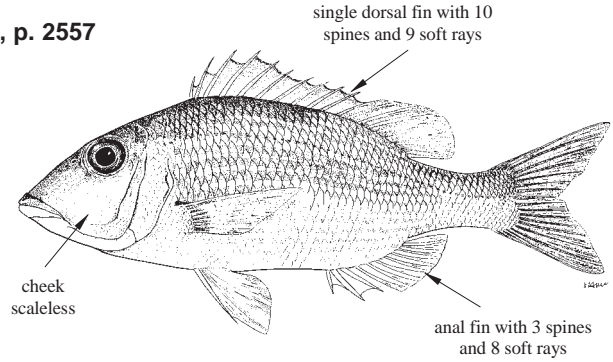


LETHRINIDAE

Vol. 4, p. 2557

Emperors

To 50 cm. Shallow coastal waters to 70 m. A single species in the area.



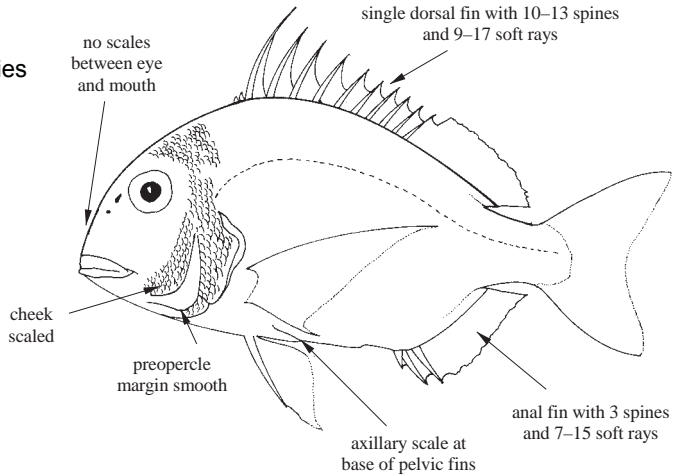
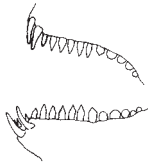
SPARIDAE

Vol. 4, p. 2559

Porgies

To 100 cm. Demersal. Forty-three species in the area.

teeth canine-like, conical or incisor-like, molars often present, roof of mouth toothless

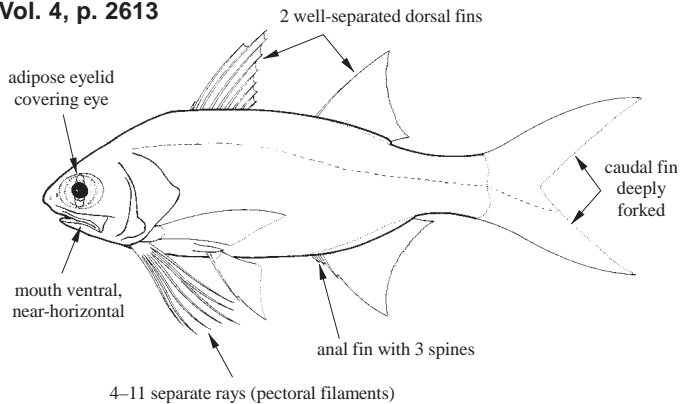


POLYNEMIDAE

Vol. 4, p. 2613

Threadfins

To 2 m. Epibenthic to 70 m. Three species in the area.

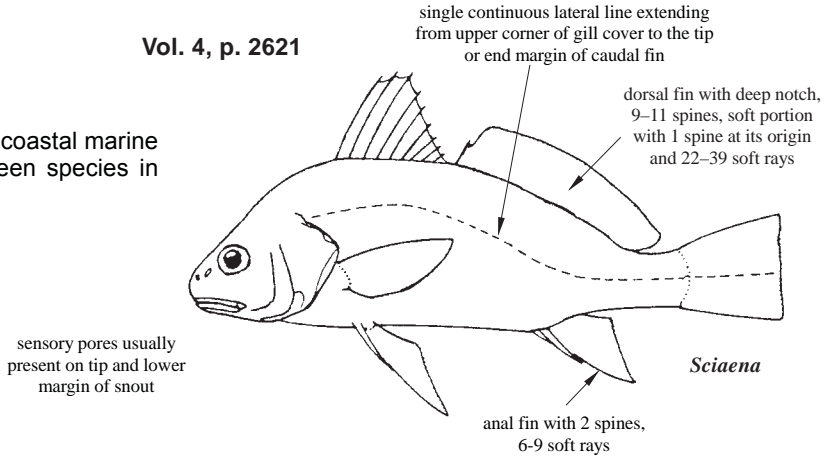


SCIAENIDAE

Vol. 4, p. 2621

Croakers

To 200 cm. Estuaries and coastal marine waters to 350 m. Seventeen species in the area.

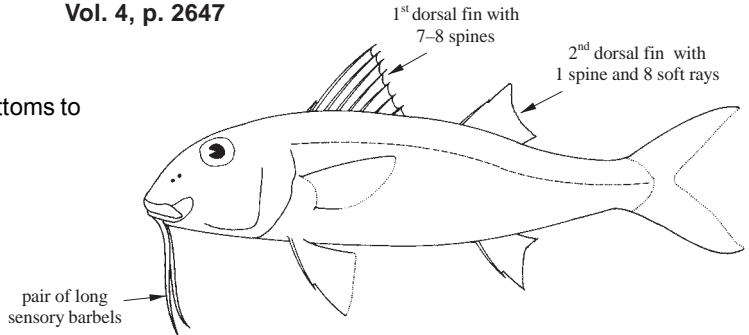


MULLIDAE

Vol. 4, p. 2647

Goatfishes

To 60 cm. Sandy, mud, or hard bottoms to 400 m. Four species in the area.

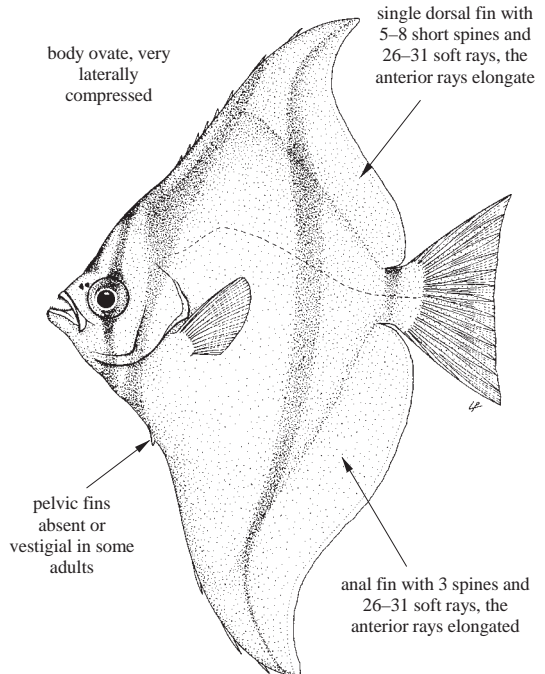


MONODACTYLIDAE

Vol. 4, p. 2653

Moonfishes

To 25 cm. Estuaries, mangrove lagoons, and shallow marine waters. A single species in the area.

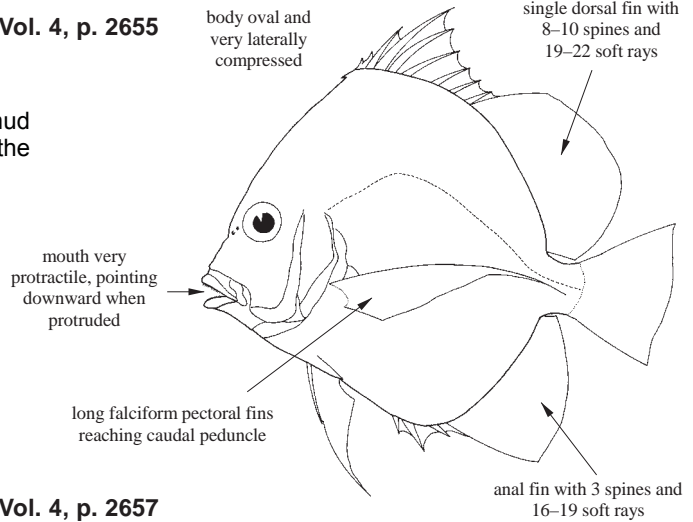


DREPANEIDAE

Vol. 4, p. 2655

Sicklefish

To 40 cm. Demersal over sand or mud bottoms to 50 m. A single species in the area.

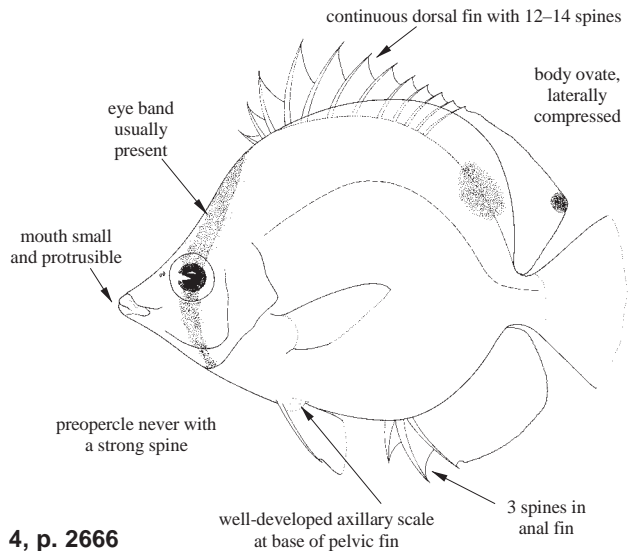


CHAETODONTIDAE

Vol. 4, p. 2657

Butterflyfishes

To 27 cm. Over coral reefs, rocky and soft bottoms to 150 m. Seven species in the area.

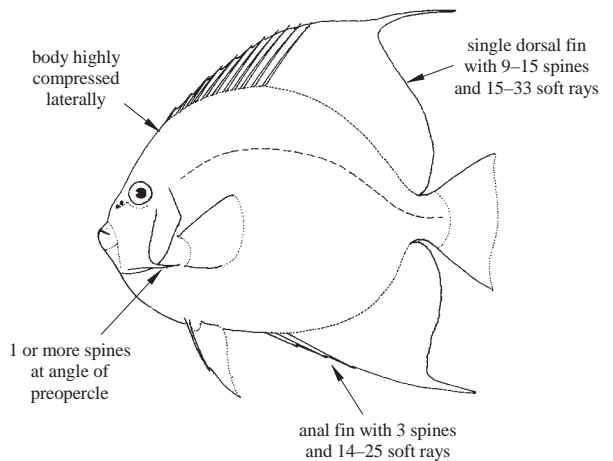


POMACANTHIDAE

Vol. 4, p. 2666

Angelfishes

To 45 cm. Coral reefs or rocky bottoms to 100 m. Four species in the area.

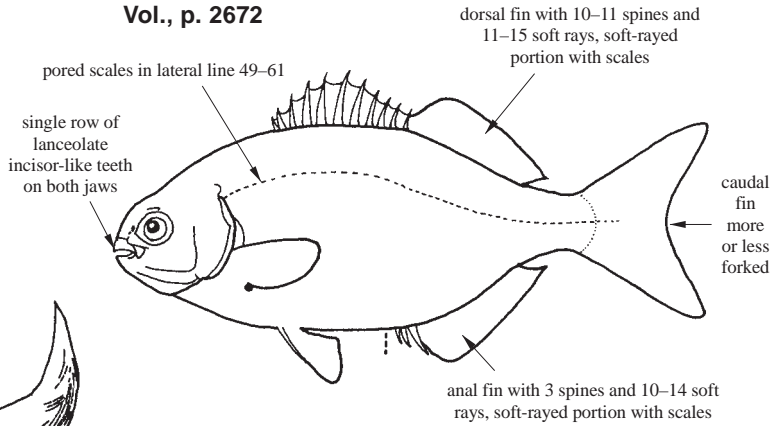
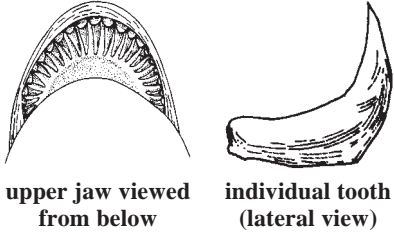


KYPHOSIDAE

Sea chubs

To 90 cm. Tropical rocky and coral reefs. Two species in the area.

Vol., p. 2672

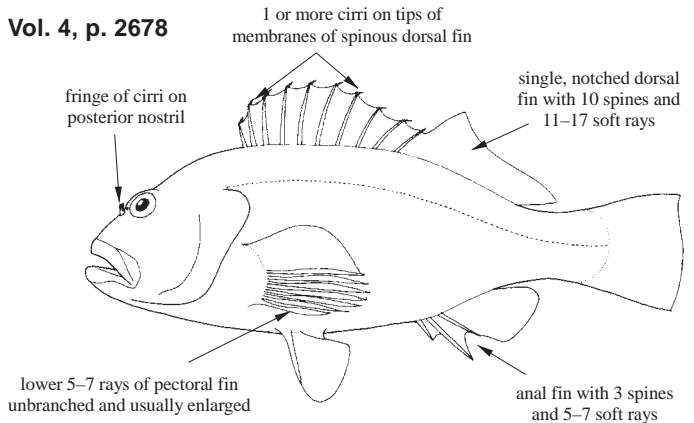


CIRRHITIDAE

Hawkfishes

To 18 cm. On coral blocks and branches to 25 m. Three species in the area.

Vol. 4, p. 2678

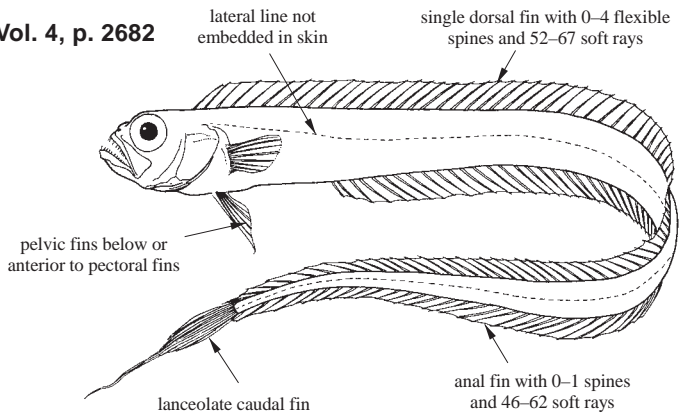


CEPOLIDAE

Bandfishes

To 80 cm. Over muddy or sandy bottoms to 400 m. Two species in the area.

Vol. 4, p. 2682

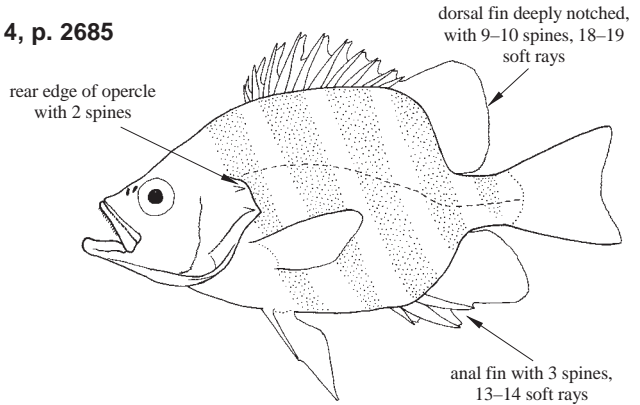


DINOPERCIDAE

Cavebass

To 30 m. Over sandy bottoms to 50 m. A single species in the area.

Vol. 4, p. 2685

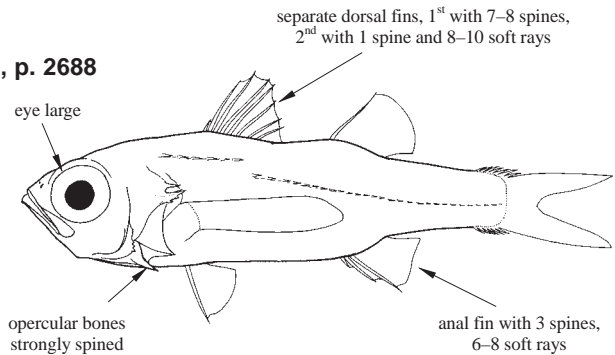


HOWELLIDAE

Picklefishes

To 12 cm. Demersal to 2 200 m, making diel migrations to the surface. Three species in the area.

Vol. 4, p. 2688

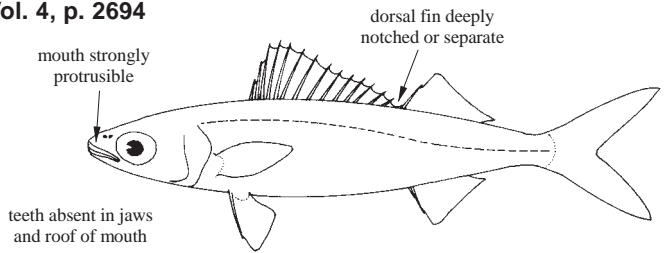


INERMIDAE

Bonnetmouths

To 23 cm. Near reefs to 50 m. A single species in the area.

Vol. 4, p. 2694



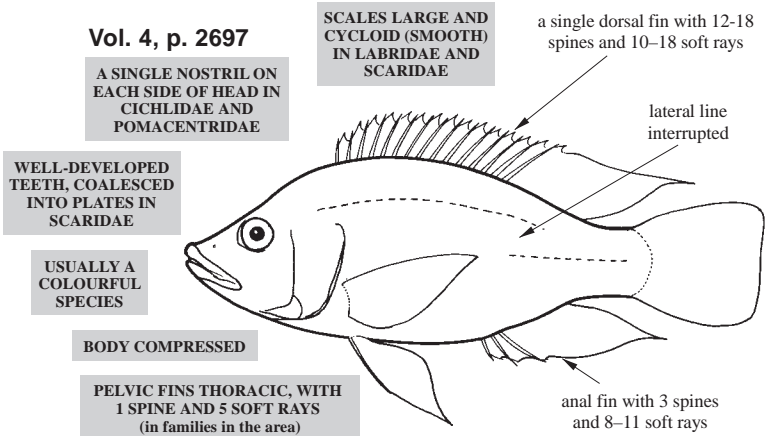
Order PERCIFORMES: Suborder LABROIDEI – Wrasses and allies

CICHLIDAE

Cichlids

To 60 cm. Fresh to brackish water. Eighteen species in the area.

Vol. 4, p. 2697

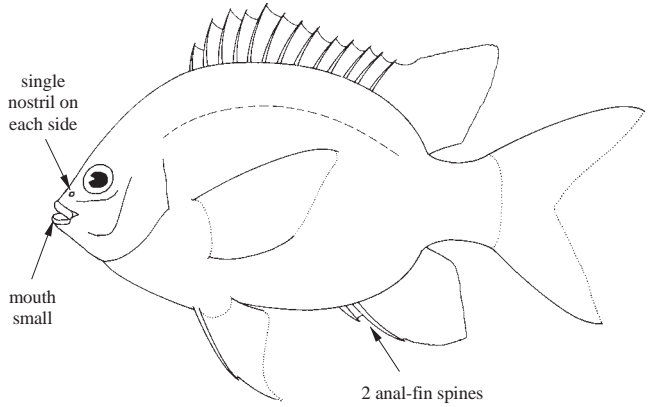


POMACENTRIDAE

Vol. 4, p. 2703

Damselfishes

To 35 cm. Shallow rocky, coral, and algae reefs to 15 m. Sixteen species in the area.

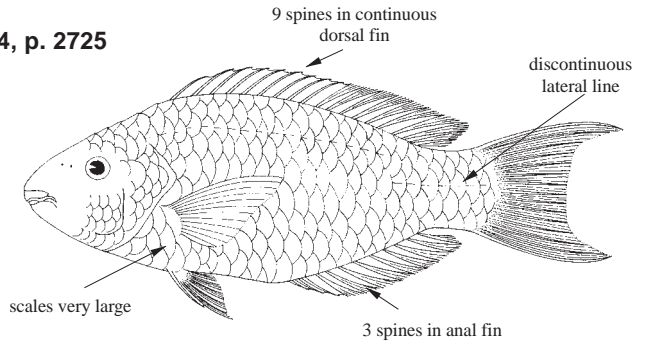
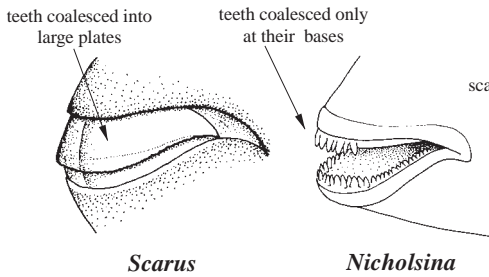


SCARIDAE

Vol. 4, p. 2725

Parrotfishes

To 50 cm. Coral reefs to 80 m. Five species in the area.

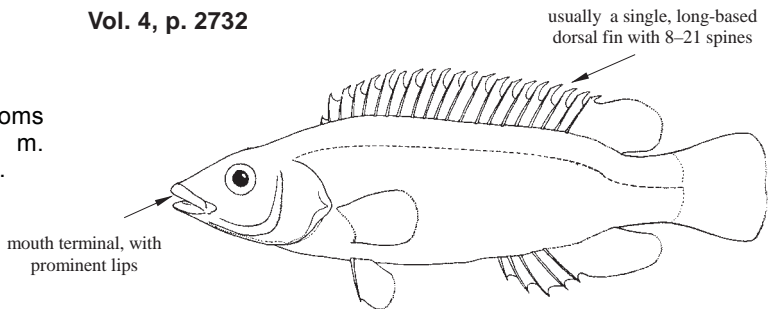


LABRIDAE

Vol. 4, p. 2732

Wrasses

To 20 cm. Over a variety of bottoms from the shore to 120 m. Twenty-five species in the area.



Order PERCIFORMES: Suborder ZOARCOIDEI – Eelpouts

ZOARCIDAE

Eelpouts

To 50 cm. Benthic or mesopelagic to 4 000 m. Six species in the area.

Vol. 4, p. 2751

EEL-LIKE BODY SHAPE

SINGLE NOSTRIL ON EACH SIDE



PELVIC FINS ABSENT OR VESTIGIAL WITH 2-3 RAYS

PARABROTULIDAE

False brotulas

To 60 mm. Pelagic to 1 500 m. Two species in the area.

Vol. 4, p. 2754

2 nostrils



no pelvic fin

Order PERCIFORMES: Suborder TRACHINOIDEI – Stargazers and allies

CHIASMODONTIDAE

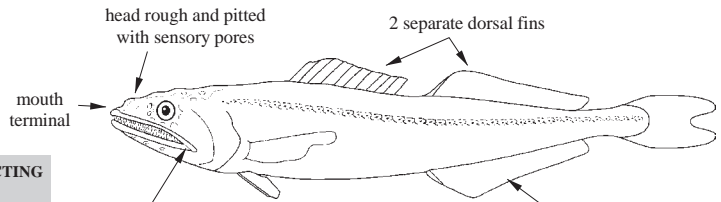
Swallowers

To 40 cm. Meso- and bathypelagic. Fourteen species in the area.

Vol. 4, p. 2756

BODY MODERATELY ELONGATE

SOFT DORSAL AND ANAL FIN ELONGATE



head rough and pitted with sensory pores

2 separate dorsal fins

mouth terminal

LOWER JAW USUALLY PROJECTING BEYOND UPPER JAW

slender premaxilla and maxilla, not protrusible

PELVIC FINS OFTEN JUGULAR

ANAL FIN WITH 0-1 SPINES

PELVIC FINS WITH 1 SPINE AND 5 SOFT RAYS (VERY SMALL IN AMMODYTIDAE)

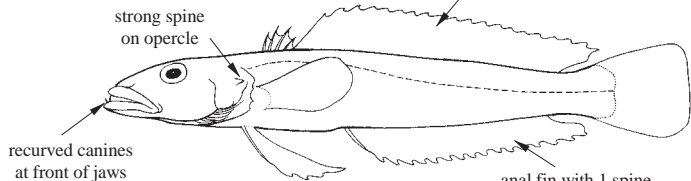
PINGUIPEDIDAE

Sandperches

To 15 cm. Over sedimentary or rubble bottoms to 200 m. A single species in the area.

Vol. 4, p. 2759

single dorsal fin with 4-5 spines and 20-24 soft rays



strong spine on opercle

recurved canines at front of jaws

anal fin with 1 spine and 16-20 soft rays

TRACHINIDAE

Weeverfishes

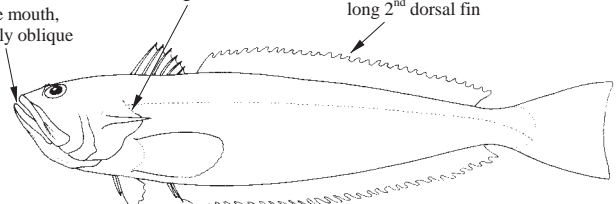
To 45 cm. Benthic over sand or mud bottoms to 200 m. Eight species in the area.

Vol. 4, p. 2761

venomous spine on gill cover

long 2nd dorsal fin

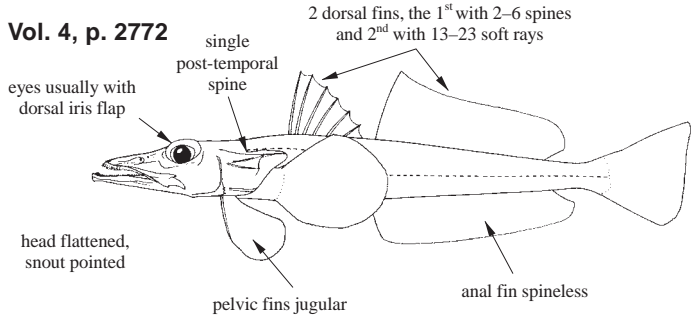
large mouth, strongly oblique



PERCOPHIDAE

Duckbills

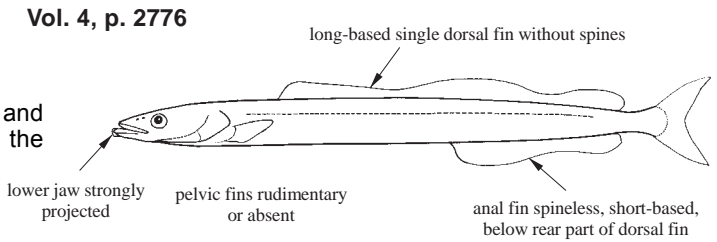
To 25 cm. Benthic to 500 m. Two species in the area.



AMMODYTIDAE

Sandlances

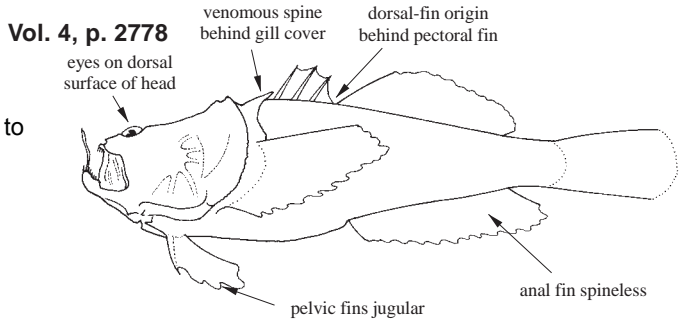
To 20 cm. Coastal over sand, shell, and fine-gravel bottoms. Two species in the area.



URANOSCOPIDAE

Stargazers

To 50 cm. Continental shelf and slope to 400 m. Four species in the area.

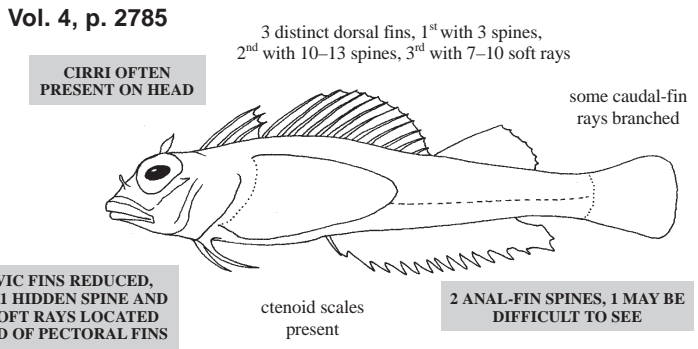


Order PERCIFORMES: Suborder BLENNOIDEI – Blennies and allies

TRIPTERYGIIDAE

Triplefins

To 9 cm. Coastal benthic to 40 m. Two species in the area.

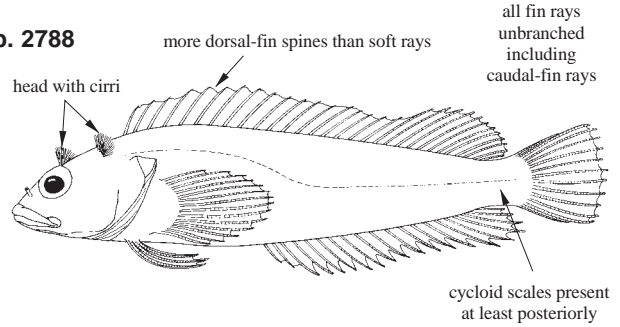


LABRISOMIDAE

Labrisomids

To 23 cm. Benthic on rocks, shells, and coral reefs. Two species in the area.

Vol. 4, p. 2788

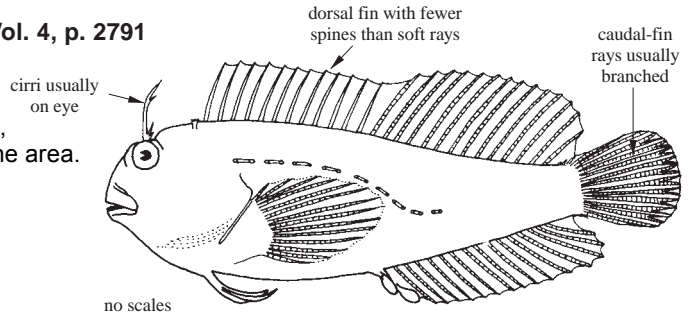


BLENNIIDAE

Combtooth blennies

To 20 cm. Benthic over structured, shallow bottoms. Thirty-four species in the area.

Vol. 4, p. 2791



Order PERCIFORMES: Suborder GOBIESOCOIDEI – Clingfishes

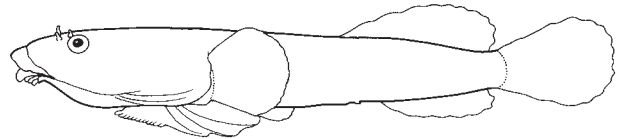
GOBIESOCIDAE

Clingfishes

To 7 cm. Fresh, brackish, and shallow tropical marine waters. Thirteen species in the area.

Vol. 4, p. 2799

SINGLE POSTERIOR SHORT DORSAL FIN



PELVIC FINS MODIFIED INTO A PROMINENT VENTRAL SUCKING DISC

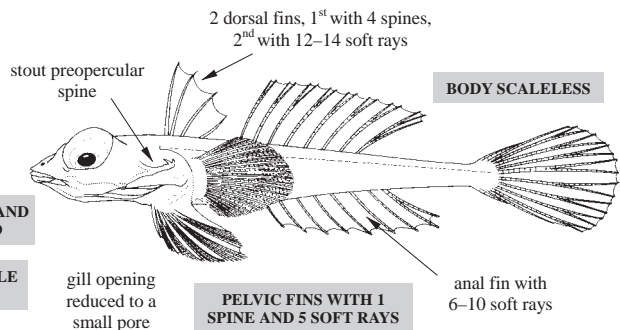
Order PERCIFORMES: Suborder CALLIONYMOIDEI – Dragonets

CALLIONYMIDAE

Dragonets

To 30 cm. Benthic over a variety of bottoms to 900 m. Twelve species in the area.

Vol. 4, p. 2802



HEAD BROAD AND DEPRESSED

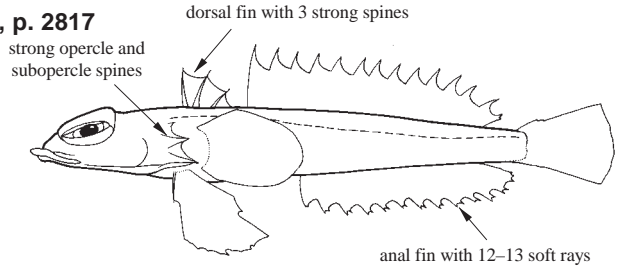
SHARP SPINE ON EITHER PREOPERCLE OR, OPERCLE AND SUBOPERCLE

DRACONETTIDAE

Deepwater dragonets

To 8 cm. Benthic over sand and mud to 594 m. A single species in the area.

Vol. 4, p. 2817



Order PERCIFORMES: Suborder GOBIOIDEI – Gobies and allies

ELEOTRIDAE

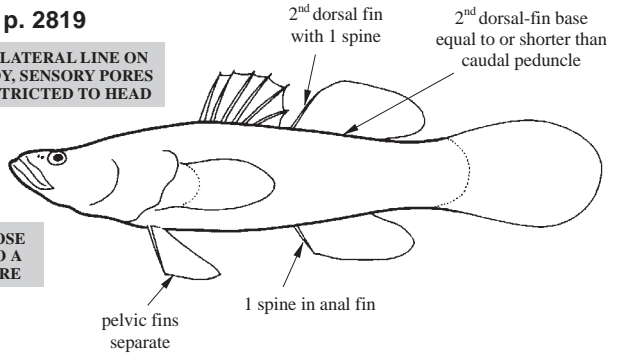
Sleeper gobies

To 28 cm. Bottom-living in lagoons, estuaries and freshwater ecosystems. Six species in the area.

Vol. 4, p. 2819

NO LATERAL LINE ON BODY. SENSORY PORES RESTRICTED TO HEAD

PELVIC FINS THORACIC. CLOSE TOGETHER OR UNITED INTO A SINGLE CUP-LIKE STRUCTURE

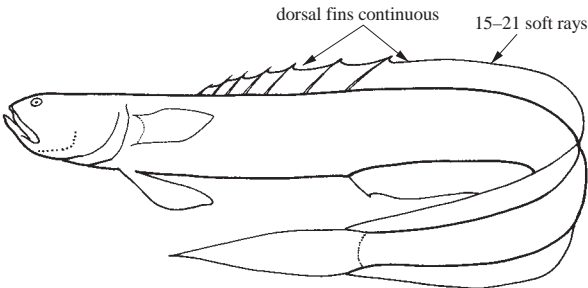


GOBIIDAE

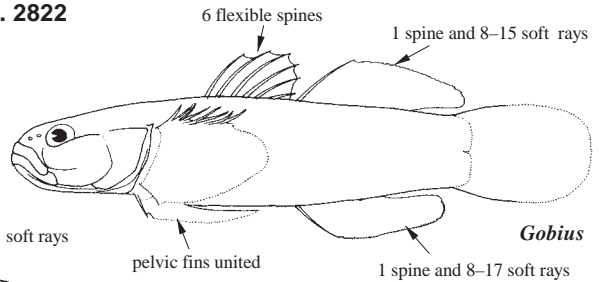
Gobies

To 36 cm. Fresh, brackish, and marine waters; some species amphibious. Sixty-five species in the area.

Vol. 4, p. 2822



Gobioides



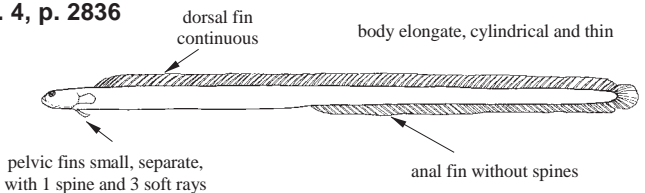
Gobius

MICRODESMIDAE

Wormfishes

To 27 cm. Shallow, inshore waters, often buried in sediment. Three species in the area.

Vol. 4, p. 2836



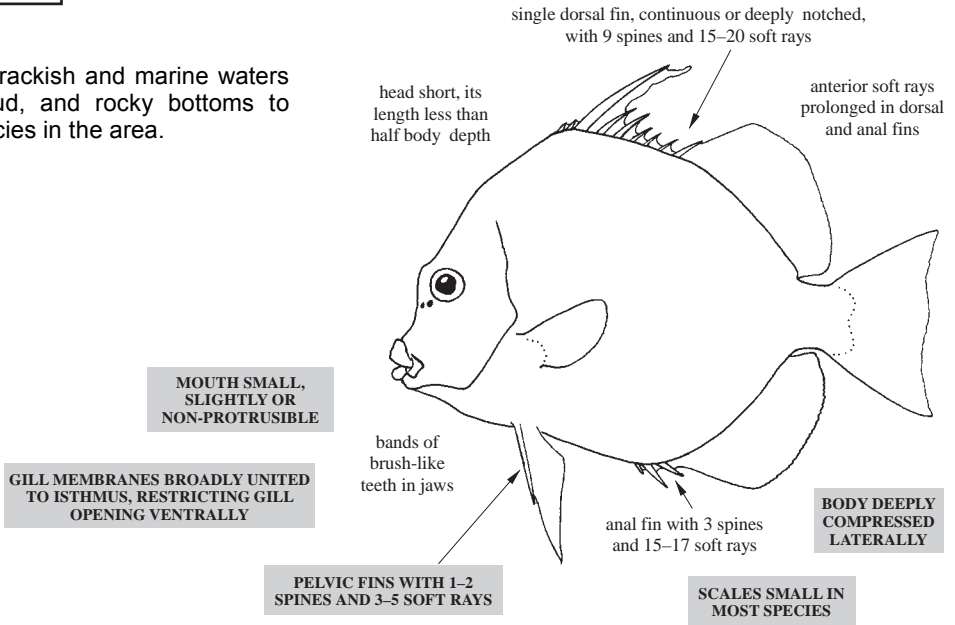
Order PERCIFORMES: Suborder ACANTHUROIDEI – Surgeonfishes and allies

EPHIPPIDAE

Vol. 4, p. 2838

Spadefishes

To 32 cm. In brackish and marine waters over sand, mud, and rocky bottoms to 45 m. Two species in the area.



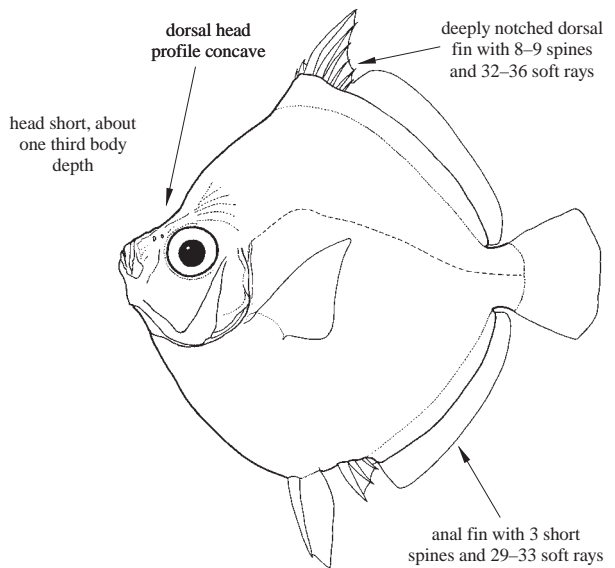
ANTIGONIIDAE

Vol. 4, p. 2843

Deep boarfish

To 30 cm. Demersal to 900 m. A single species in the area.

Taxonomic remarks: Eschmeyer's Catalog of Fishes currently places this group in family Caproidae.

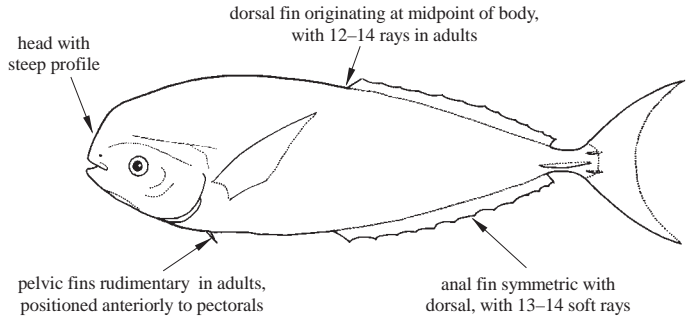


LUVARIDAE

Louvar

To 2 m. Oceanic and occasionally coastal. A single species in the area.

Vol. 4, p. 2846

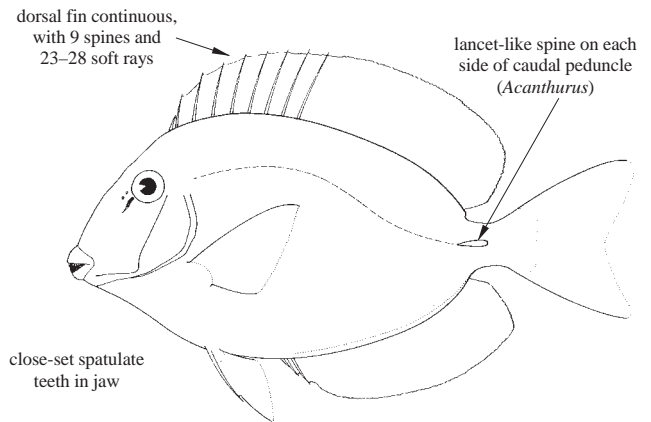


ACANTHURIDAE

Surgeonfishes

To 45 cm. On coral reefs and adjacent habitat. Five species in the area.

Vol. 4, p. 2848



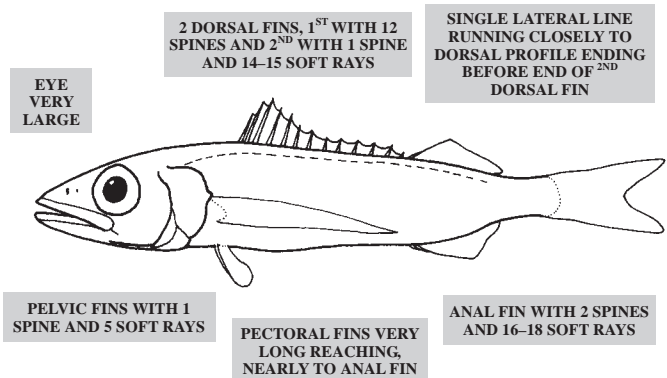
Order PERCIFORMES: Suborder SCOMBROIDEI – Tunas and allies

SCOMBROLABRACIDAE

Vol. 4, p. 2855

Longfin escolars

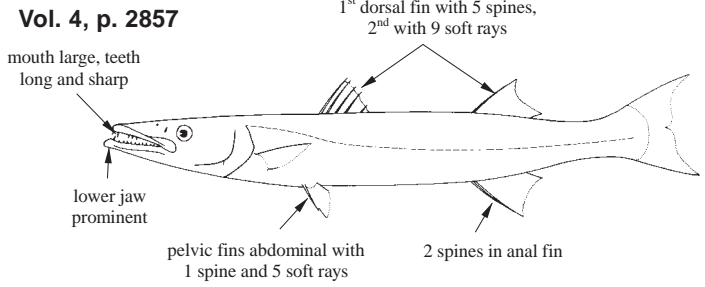
To 30 cm. Continental slope and shelf to 900 m. A single species in the area.



SPHYRAENIDAE

Barracudae

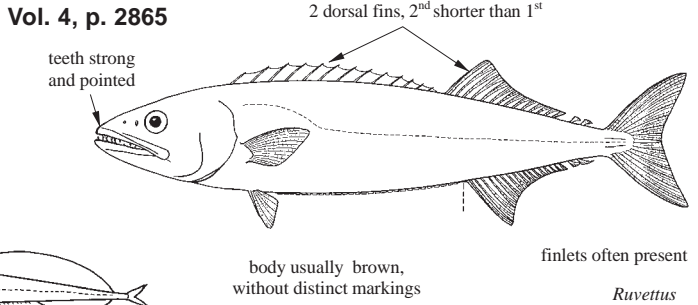
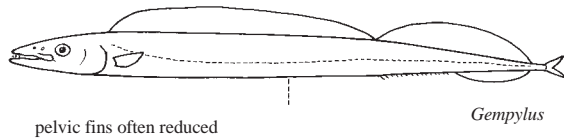
To 205 cm. Tropical marine waters from the surface to 100 m. Five species in the area.



GEMPYLIDAE

Snake mackerels

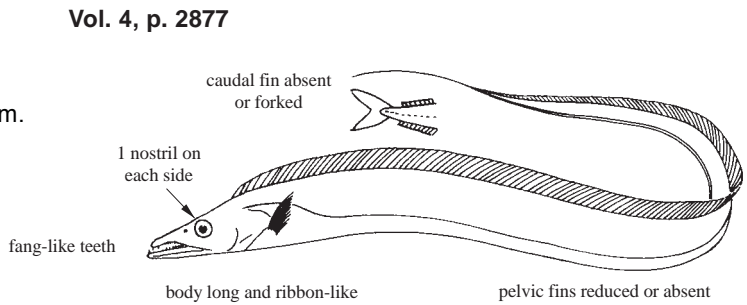
To 3 m. Continental slope and open ocean to 500 m. Eight species in the area.



TRICHIURIDAE

Scabbardfishes

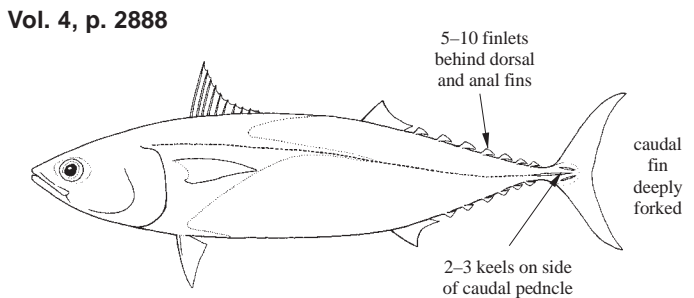
To 2 m. Benthopelagic to 1 600 m. Eight species in the area.



SCOMBRIDAE

Mackerels

To 3 m. Pelagic, coastal to migratory. Fifteen species in the area.



Order PERCIFORMES: Suborder STROMATEOIDEI – Butterfishes and allies

CENTROLOPHIDAE

Medusafishes

To 120 cm. Pelagic, mesopelagic, or epibenthic. Six species in the area.

Vol. 4, p. 2908

SNOUT TYPICALLY BLUNT AND THICK

no teeth on lower palatines or basibranchials

TEETH SMALL, APPROXIMATELY UNISERIAL

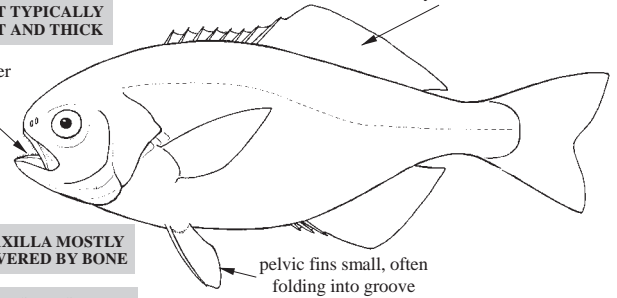
MAXILLA MOSTLY COVERED BY BONE

TOOTHED SACCULAR OUTGROWTHS PRESENT IN GULLET IMMEDIATELY BEHIND LAST GILL ARCH

single, long continuous or nearly continuous dorsal fin

pelvic fins small, often folding into groove

PELVIC FINS BELOW OR JUST BEHIND PECTORAL FINS OR ABSENT



NOMEIDAE

Driffishes

To 100 cm. Epipelagic and mesopelagic. Nine species in the area.

Vol. 4, p. 2911

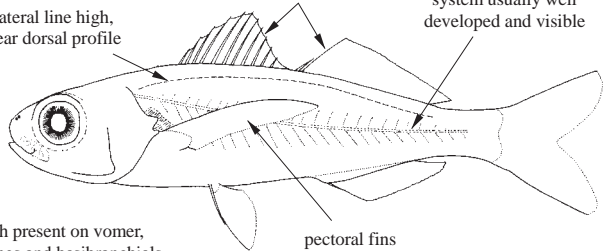
lateral line high, near dorsal profile

2 dorsal fins, 1st with 10 weak spines

subcutaneous mucous canal system usually well developed and visible

teeth present on vomer, palatines and basibranchials

pectoral fins large in adults



ARIOMMATIDAE

Ariommas

To 20 cm. Offshore over muddy bottoms to 750 m. Three species in the area.

Vol. 4, p. 2916

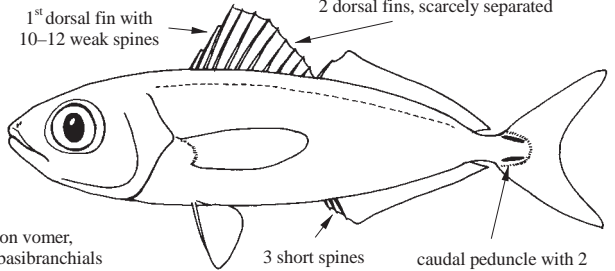
1st dorsal fin with 10–12 weak spines

2 dorsal fins, scarcely separated

no teeth on vomer, palatines or basibranchials

3 short spines in anal fin

caudal peduncle with 2 fleshy keels on each side



TETRAGONURIDAE

Squaretails

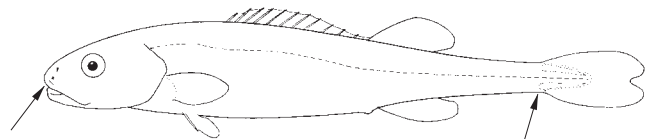
To 70 cm. Mesopelagic in tropical and temperate waters. Two species in the area.

Vol. 4, p. 2921

mouth box-like, lower jaw fits in upper jaw

scales with heavy keel

caudal peduncle square in cross-section, with 2 low keels

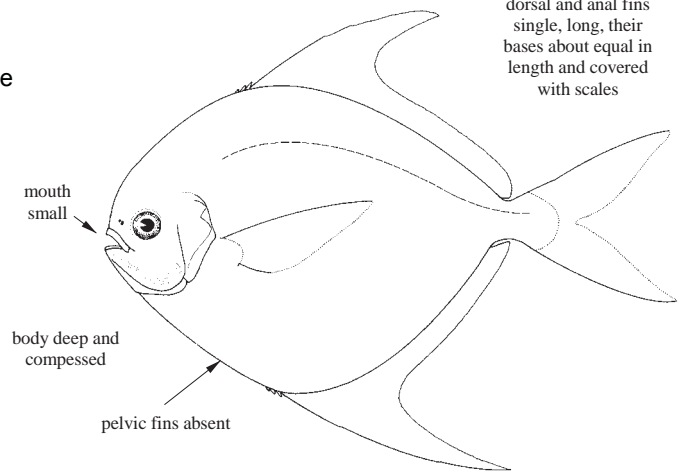


STROMATEIDAE

Vol. 4, p. 2923

Butterfishes

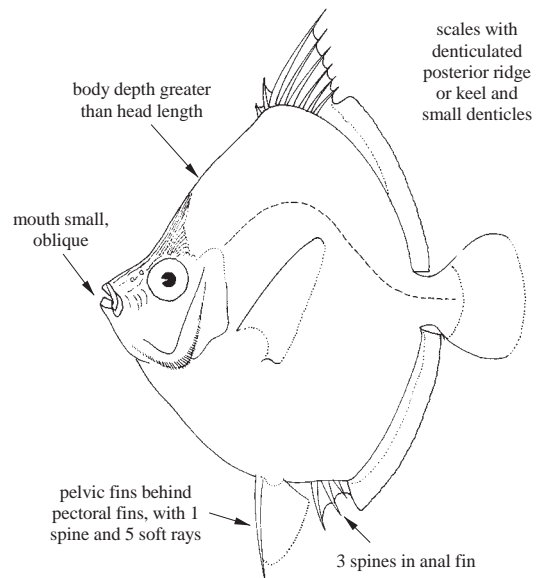
To 50 cm. Pelagic to 160 m. A single species in the area.

**Order PERCIFORMES: Suborder CAPROIDEI – Boarfishes****CAPROIDAE**

Vol. 4, p. 2925

Boarfishes

To 16 cm. Demersal over sandy, rocky, and coral bottoms to 600 m. A single species in the area.



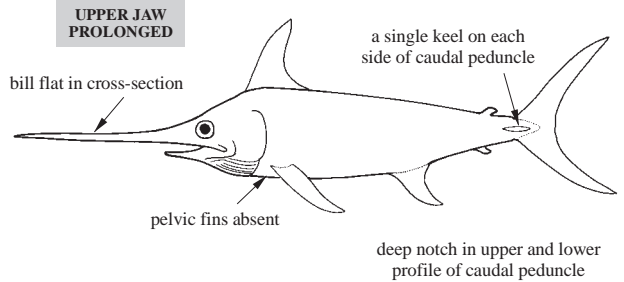
Order PERCIFORMES: Suborder XIPHIODEI – Billfishes and allies

XIPHIIDAE

Vol. 4, p. 2928

Swordfish

To 4.5 m. Highly migratory offshore. A single species in the area.

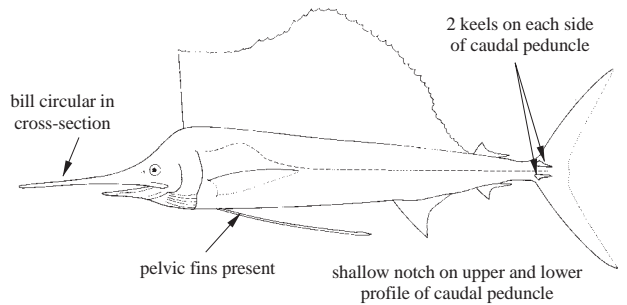


ISTIOPHORIDAE

Vol. 4, p. 2930

Billfishes

To 4 m. Warm and temperate waters offshore. Five species in the area.



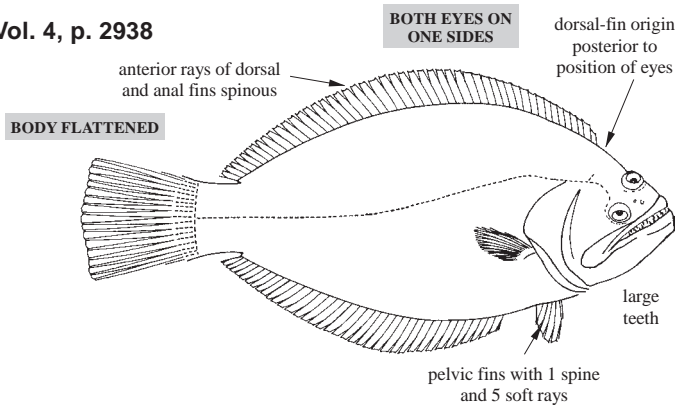
Order PLEURONECTIFORMES – Flatheads

PSETTODIDAE

Vol. 4, p. 2938

Spiny turbot

To 62 cm. Coastal, demersal. Two species in the area.

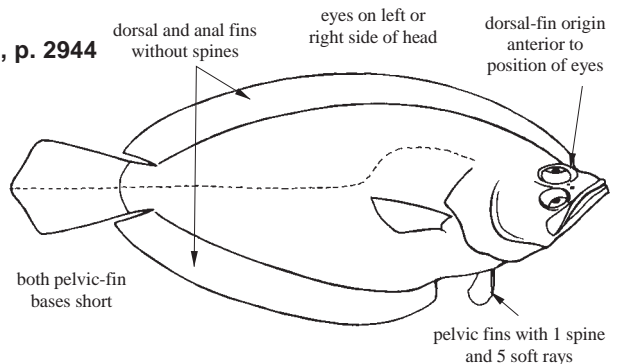


CITHARIDAE

Vol. 4, p. 2944

Largescale flounders

To 30 cm. Soft bottoms to 450 m. A single species in the area.

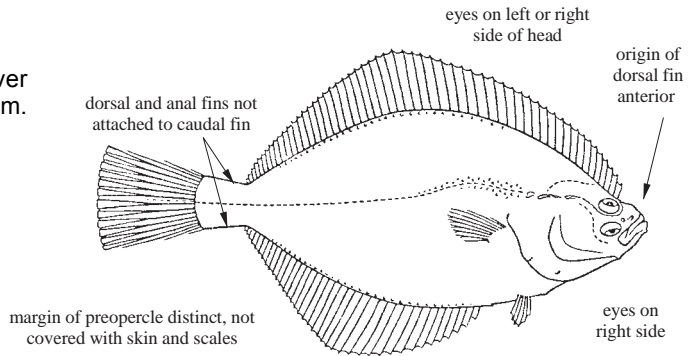


PLEURONECTIDAE

Vol. 4, p. 2948

Righteye flounder

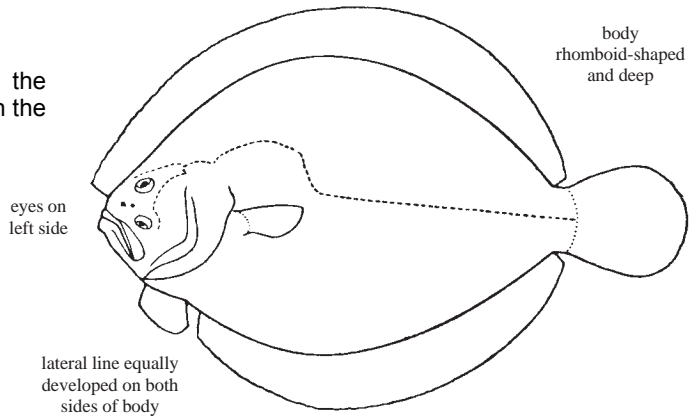
To 2 m. In cold or temperate waters over mud, sand, or rubble bottoms to 100 m. Two species in the area.

**SCOPHTHALMIDAE**

Vol. 4, p. 2952

Turbots

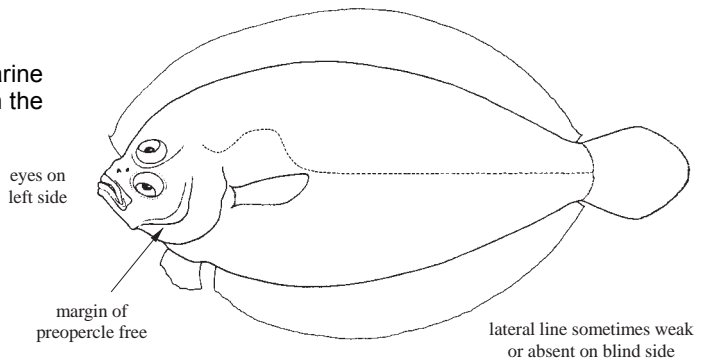
To 100 cm. Benthic waters from the intertidal to outer shelf. Five species in the area.

**BOTHIDAE**

Vol. 4, p. 2965

Lefteye flounders

To 45 cm. Demersal in brackish or marine waters to 1 000 m. Thirteen species in the area.

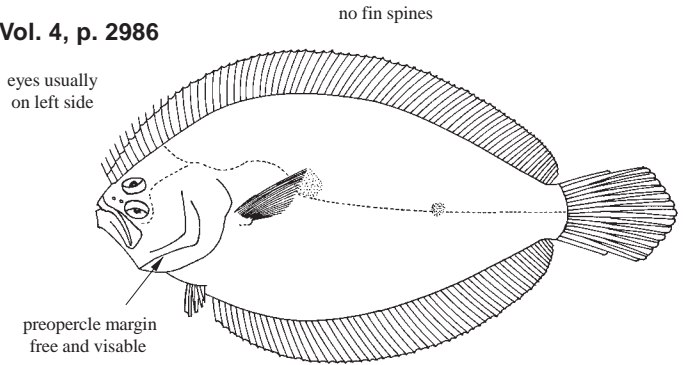


PARALICHTHYIDAE

Sand flounders

To 40 cm. Benthic on sand or soft mud. Three species in the area

Vol. 4, p. 2986

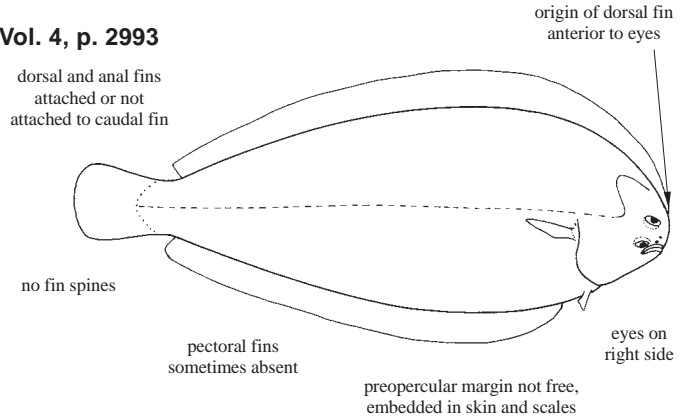


SOLEIDAE

Soles

To 70 cm. Benthic over sandy or muddy bottoms from the shore to the continental shelf from the surface to 1 000 m. Twenty-two species in the area.

Vol. 4, p. 2993

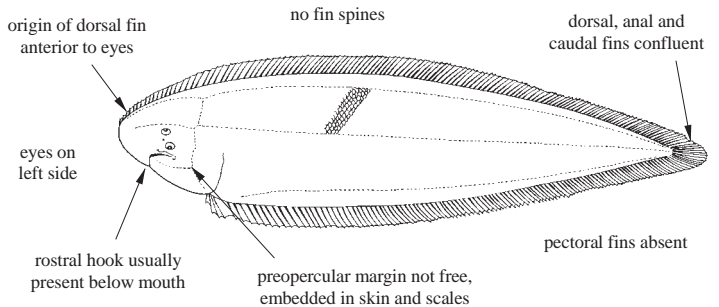


CYNOGLOSSIDAE

Tonguesoles

To 70 cm. Benthic over mud or sand to 1 500 m. Twelve species in the area.

Vol. 4, p. 3022



Order TETRAODONTIFORMES – Pufferfishes and allies

BALISTIDAE

Triggerfishes

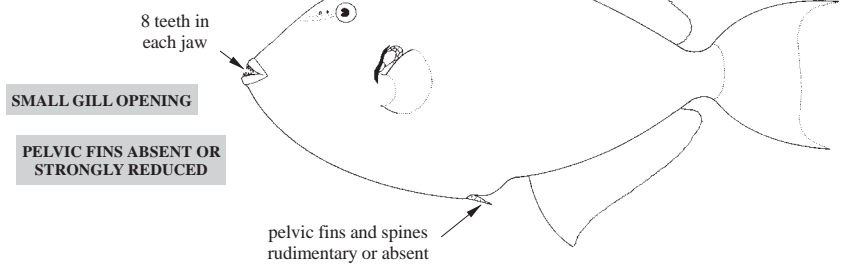
To 40 cm. Pelagic or benthic on rocky and coral reefs to 90 m. Five species in the area.

Vol. 4, p. 3040

SMALL MOUTH WITH STRONG TEETH FREQUENTLY COALESCED INTO BITING PLATE

3 spines visible in dorsal fin, the 1st very stout, long and erectile (can be locked in erect position by the 2nd)

SKIN THICK OR ROUGH SOMETIMES WITH PRICKLES, SPINES OR SCALY PLATES



MONACANTHIDAE

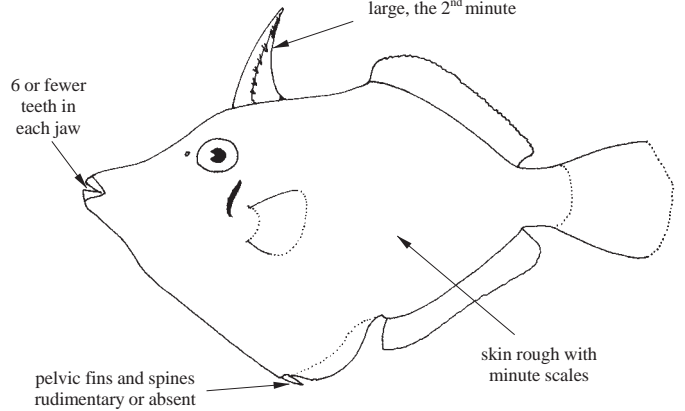
Filefishes

To 50 cm. Benthic around coral reefs and surrounding habitats to 90 m. Five species in the area.

Vol. 4, p. 3048

6 or fewer teeth in each jaw

2 dorsal fin spines, the 1st very large, the 2nd minute



OSTRACIIDAE

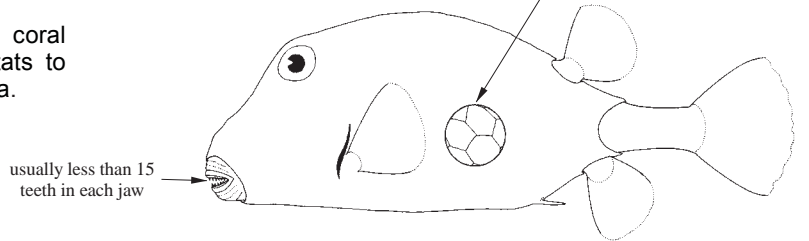
Boxfishes

To 45 cm. Benthic around coral reefs and surrounding habitats to 90 m. Two species in the area.

Vol. 4, p. 3055

body encased in a rigid bony shell formed of scale plates

spinous dorsal fin absent

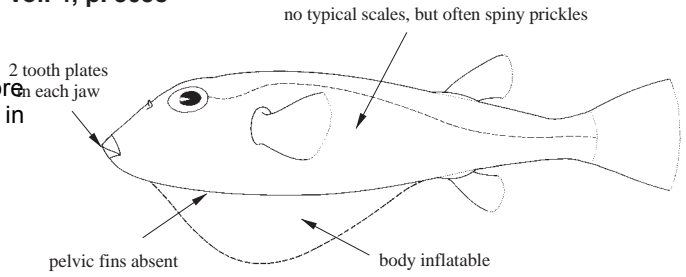


TETRAODONTIDAE

Vol. 4, p. 3058

Puffers

To 30 cm. Fresh, brackish, and nearshore marine waters to 1 000 m. Five species in the area.

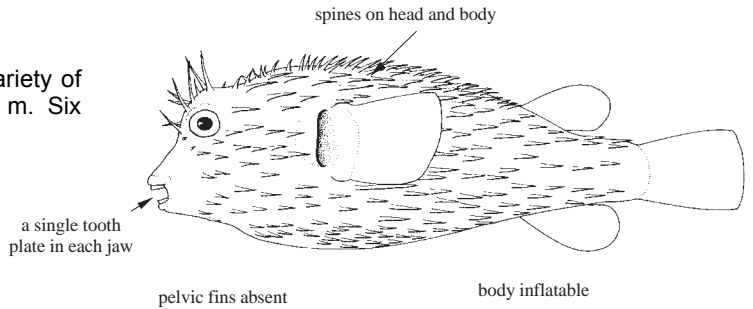


DIODONTIDAE

Vol. 4, p. 3066

Porcupine fishes

To 1 m. Mostly benthic over a variety of bottoms, some pelagic, to 100 m. Six species in the area.

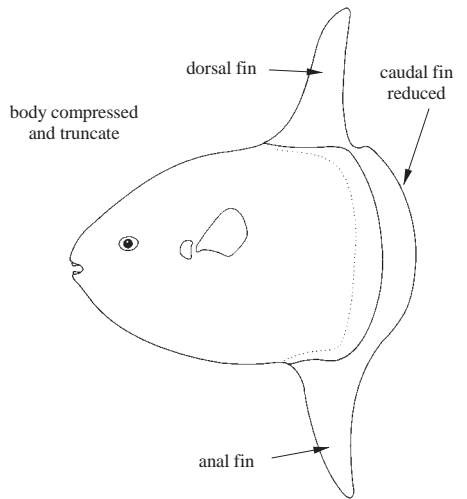


MOLIDAE

Vol. 4, p. 3072

Molas

To 3.5 m. Pelagic in warm seas. Three species in the area.



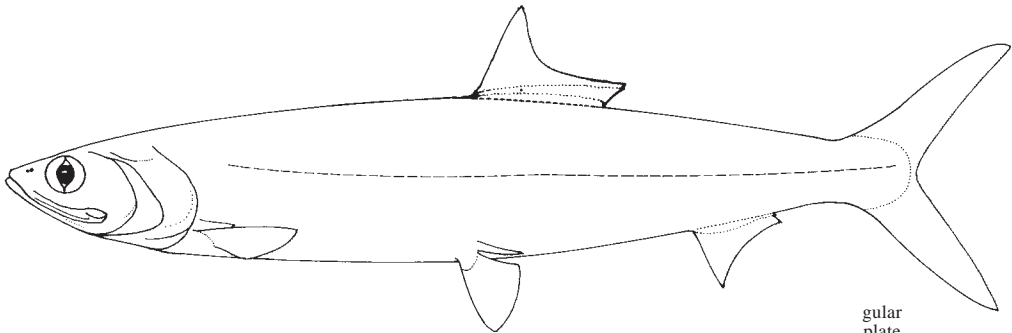
Order ELOPIFORMES

ELOPIDAE

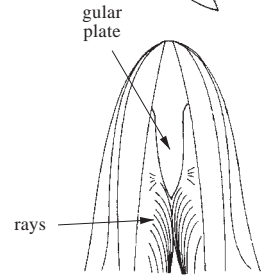
Tenpounders (ladyfishes)

by C.J. Ferraris Jr, Portland, Oregon, USA

Diagnostic characters: Body elongate, fusiform; body oval and slightly compressed in cross-section. **Mouth large**, horizontal, and terminal; gape extending posteriorly to past eye. Teeth present on jaws, roof of mouth, lower medial portion of gill apparatus, and tongue; teeth small and granular. A **bony gular plate present between arms of lower jaw**; branchiostegal rays numerous, up to 30 or more. Gill rakers moderately long, 10 to 19 on lower limb of first arch. Fins lacking spines; dorsal fin single, falcate, its origin at about midpoint of body; anal fin falcate, its origin entirely posterior of dorsal-fin base. Caudal fin deeply forked, upper and lower lobes symmetrical. Pectoral and pelvic fins inserted low on body; pelvic fin abdominal, its origin directly ventral to dorsal-fin origin. **Scales very small, 70 to 120 in lateral series.** Lateral line complete, nearly straight, extending onto base of caudal fin. Vertebrae number between 63 and 86. **Colour:** blue-green dorsally, sides silvery; fins tinged with yellow, tip of dorsal fin and upper edge as well as hind margin of caudal fin dusky or black.



Habitat, biology, and fisheries: Species of *Elops* occur in all warm seas; 2 species in the area, their distribution overlapping, but by no means clear from the literature. They chiefly inhabit shallow coastal areas, penetrating into brackish or even freshwaters. Spawning occurs in the sea, all species having a leptocephalus larval stage. Adults feed mainly on crustaceans and small fishes. Eaten, but not prized because of their numerous small bones.

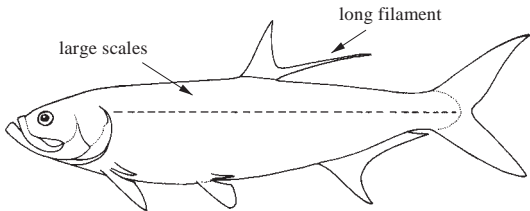


ventral view of head

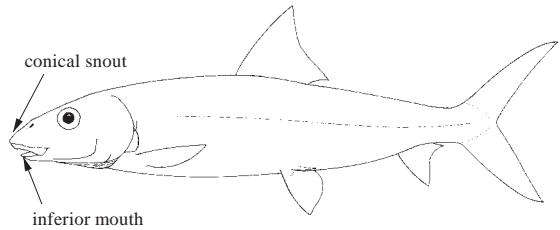
Similar families occurring in the area

Megalopidae: last dorsal-fin ray produced into a long filament; scales large 41 to 48 in lateral line (70 to 120 in Elopidae).

Albulidae: snout conical, projecting beyond lower jaw, mouth inferior; scales 60 to 80 in lateral line.



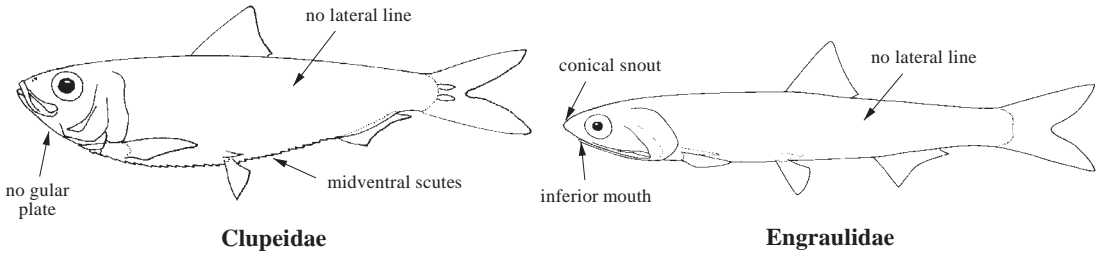
Megalopidae



Albulidae

Clupeidae: keel of scutes usually present along belly; gular plate absent, lateral line absent, and scales usually easily removed from body.

Engraulidae: snout conical, projecting, mouth inferior; lateral line absent.



Key to species of Elopidae occurring in the area

- 1a. Lower limb of first gill arch with 11 to 15 gill rakers; scales in lateral series 92 to 100
 ***Elops senegalensis***
- 1b. Lower limb of first gill arch with 17 to 19 gill rakers; scales in lateral series 72 to 83
 ***Elops lacerta***

List of species occurring in the area

The symbol is given when species accounts are included.

Elops lacerta Valenciennes, 1847.

Elops senegalensis Regan, 1909.

References

Forey, P.L. 1973. A revision of the elopiform fishes, fossil and Recent. *Bulletin of the British Museum (Natural History), Geology, Supplemental*, 10: 1–222.

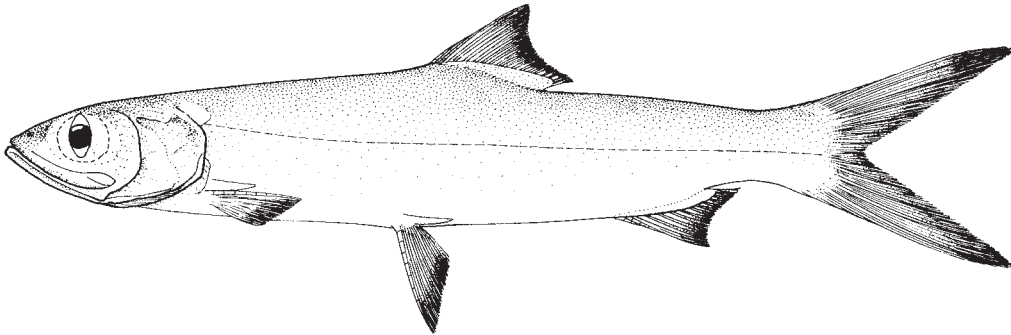
Regan, C.T. 1909. A revision of the fishes of the genus *Elops*. *Annals and Magazine of Natural History*, (8)3: 37–40.

Whitehead, P.J.P. 1962. The species of *Elops* (Pisces: Elopidae). *Annals and Magazine of Natural History*, (13)5: 321–329.

Elops lacerta Valenciennes, 1847

Frequent synonyms / misidentifications: None / None.

FAO names: **En** – West African ladyfish; **Fr** – Guinée d’Afrique occidentale; **Sp** – Malacho de Africa occidental.



Diagnostic characters: Body elongate, fusiform, oval in cross-section. Mouth terminal, upper jaw extending well beyond eye; **a gular plate present between arms of lower jaw**; branchiostegal rays numerous, at least 20; **lower gill rakers 17 to 19**. Dorsal fin a little behind midpoint of body; anal fin short, well behind dorsal-fin base. **Scales small, 72 to 83 in lateral line**. **Colour:** back blue-grey, sides bright silver; all fins with some pale yellow; tip of dorsal fin dusky, as also upper edge and hind margin of caudal fin.

Size: Maximum to 100 cm; common to 40 cm.

Habitat, biology, and fisheries: Inhabits shallow coastal waters, penetrating into brackish or even freshwater. Spawns in the sea, the transparent larvae (leptocephali) presumably migrating inshore to nursery areas. Feeds mainly on crustaceans and small fishes. Caught throughout its range, but no special fishery. Caught with purse seines, encircling gillnets and beach seines. Marketed fresh or frozen. Probably mixed with *Elops senegalensis*.

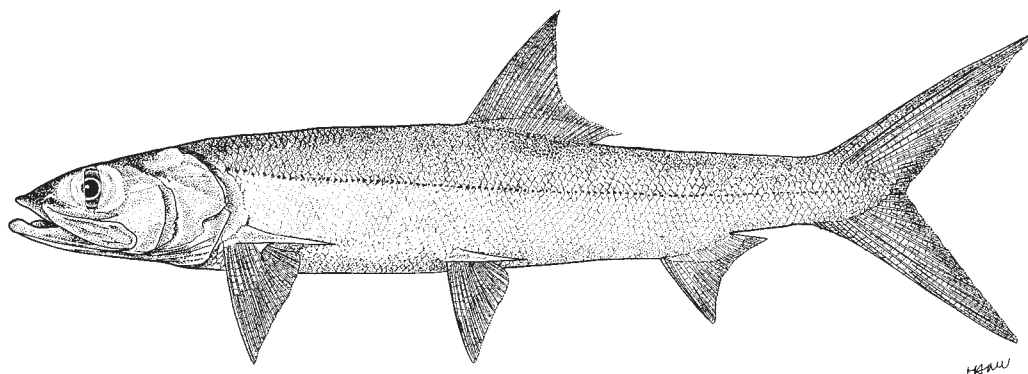
Distribution: From Mauritania (perhaps also further north) southward to Angola, but records may be mixed with those for *E. senegalensis*.



***Elops senegalensis* Regan, 1909**

Frequent synonyms / misidentifications: None / *Elops lacerta*.

FAO names: En – Senegalese ladyfish; Fr – Guinée du Sénégal; Sp – Malacho senegalés.



Diagnostic characters: Body elongate, fusiform, oval in cross-section. Mouth terminal, upper jaw reaching well beyond eye; **a gular plate present between arms of lower jaw**; branchiostegal rays numerous, at least 20; **lower gill rakers 11 to 15**. Dorsal fin a little behind midpoint of body; anal fin short, well behind dorsal-fin base. **Scales very small, 92 to 100 in lateral line**. **Colour:** back blue-grey, sides bright silver, all fins with some pale yellow; tip of dorsal fin dusky, as also upper edge and hind margin of caudal fin.

Size: Maximum to 90 cm; common to 40 cm.

Habitat, biology, and fisheries: Feeds mainly on crustaceans and small fishes. Caught throughout its range, but no special fishery. Separate statistics are not reported for this species. Caught with purse seines, encircling gillnets and beach seines. Marketed fresh or frozen. Recorded in catches together with *Elops lacerta*.

Distribution: Along west African coast, extending at least from Senegal to Republic of the Congo. Distribution may extend further north and south, as this species has been routinely misidentified as *E. lacerta*.



MEGALOPIDAE

Tarpons

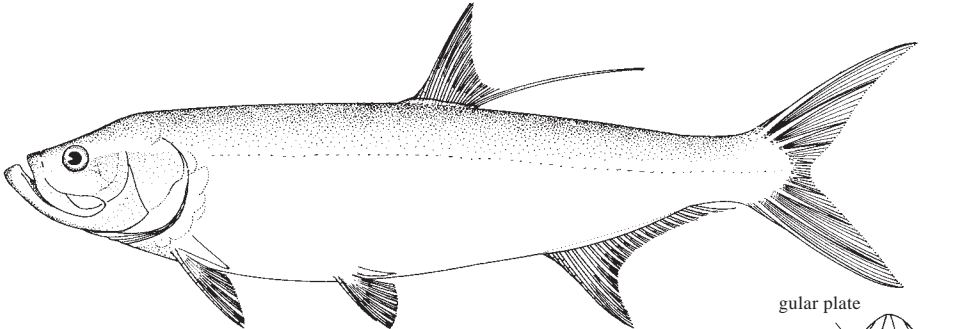
by C.J. Ferraris Jr, Portland, Oregon, USA and D.G. Smith, National Museum of Natural History, Washington, DC, USA

A single species occurring in the area.

Megalops atlanticus Valenciennes, 1847

Frequent synonyms / misidentifications: *Tarpon atlanticus* (Valenciennes, 1847) / None.

FAO names: En – Tarpon; Fr – Tarpon argenté; Sp – Tarpón.



Diagnostic characters: Body moderately elongate and highly compressed. Head moderately short and deep, its dorsal outline nearly straight and horizontal, the back somewhat elevated, the ventral outline strongly curved anteriorly. Eye large, 3.3 to 4.7 times in head length. **Mouth large and oblique, lower jaw prominently projecting; a gular plate present between arms of lower jaw.** Teeth small, bluntly villiform, and present on jaws, vomer, palatines, pterygoids, tongue, and basibranchials. Branchiostegal rays numerous, approximately 23. Gill rakers long and slender, scarcely denticulate, 19 to 21 on upper limb and 36 to 40 on lower limb. All fins soft rayed. **Dorsal fin** short based, with 13 to 15 rays, located behind pelvic fins but entirely before anal fin, falcate, **with a greatly prolonged final ray.** Anal fin strongly falcate, with 21 to 25 rays, last anal-fin ray somewhat elongate, but much less so than that of the dorsal fin. Caudal fin deeply forked, lobes about equal in length. Pectoral and pelvic fins inserted low on body, with elongate axillary scales; pelvic fin abdominal in position. Scales large, firm, with crenulate anterior border and membranous posterior border. **Lateral line** complete and relatively straight, though anterior part slightly curved ventrally; pores branched; **41 to 48 scales.** Gas bladder large, highly vascularized and modified to serve as an air-breathing organ. Vertebrae 53 to 57.

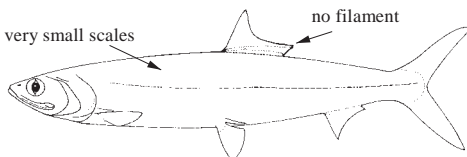
Colour: bright silvery all over, the back darker than the belly.

lateral view of head ventral view of head

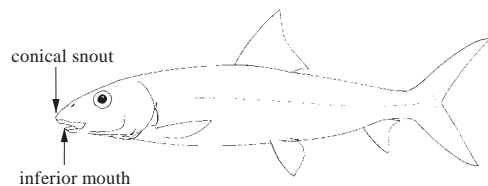
Similar families occurring in the area

Elopidae: last dorsal-fin ray not produced into a long filament; scales small, 70 to 120 in lateral line.

Albulidae: last dorsal-fin ray not produced into a long filament; snout conical, projecting beyond lower jaw, mouth inferior; scales small, 60 to 80 in lateral line.



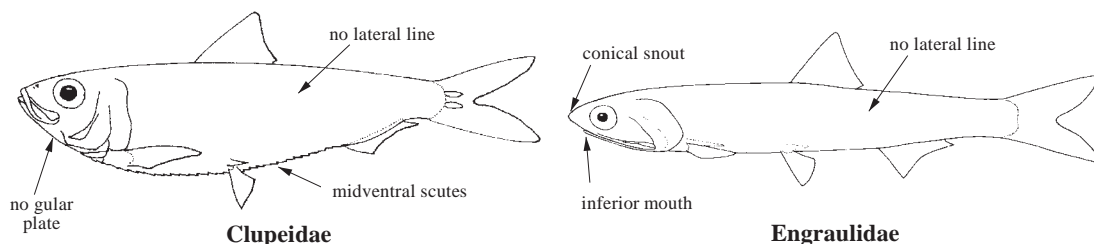
Elopidae



Albulidae

Clupeidae: last dorsal-fin ray generally not produced into a long filament; keel of scutes usually present along belly; gular plate absent, lateral line absent, and scales usually easily removed from body.

Engraulidae: last dorsal-fin ray not produced into a long filament; snout conical, projecting, mouth inferior; lateral line absent.



Size: Maximum to 250 cm; common to 130 cm. Males substantially smaller than maximum size attained by females. Females attain 120 kg, males rarely more than 50 kg.

Habitat, biology, and fisheries: Tarpon occur in a wide variety of habitats ranging from freshwater lakes and rivers to offshore marine waters. In the western Atlantic it moves into open waters to spawn (late April to August), and this possibly also happens off West Africa. Tarpon have a leptocephalus larva and spawn offshore. Metamorphic larvae are typically found inshore in mangrove-lined estuaries but also occur in temperate marshes. Young-of-the-year tarpon occur in small stagnant pools of varying salinity. Tarpon occur in salinities ranging from freshwater to more than 45‰ and are capable of surviving temperatures of at least 40°C. In tropical areas, juvenile tarpon typically occur in mangrove habitats, often in water with low dissolved oxygen levels. In low oxygen environments, they may rise to the surface and breath air, which is unusual among marine species. Air breathing is accomplished by way of a highly vascularized swimbladder that functions as an air-breathing organ. Tarpon are facultative air-breathers and, in well-oxygenated waters, are able to meet their oxygen requirements without breathing air. Tarpon are relatively long-lived and can reach ages greater than 50 years. They reach sexual maturity at 80 to 120 cm. They feed on fishes, mainly those forming schools, such as sardines, anchovies and mullets; they also take crabs. Tarpon are among the most highly esteemed recreational fishes in the world. Throughout area of distribution, they are caught in small numbers, but no special fishery. Separate statistics are not reported for this species. They are caught mainly on hook-and-line as a sports fish, but probably also taken in purse seines and beach seines. Marketed fresh or frozen; the flesh is fatty.

Distribution: In eastern Atlantic, found routinely in coastal waters from about Mauritania south to Republic of the Congo and Angola. Infrequently reported from coastal areas of western Europe. In western Atlantic, occurs regularly along coast from United States to central Brazil and throughout Gulf of Mexico and islands of Caribbean Sea.

Remarks: In the Americas, this species is generally referred to by the name *Megalops atlanticus*, but in European and African literature, the species is often called *Tarpon atlanticus*. The name *Megalops atlanticus* is followed here, based on its use in the FAO western central Atlantic guide.



Reference

Wade, R.A. 1962. The biology of the tarpon, *Megalops atlanticus*, and the ox-eye, *Megalops cyprinoides*, with emphasis on larval development. *Bulletin of Marine Science of the Gulf and Caribbean*, 12(4): 545–622.

Order ALBULIFORMES

ALBULIDAE

Bonefishes

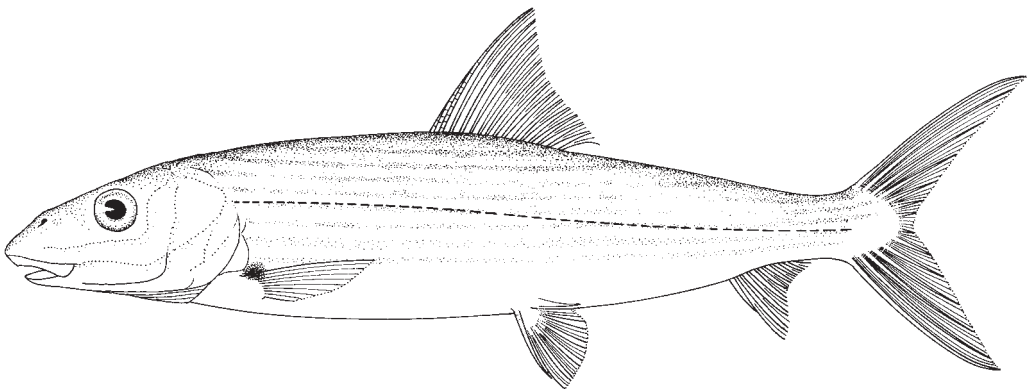
by D.G. Smith, National Museum of Natural History, Washington, DC, USA

A single species occurring in the area.

Albula vulpes (Linnaeus, 1758)

Frequent synonyms / misidentifications: None / None.

FAO names: En – Bonefish; Fr – Banane de mer; Sp – Macabí.



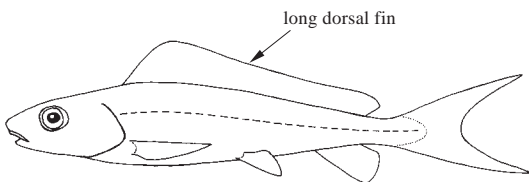
Diagnostic characters: Body elongate, oval in cross-section. **Snout conical, projecting beyond tip of lower jaw; mouth inferior, upper jaw not reaching to eye;** branchiostegal rays 13 or 14. Fins lacking spines; **dorsal-fin base short**, with 17 to 19 rays; anal-fin base short, with 8 or 9 rays, its origin far back on body. Scales small, 65 to 70 in lateral line. **Colour:** back blue-green with narrow dark horizontal lines fading rapidly after death, sides silvery; a dark blotch on upper pectoral-fin base; young specimens (up to 28 cm) usually have about ten dark vertical bars on back.

Size: Maximum to 77 cm; common to 35 cm.

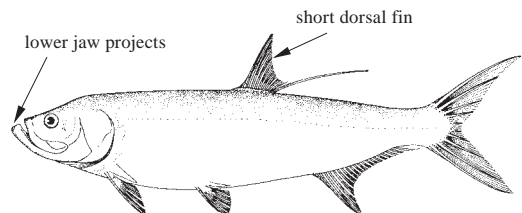
Similar families occurring in the area

Pterothrissidae (*Pterothrissus belloci*): dorsal-fin base long, with more than 50 rays (17 to 19 in *Albula*).

Megalopidae (*Megalops atlanticus*): dorsal-fin base short, lower jaw projecting; scales larger, 41 to 48 in lateral line.



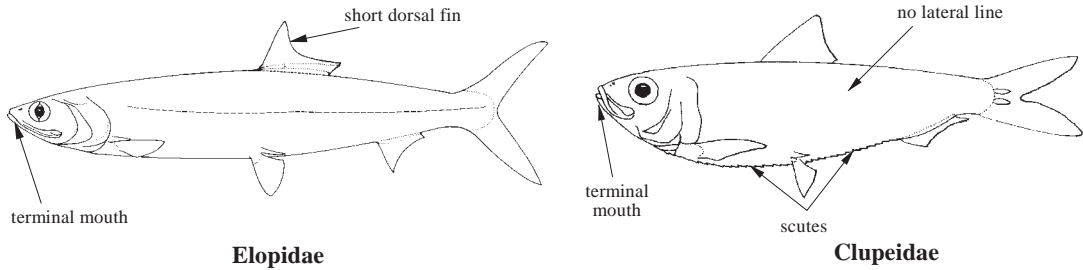
Pterothrissidae



Megalopidae

Elopidae (*Elops* spp.): dorsal-fin base short, mouth terminal.

Clupeidae: dorsal-fin base short, snout not projecting, mouth terminal, a keel of scutes along belly, no lateral line.



Habitat, biology, and fisheries: Found in shallow coastal waters, estuaries and bays, over sand or mud bottoms. Spawns in the open sea, the transparent larvae (leptocephali) migrating to coastal nursery areas. Juveniles often shoal, whereas large adults are more solitary. Feeds on worms, molluscs, crabs, shrimps and squids, grubbing its food from the bottom, often in water so shallow that its tail breaks the surface. Caught throughout its range, but no special fishery. Separate statistics are not reported for this species. Caught with purse seines and beach seines. Marketed fresh or frozen. Also an important sport fish, caught on hook-and-line.

Remarks: *Albula vulpes* was formerly considered to be a single cosmopolitan species. Studies in recent years, however, indicate that it is probably a complex of several sibling species (Colborn *et al.*, 2001). The eastern Atlantic species therefore may not be the true *Albula vulpes*, which was described from the western Atlantic. Further studies are needed.

Distribution: Regularly from Senegal southward to Angola, sporadically northward.



References

- Colborn, J., Crabtree, R.E., Shaklee, J.B., Pfeiler, E. & Bowen, B.W. 2001. The evolutionary enigma of bonefishes (*Albula* spp.): cryptic species and ancient separations in a globally distributed shorefish. *Evolution*, 55(4): 807–820.
- Hildebrand, S.F. 1963. Family Albulidae. In H.B. Bigelow, ed. *Fishes of the western North Atlantic, Part 3. Memoirs of the Sears Foundation for Marine Research*, 1(3): 132–147.

PTEROTHRISSIDAE

Longfin bonefishes

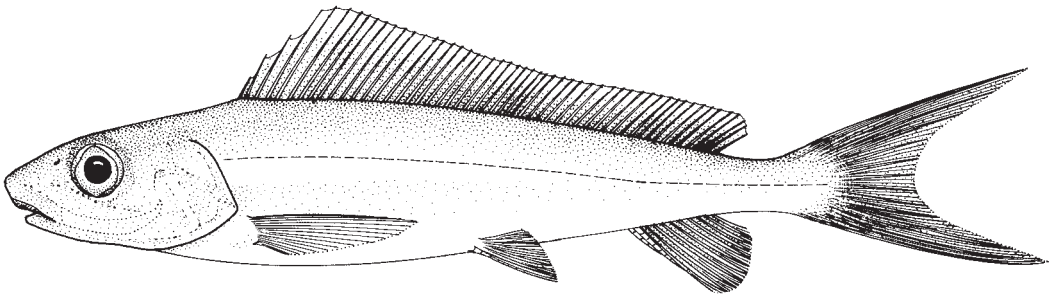
by D.G. Smith, National Museum of Natural History, Washington, DC, USA

A single species occurring in the area.

Pterothrissus bellocci Cadenat, 1937

Frequent synonyms / misidentifications: None / None.

FAO names: En – Longfin bonefish; Fr – Banane gisu; Sp – Macabí badejo.



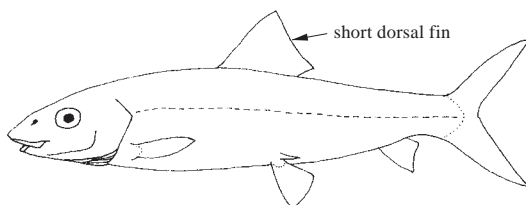
Diagnostic characters: Body elongate, oval in cross-section. **Snout conical, projecting beyond tip of lower jaw; mouth inferior, upper jaw not reaching to eye.** Branchiostegal rays 6. Fins lacking spines; **dorsal fin long**, with more than 50 rays; anal fin short, below final part of dorsal fin. Scales small, 67 to 70 lateral-line scales. **Colour:** back grey-brown with silver reflections, golden reflections on sides; lateral line darker grey; belly pale.

Size: Maximum to 40 cm; common to 30 cm.

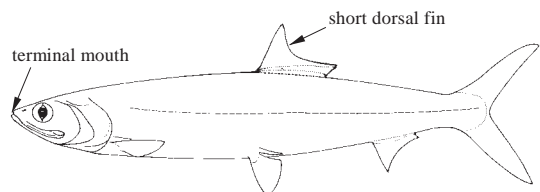
Similar families occurring in the area

Albulidae: dorsal fin short, with 17 to 19 rays (more than 50 in *Pterothrissus*).

Elopidae: dorsal fin short; snout not projecting, mouth terminal; scales much smaller, about 100 on lateral line (67 to 70 in *Pterothrissus*).



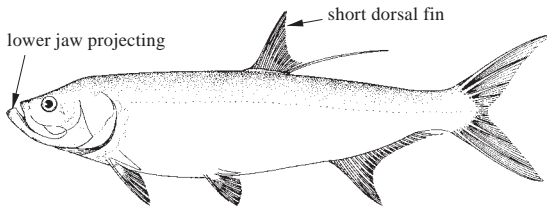
Albulidae



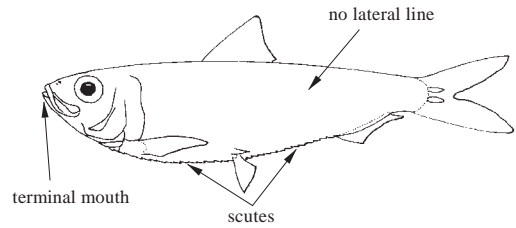
Elopidae

Megalopidae: dorsal fin short; snout not projecting, mouth supraterminal, lower jaw projecting; scales large, 40 to 48 in lateral line (65 to 70 in *Pterothrissus*).

Clupeidae: dorsal fin short, snout not projecting, mouth terminal, a keel of scutes along belly, no lateral line.



Megalopidae (*Megalops* spp.)



Clupeidae

Habitat, biology, and fisheries: Caught at depths from 50 to 500 m, mostly from 100 to 400 m (at least off Mauritania, where the smaller fishes occur in less than 100 m). It has a leptocephalous larval stage. Probably feeds at the bottom. Caught in small numbers throughout its range, but no special fishery. Separate statistics are not reported for this species. Marketed fresh or frozen.

Distribution: West coast of Africa from Western Sahara to Namibia; apparently fairly abundant off Mauritania and northern Senegal.

Remarks: Eschmeyer's Catalog of Fishes currently places this species in the family Albulidae, subfamily Pterothrissinae. Family designations at the time of writing have been retained for the sake of organization

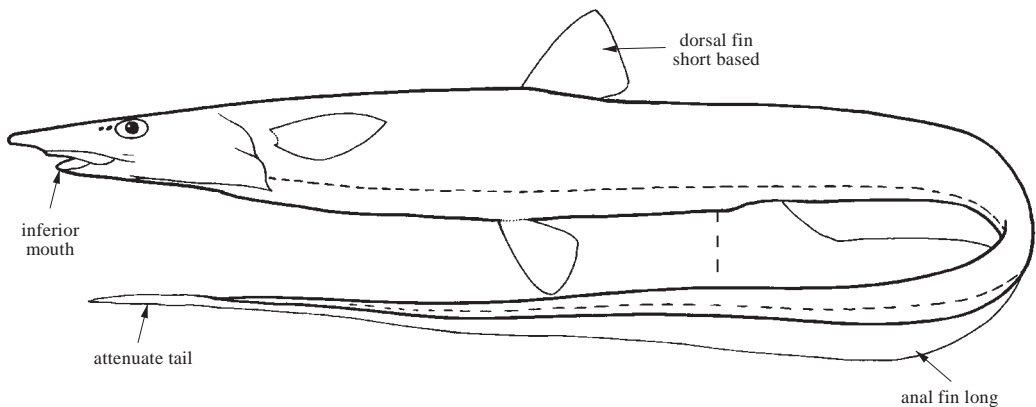


HALOSAURIDAE

Halosaurs

by D.G. Smith, National Museum of Natural History, Washington, DC, USA

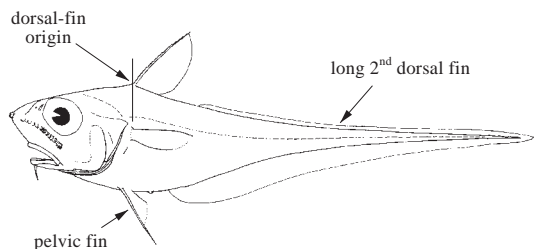
Diagnostic characters: Medium-sized fishes, to approximately 1 m in total length, with much of this consisting of the attenuate tail. Body elongate; tail slender and attenuate, frequently broken and regenerated; anus slightly before midlength. Head elongate, its length contained approximately 3 times in preanal length. Eye well developed. Snout prolonged, extending well in front of mouth, tip rounded or pointed, often depressed. Anterior and posterior nostrils close together, in front of eye. **Mouth inferior, overhung by snout**, moderate in size, gape ending approximately under or slightly before front of eye. Teeth small, granular, in patches on jaws and palatopterygoid. **Dorsal fin short-based, on midtrunk, slightly closer to anus than to tip of snout, all rays segmented** (the anteriormost ray reduced and unsegmented in *Aldrovandia*); **anal-fin base long, extending from just behind anus to tip of tail**; pectoral fin well developed, on side of body at or above lateral midline; pelvic fins present, located abdominally, under or slightly in front of dorsal fin; caudal fin absent. Scales relatively large, overlapping, covering body in well-defined horizontal and vertically oblique rows; scales of lateral line enlarged; head partially scaled. Lateral line well developed, canals large and cavernous on head and body; lateral line runs along lower side of body, near ventral outline in lateral view. **Colour:** variable, ranging from black to light grey or tan; sides of body and opercle often silvery in fresh specimens; no bars, stripes, spots or other distinct markings. Inside of mouth and pharyngeal cavity sometimes black.



Habitat, biology, and fisheries: Halosaurs live on or near the bottom in moderate to deep water, usually between about 500 and 3 000 m. They are bottom feeders, preying mainly on crustaceans and other small invertebrates. Males develop markedly enlarged olfactory organs at maturity, suggesting that they locate their mates through pheromones. Like eels and elopiforms, halosaurs have a pelagic, leptocephalous larva. Like many deep-sea fishes, halosaurid species tend to be widely distributed. Although they are occasionally taken in deep bottom trawls, halosaurs have no commercial importance.

Similar families occurring in the area

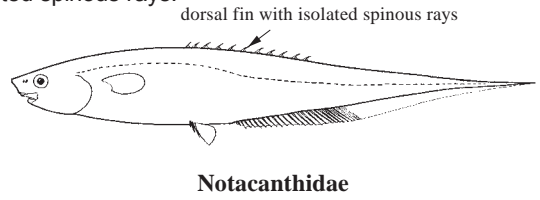
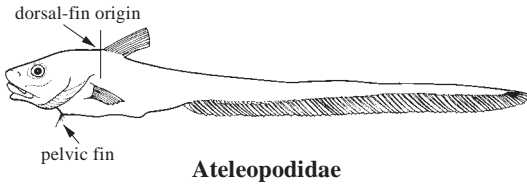
Macrouridae: anterior dorsal fin directly above pectoral fin; a long, low second dorsal fin extending to end of tail; pelvic fin directly under pectoral fin; snout short.



Macrouridae

Ateleopodidae: dorsal fin above pectoral fin; pelvic fin under or ahead of pectoral fin; snout short and bulbous; scales very small or absent.

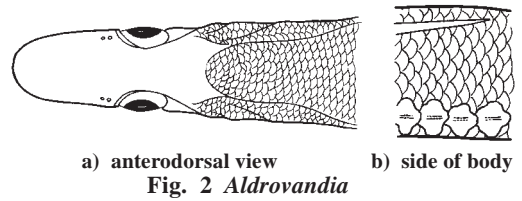
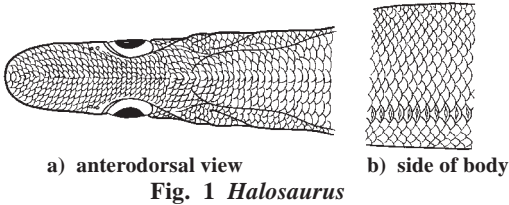
Notacanthidae: dorsal fin consists of a series of separated spinous rays.



Key to the species of Halosauridae occurring in the area

Note: Trawled specimens often lose their scales; scale pockets remain, however, and these are usually sufficient to indicate scale distribution patterns.

- 1a. Top of head scaled at least as far forward as level of nostrils (Fig. 1a); lateral-line scales slightly enlarged, 1 such scale for each transverse row of body scales (Fig. 1b) → 2
- 1b. Top of head naked (Fig. 2a); lateral-line scales markedly enlarged, 1 such scale for each 2 or 3 transverse rows of body scales (Fig. 2b) → 5



- 2a. Dark colour on roof of mouth does not extend lateral to palatopterygoid arcade, dark colour on floor of mouth extends only slightly anterior to tongue, leaving anteriormost part pale (Fig. 3); body compressed, darker on dorsal half; pyloric caeca pale, 12 to 20 *Halosaurus ovenii*
- 2b. Entire lining of mouth dark (Fig. 4); body cylindrical, uniform in colour; pyloric caeca dark, 4 to 12 → 3

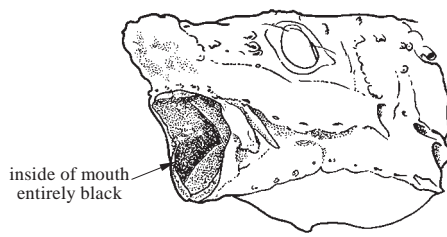
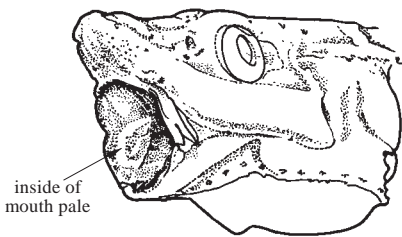



Fig. 3 oblique frontal view of head










Fig. 4 oblique frontal view of head

- 3a. Body brownish; head length about one-fourth preanal length; pyloric caeca long, 8 to 12 *Halosaurus guentheri*
- 3b. Body white or pinkish; head length about one-third preanal length; pyloric caeca short, 4 or 5 → 4
- 4a. Gill rakers on anterior branchial arch 14, longer than opposite gill laminae *Halosaurus johnsonianus*
- 4b. Gill rakers on anterior branchial arch 7 to 11, shorter than opposite gill laminae *Halosaurus attenuatus*

- 5a. First dorsal-fin ray as long as second and segmented; scales on opercle; sheath of lateral line darkly pigmented in adults; pyloric caeca pale and in a double row . . . *Halosauropsis macrochir*
- 5b. First dorsal-fin ray much shorter than second and unsegmented; no scales on opercle; sheath of lateral line unpigmented; pyloric caeca black and in a single row → 6
- 6a. Anal opening dark blue or black, surrounded by a white field → 7
- 6b. Anal opening white, surrounded by a dark field → 8
- 7a. Lateral-line scales contiguous; 1 lateral-line scale to every 2 body scales, 22 or 23 before anus; preoral portion of snout very long, less than 2 times in total snout length . *Aldrovandia rostrata*
- 7b. Lateral-line scales not contiguous but separated by body scales; 1 lateral-line scale to every 3 body scales, 18 to 20 before anus; preoral portion of snout shorter, 2.25 to 2.5 in total snout length. *Aldrovandia gracilis*
- 8a. Palatine tooth patches of the 2 sides in contact medially; 13 to 15 gill rakers on anterior arch; preoral portion of snout about 2 times in total snout length; dorsal-fin origin over or very slightly behind base of pelvic fin *Aldrovandia affinis*
- 8b. Palatine tooth patches of the 2 sides separated medially; 19 to 23 gill rakers on anterior arch; preoral portion of snout about 3 times in total snout length; dorsal-fin origin distinctly behind base of pelvic fin → 9
- 9a. Lateral-line scales before anus 24 to 28; palatine tooth patch separated from pterygoid patch by less than half its own length; pectoral-fin rays 11 to 13 *Aldrovandia phalacra*
- 9b. Lateral-line scales before anus 16 to 21; palatine tooth patch separated from pterygoid patch by 1 to 4 times its own length; pectoral-fin rays 9 to 11 *Aldrovandia oleosa*

List of species occurring in the area

The symbol  is given when species accounts are included.

-  *Aldrovandia affinis* (Günther, 1877).
-  *Aldrovandia gracilis* (Goode and Bean, 1896).
-  *Aldrovandia oleosa* Sulak, 1977.
-  *Aldrovandia phalacra* (Vaillant, 1888).
-  *Aldrovandia rostrata* (Günther, 1878).
-  *Halosauropsis macrochir* (Günther, 1878).
-  *Halosaurus attenuatus* Garman, 1899.
-  *Halosaurus guentheri* Goode and Bean, 1896.
-  *Halosaurus johnsonianus* Vaillant, 1888.
-  *Halosaurus ovenii* Johnson, 1864.

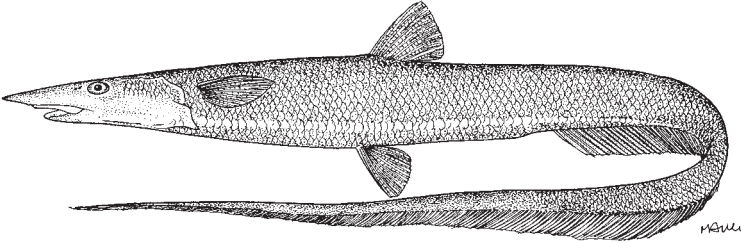
Note: Maximum size for all species is given as preanal length (tip of snout to anus), to avoid problems caused by the frequency of damaged and regenerated tails.

References

- McDowell, S.B. 1963. Family Halosauridae. In D.M. Cohen, ed. Fishes of the Western North Atlantic. *Memoirs of the Sears Foundation for Marine Research*, 1(6): 32–123.
- Sulak, K.J. 1977. *Aldrovandia oleosa*, a new species of the Halosauridae, with observations on several other species of the family. *Copeia*, 1977(1):11–20.

Aldrovandia affinis* (Günther, 1877)*En** – Pale halosaur.

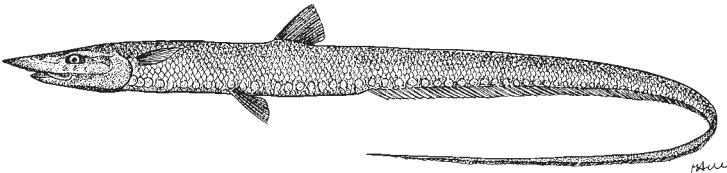
Maximum size 22 cm preanal length. Recorded from all oceans except eastern Pacific, in depths of 730 to 2 200 m, primarily above the 4°C isotherm; in the area, known from off Madeira and the Canary Islands.



(after Goode and Bean, 1896)

***Aldrovandia gracilis* (Goode and Bean, 1896)****En** – Slender halosaur.

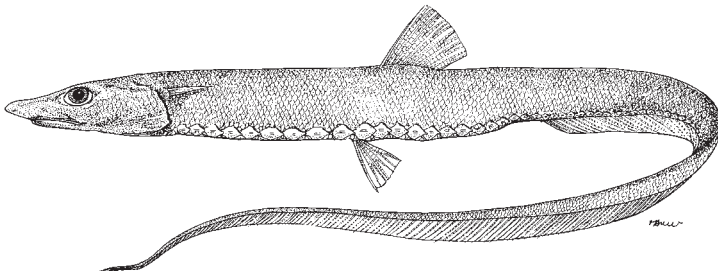
Maximum size 22 cm preanal length. Eastern and western North Atlantic, in depths of 460 to 2 560 m; in the area, off northwestern Africa from 9° to 26°N.



(after Goode and Bean, 1896)

***Aldrovandia oleosa* Sulak, 1977****En** – Oily halosaur.

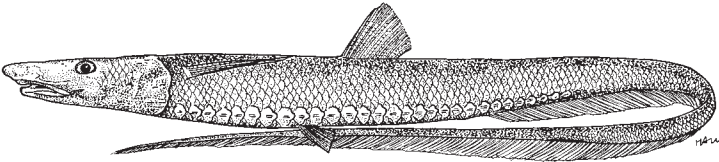
Maximum size 16 cm preanal length. Probably worldwide, in depths of 1 200 to 1 900 m; in the area, known from the Gulf of Guinea.



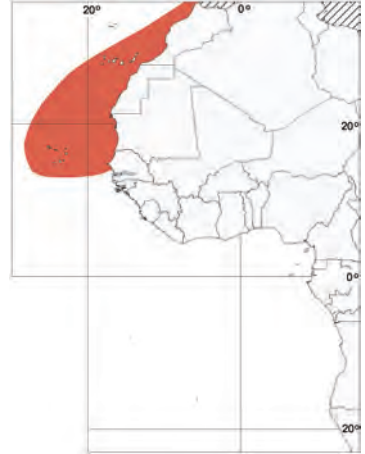
***Aldrovandia phalacra* (Vaillant, 1888)**

En – Hawaiian halosaur.

Maximum size 19 cm preanal length. North Atlantic, Indian Ocean, central Pacific, in depths of 500 to 2 300 m; in the area, known from the Cape Verde and Canary Islands, and the adjacent coast of Africa to Gibraltar.



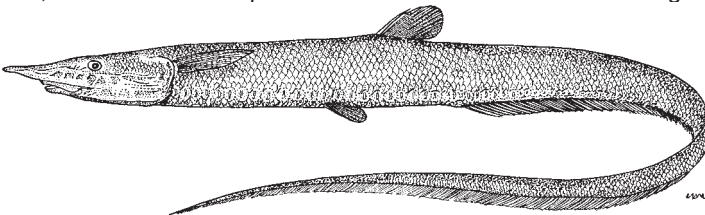
(after Goode and Bean, 1896)



***Aldrovandia rostrata* (Günther, 1878)**

En – Sharpnose halosaur.

Maximum size 16 cm preanal length. Known from the western Atlantic and along the mid-Atlantic Ridge, in depths of 2 690 to 5 029 m; in the area, recorded from the open Atlantic on the eastern side of the Ridge.



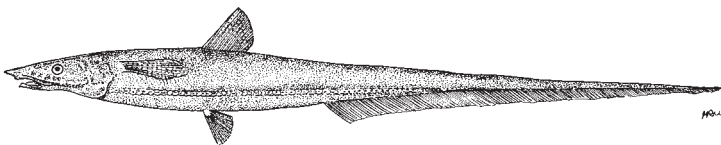
(after Goode and Bean, 1896)



***Halosauropsis macrochir* (Günther, 1878)**

En – Abyssal halosaur.

Maximum size 33 cm preanal length. Atlantic and western Indian Ocean, in depths of 1 100 to 3 300 m, primarily between 2° and 4°C isotherms; in the area, off the northwest coast of Africa north of 21°N.



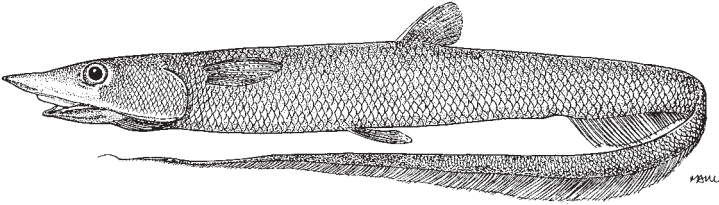
(after Goode and Bean, 1896)



***Halosaurus attenuatus* Garman, 1899**

En – Abyssal halosaur.

Maximum size 18 cm preanal length. Probably worldwide, known from the Galapagos Islands and the Gulf of Guinea, in depths of 2 300 to 2 500 m; in the area, from Nigeria to Gabon.



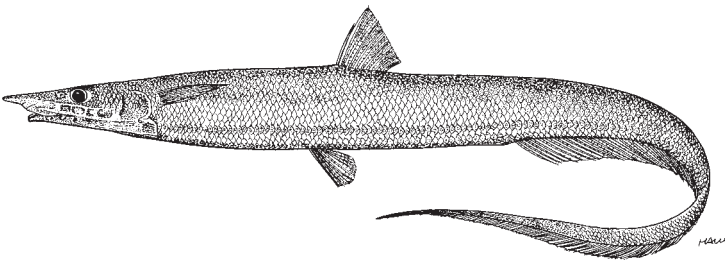
(after Goode and Bean, 1896)



***Halosaurus guentheri* Goode and Bean, 1896**

En – Günther's halosaur.

Maximum size 26 cm preanal length. Eastern and western North Atlantic, in depths of 550 to 1 600 m; in the area known from the Canary Islands and along the northwest coast of Africa between 18° and 24°N.



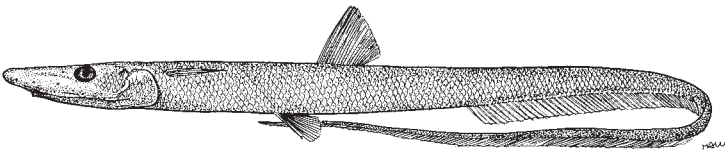
(after Goode and Bean, 1896)



***Halosaurus johnsonianus* Vaillant, 1888**

En – Johnson's halosaur.

Maximum size 21 cm preanal length. Northeastern Atlantic in depths of 680 to 2 100 m; in the area, the coast of Africa north of about 20°N.



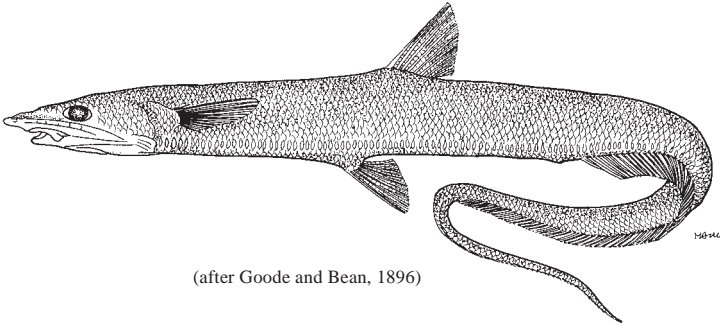
(after Goode and Bean, 1896)



***Halosaurus ovenii* Johnson, 1863**

En – Owen's halosaur.

Maximum size 26 cm preanal length. Eastern and western Atlantic, in depths of 440 to 1 700 m; in the area, off coast of central and northwestern Africa between 30°N and 12°S.

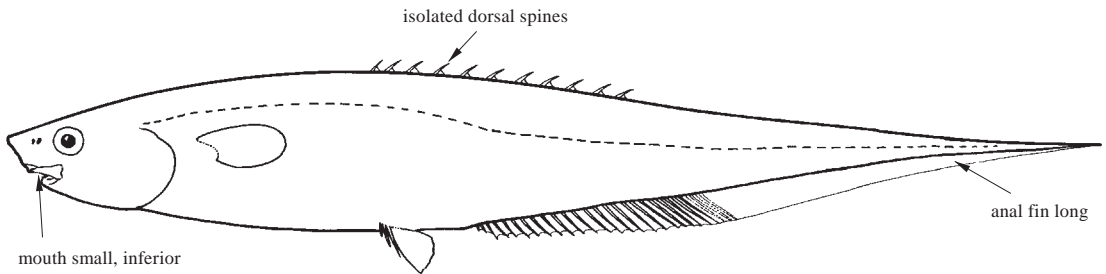


NOTACANTHIDAE

Spiny eels

by D.G. Smith, National Museum of Natural History, Washington, DC, USA

Diagnostic characters: Maximum size 120 cm. Body moderate to moderately elongate; **tail slender and tapering to a point, often broken and regenerated**; anus somewhat before midlength. Head moderately deep to moderately elongate, somewhat compressed, its length contained 2 or 3 times in preanal length. Eye well developed. Snout projects beyond mouth, tapering to a rounded tip. Anterior and posterior nostrils close together, in front of eye. **Mouth relatively small, inferior, overhung by snout**, gape ending in front of or under eye; **maxilla without teeth, nearly excluded from gape by premaxilla**. Teeth small, pointed, in a single row on premaxilla, in one to several rows on palatine and dentary. **Dorsal fin consists of a series of unsegmented spines, isolated from each other and not connected by a membrane**, its length variable, beginning on head or trunk and extending behind anus, but ending well before end of tail; **anal fin long, extending from just behind anus to tip of tail, anterior rays spinous**; pectoral fin well developed, located on midside, a short but distinct distance behind gill opening; pelvic fins abdominal, slightly in front of anus; caudal fin absent. Scales small and overlapping, covering most of head and body. Lateral line complete, on dorsal half of body anteriorly, becoming midlateral on tail; canals and scales not notably enlarged. **Colour:** light grey to dark brown, lining of mouth and branchial chamber black; no distinct markings or patterns.

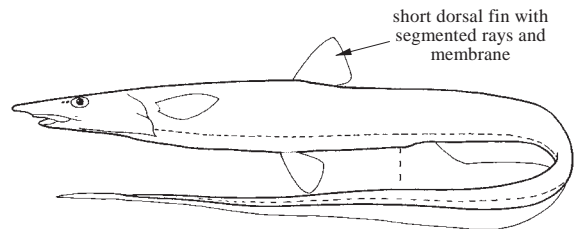


Habitat, biology, and fisheries: Spiny eels live on the bottom at depths of approximately 200 to 3 500 m. They feed on various small invertebrates, including crustaceans, echinoderms, polychaetes, bryozoans, and hydrozoans. Their olfactory organs are well developed and are undoubtedly used in finding food. Spiny eels show little sexual dimorphism, although males tend to be smaller than females and have a larger olfactory organ. The larva is a leptocephalus, similar to that of the halosaurs, eels, and elopiforms. Spiny eels are occasionally taken in deep bottom trawls, but they have no commercial value.

Similar families occurring in the area

Notacanthids are unlikely to be confused with any other fishes except perhaps the Halosauridae. The peculiar spinous dorsal fin, without connecting membranes, the slender, tapering tail, and the long anal fin distinguish them from all other families in the area.

Halosauridae: dorsal-fin base short, with soft rays connected by membrane.



Halosauridae

Key to the species of Notacanthidae occurring in the area

- 1a. Dorsal-fin spines 6 to 15; body relatively stout, greatest depth less than 3 times in preanal length (Fig. 1) → **2**
- 1b. Dorsal-fin spines 26 to 40; body relatively slender, greatest depth more than 3 times in preanal length (Fig. 2) → **3**

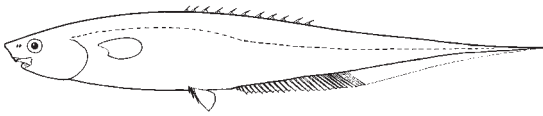


Fig. 1 *Notacanthus*

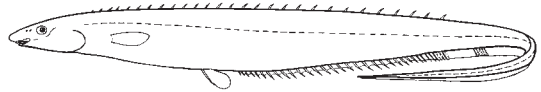


Fig. 2 *Polyacanthonotus*

- 2a. Colour pale grey to pink; teeth of lower jaw in a single row ***Notacanthus bonaparte***
- 2b. Colour tan to dark brown; teeth of lower jaw in 2 or more rows ***Notacanthus chemnitzii***
- 3a. Anterior and posterior nostrils closely set, distance between them 33 to 62% of horizontal eye diameter (Fig. 3); total vertebrae 254 or more . . . ***Polyacanthonotus challengerii***
- 3b. Anterior and posterior nostrils widely set, distance between them 67 to 103% of horizontal eye diameter (Fig. 4); total vertebrae 245 or fewer ***Polyacanthonotus merretti***

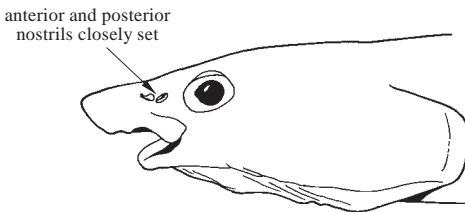


Fig. 3 *Polyacanthonotus challengerii*

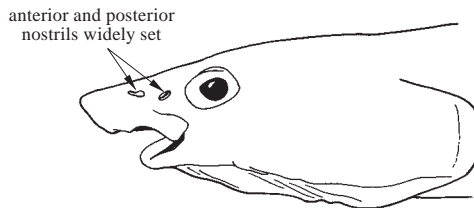






Fig. 4 *Polyacanthonotus merretti*

List of species occurring in the area

The symbol  is given when species accounts are included.

-  *Notacanthus bonaparte* Risso, 1840.
-  *Notacanthus chemnitzii* Bloch, 1788.
-  *Polyacanthonotus challengerii* (Vaillant, 1888).
-  *Polyacanthonotus merretti* Sulak, Crabtree, and Hureau, 1984.

References

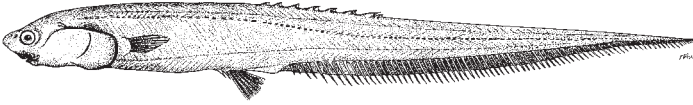
McDowell, S.B. 1963. Family Notacanthidae. In D.M. Cohen, ed. Fishes of the western North Atlantic. *Memoirs of the Sears Foundation for Marine Research*, 1(6): 124–207.

Sulak, K.J., Crabtree, R.E. & Hureau, J.-C. 1984. Provisional review of the genus *Polyacanthonotus* (Pisces, Notacanthidae) with description of a new Atlantic species, *Polyacanthonotus merretti*. *Cybiurn*, 8(4): 57–68.

***Notacanthus bonaparte* Risso, 1840**

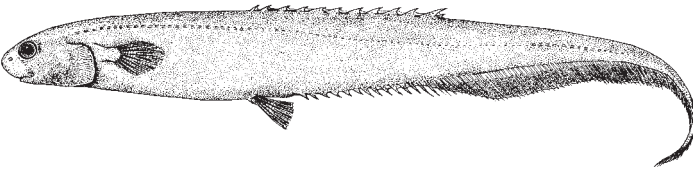
En – Bonaparte's spiny eel.

Maximum size 40 cm. Eastern North Atlantic and Mediterranean from Faeroe Islands to North Africa, at depths of 700 to 2 000 m; in the area, coast of Africa north of 20°N.

***Notacanthus chemnitzii* Bloch, 1788**

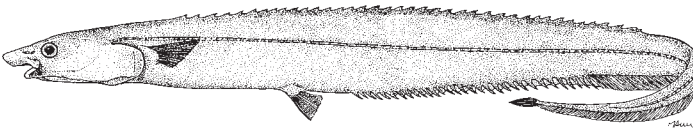
En – Chemnitz's spiny eel.

Maximum size 120 cm. Probably circumglobal and antitropical, most commonly in depths of 125 to 1 000 m (shallower in higher latitudes), down to 2 500 m; in the area, north of Cape Blanc.

***Polyacanthonotus challengerii* (Vaillant, 1888)**

En – Challenger's spiny eel.

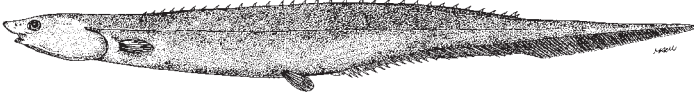
Maximum size 50 cm. Found in all oceans, in depths of 700 to 3 000 m (most common in 1 500 to 2 000 m); in the area, the Canary Islands and adjacent African coast. *Polyacanthonotus africanus* is a synonym.



***Polyacanthonotus merretti* Sulak, Crabtree, and Hureau, 1984**

En – Merrett's spiny eel.

Maximum size 30 cm. Eastern and western North Atlantic, between about 10° and 40°N, in depths of 600 to 2 000 m (most common in 1 200 to 1 500 m); in the area, known from the Canary Islands and adjacent coast of Africa.



Order ANGUILLIFORMES

ANGUILLIDAE

Freshwater eels

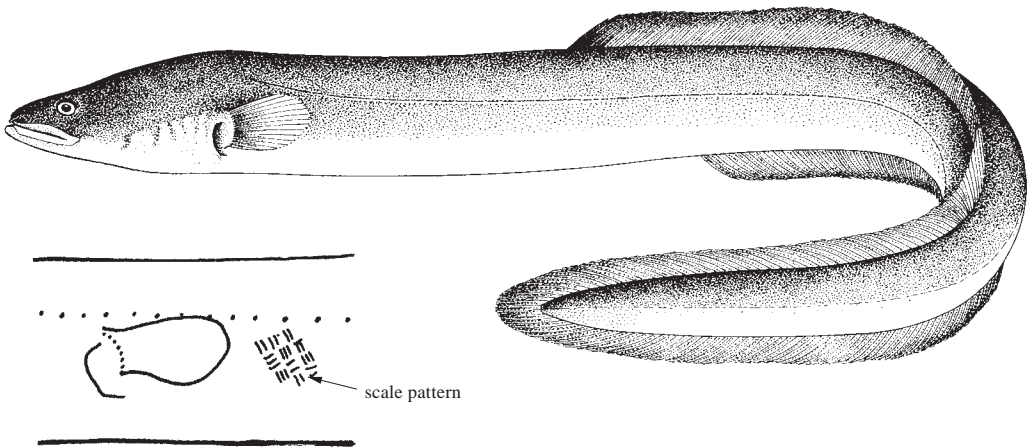
by D.G. Smith, National Museum of Natural History, Washington, DC, USA

A single species occurring in the area.

Anguilla anguilla (Linnaeus, 1758)

Frequent synonyms / misidentifications: None / None.

FAO names: **En** – European eel (AFS: American eel); **Fr** – Anguille d'Europe; **Sp** – Anguila europea.



Diagnostic characters: Body moderately elongate, cylindrical in front and only moderately compressed along the tail. Eye well developed, moderately small in females and immatures, markedly enlarged in mature males. Snout rounded. Anterior nostril tubular, near tip of snout; posterior nostril a simple opening in front of eye at about mid-eye level. Mouth moderately large, gape ending near rear margin of eye; **lower jaw projects beyond upper; well developed fleshy flanges on upper and lower lips. Teeth small, granular, in narrow to broad bands on jaws and vomer.** Dorsal and anal fins continuous around tail; **dorsal fin begins well behind pectoral fin, closer to anus than to pectoral-fin base; pectoral fin well developed. Small oval scales present, embedded in skin and arranged in a basket-weave pattern.** Lateral line complete. **Colour:** immature individuals, called yellow eels, vary from yellowish green to brown above, paler ventrally; sexually mature individuals become bicoloured, black above and white below, with a bronze or silvery sheen, and are then referred to as silver eels or bronze eels.

Size: Maximum about 150 cm, common to 50 cm; females grow much larger than males.

Similar species occurring in the area

The combination of the following characters will distinguish *Anguilla anguilla* from all other species of eels in the area: presence of scales and of pectoral fins; teeth in upper and lower jaws minute; lower jaw protruding beyond upper jaw; dorsal fin begins far behind pectoral fins, closer to anus than to pectoral-fin base.

Habitat, biology, and fisheries: Adults of *Anguilla anguilla* spend most of their lives in fresh water or estuarine habitats. They are nocturnal, hiding by day and coming out at night to forage. They take almost any available food, mainly small, benthic invertebrates and fishes. They are extremely hardy and live in a wide variety of aquatic habitats. Mature eels leave fresh water in the autumn and travel to the Sargasso Sea, where they spawn in late winter and early spring. Spawning is the terminal event in the eel's life, and it dies without returning to fresh water. The eggs hatch into larvae called leptocephali, which are carried on the currents back to the continent. When they reach the edge of the continental shelf, they metamorphose into juvenile eels called elvers and enter fresh water the following spring. Elvers are caught with fine-mesh fyke nets and dip nets in the spring during their inshore migration. Yellow eels are caught with baited eel pots and trot lines. Silver eels are taken in pound nets in estuarine areas during seaward migration. In recent years, populations have declined notably.

Distribution: In the area, only in Madeira, the Canary Islands and Morocco. Elsewhere widely distributed in lands bordering the eastern North Atlantic from Iceland and Norway to Spain and throughout the Mediterranean basin.



Reference

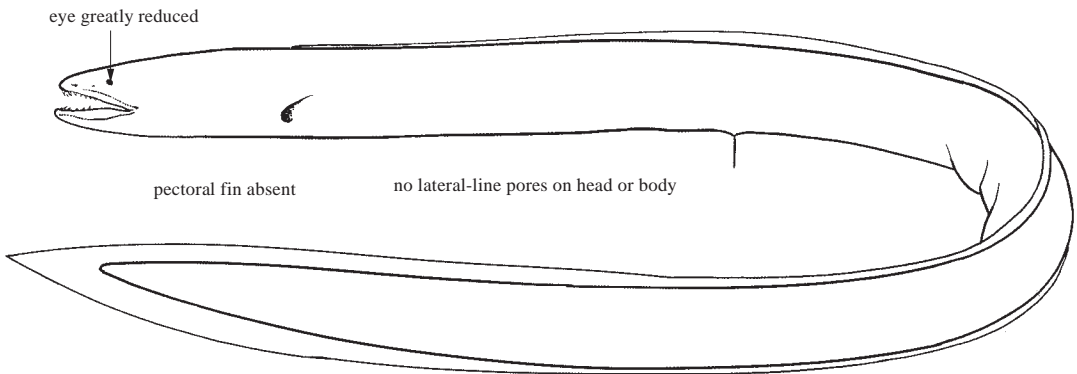
Tesch, F.W. 1977. *The Eel - Biology and Management of Anguillid Eels*. London: Chapman and Hall. xiv + 434 pp.

HETERENCHELYIDAE

Shortfaced eels

by D.G. Smith, National Museum of Natural History, Washington, DC, USA

Diagnostic characters: Medium-sized eels, maximum size about 1 m. Body moderately elongate to elongate, cylindrical anteriorly, compressed posteriorly, tail longer than head and trunk. Head moderate; **eye greatly reduced, covered by semi-transparent skin**; jaws nearly equal or lower jaw projects slightly beyond upper; mouth relatively large, gape ending well behind eye; teeth conical to molariform, bi- or triserial on jaws, in one to several rows on vomer. Dorsal and anal fins low and confluent with caudal fin; dorsal fin begins over or slightly behind gill opening; **pectoral fins absent**. Scales absent. **Lateral line absent, no pores on head or body**. **Colour:** grey or brown in preservative; freshly collected specimens largely unpigmented, with a reddish cast due to blood in superficial capillaries.

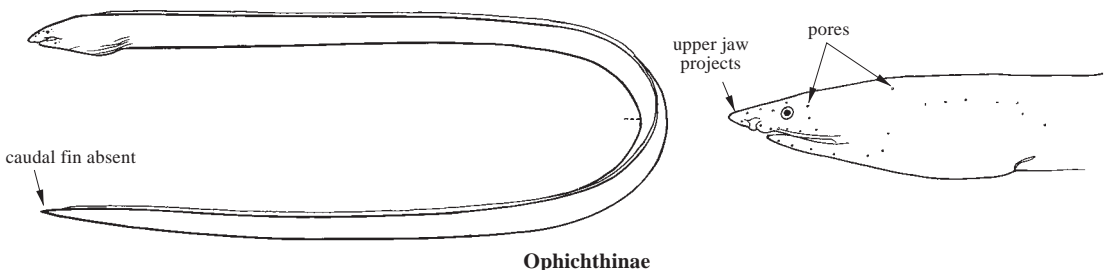


Habitat, biology, and fisheries: Heterenchelyids occur over sandy or muddy bottoms in relatively shallow water, where they spend most or all of their time buried in the substrate. They are seldom seen, and virtually nothing is known about their biology. They are rare and of no importance to fisheries.

Remarks: The centre of distribution of the Heterenchelyidae is the eastern Atlantic, where 2 genera and 5 species occur. A single species each occurs in the western tropical Atlantic and the eastern tropical Pacific.

Similar families occurring in the area

The only other eels in the area with eyes as reduced as those of the heterenchelyids are certain members of the Ophichthidae, but ophichthids have a well-developed lateral line with pores on the head and body, and in nearly all of them the upper jaw projects beyond the lower. The small-eyed, burrowing ophichthids of the subfamily Ophichthinae have no caudal fin, and the tail ends in a hard, finless point.



Key to the species occurring in the area

- 1a. Preanal length 22 to 37% of total length; no dermal crest on top of head (Fig. 1) → 2
- 1b. Preanal length 12 to 20% of total length; a dermal crest on top of head (Fig. 2) → 3

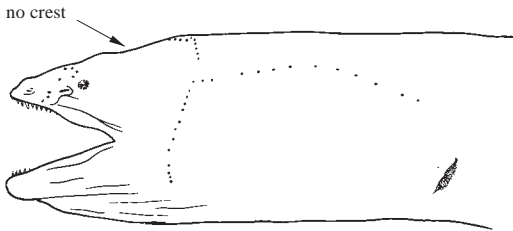


Fig. 1

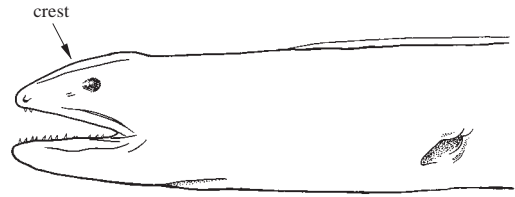


Fig. 2

- 2a. Preanal length 22 to 27% total length; vertebrae 124 to 134. *Pythonichthys macrurus*
- 2b. Preanal length 33 to 37% total length; vertebrae 109 to 114 . . . *Pythonichthys microphthalmus*
- 3a. Head 32 to 36% of preanal length; vertebrae 209 to 227 *Panturichthys longus*
- 3b. Head 52 to 68% of preanal length; vertebrae 141 to 176 → 4
- 4a. Vertebrae 149 to 162 *Panturichthys isognathus*
Gabon to Angola
- 4b. Vertebrae 164 to 176. *Panturichthys mauritanicus*
Morocco to Guinea

List of species occurring in the area

The symbol is given when species accounts are included.

- Panturichthys isognathus* Poll, 1953.
- Panturichthys longus* (Ehrenbaum, 1915).
- Panturichthys mauritanicus* Pellegrin, 1913.
- Pythonichthys macrurus* (Regan, 1912).
- Pythonichthys microphthalmus* (Regan, 1912).

Reference

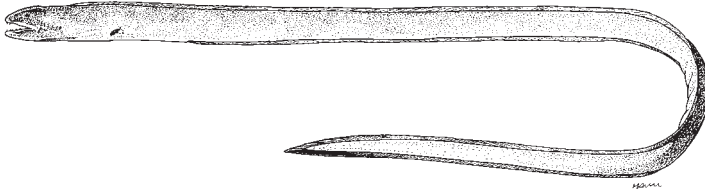
Blache, J. 1968. Contribution à la connaissance des poissons Anguilliformes de la côte occidentale d'Afrique. Neuvième note: Les Heterenchelyidae. *Bulletin de l'Institut Fondamental d'Afrique Noire*, T. 30, sér. A, No. 4: 1540–1581.

Blache, J. 1975. Contribution à la connaissance des poissons Anguilliformes de la côte occidentale d'Afrique. 15th note: compléments aux familles des Muraenidae, des Heterenchelyidae et des Ophichthidae. *Bulletin de l'Institut Fondamental d'Afrique Noire*, T. 37, sér. A, No. 3: 708

***Panturichthys isognathus* (Poll, 1953)**

En – Angolan shortfaced eel.

Size 612 mm. Known from a few adult specimens and numerous larvae collected from Gabon to Angola. Depth 100 to 120 m.



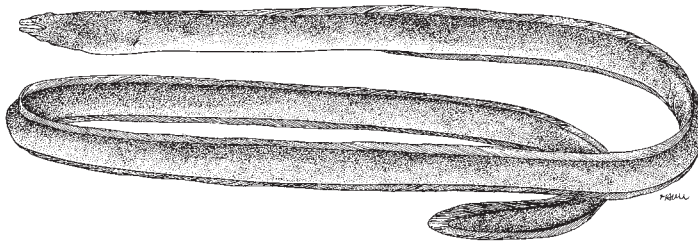
(after Blache, 1968)



***Panturichthys longus* (Ehrenbaum, 1915)**

En – Slender shortfaced eel.

Maximum size 150 cm. Coastal waters from Benin to Angola.



(after Blache, 1968)



***Panturichthys mauritanicus* Pellegrin, 1913**

En – Mauritanian shortfaced eel.

Maximum size 84 cm. Morocco to Guinea in depths of 30 to 50 m.



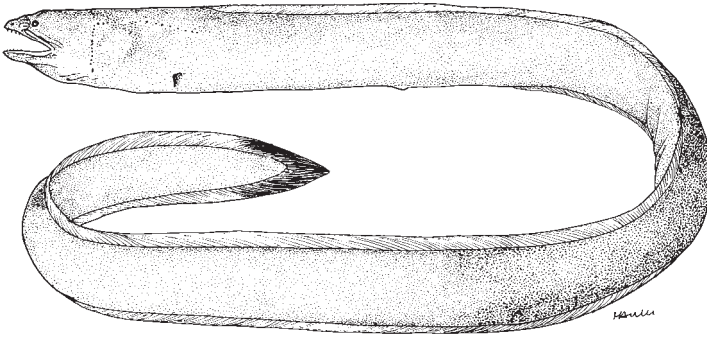
(after Blache, 1968)



***Pythonichthys macrurus* (Regan, 1912)**

En – Longtailed shortfaced eel.

Maximum size 80 cm. Coastal waters from Sierra Leone to northern Angola.



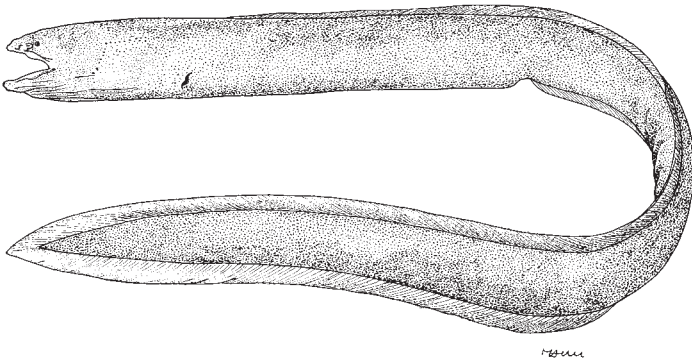
(after Blache, 1968)



***Pythonichthys microphthalmus* (Regan, 1912)**

En – Shorttailed shortfaced eel.

Maximum size 50 cm. Mauritania to Angola, in depths of 40 to 150 m.



(after Blache, 1968)

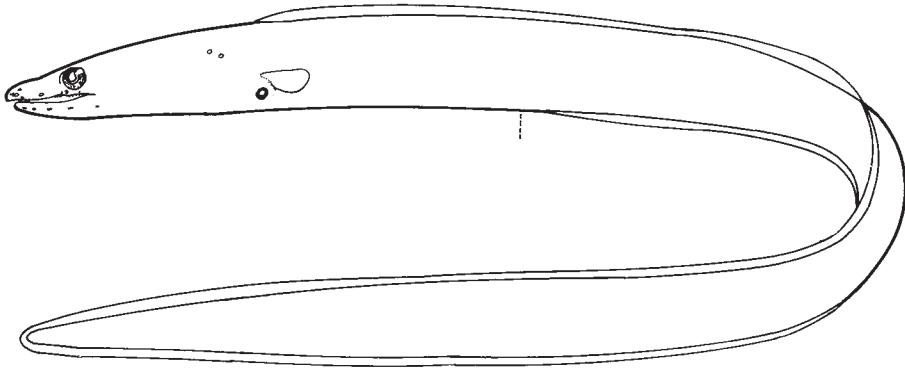


CHLOPSIDAE

False morays

by D.G. Smith, National Museum of Natural History, Washington, DC, USA

Diagnostic characters: Small eels, no more than 30 cm, usually 15 to 20 cm. Body stout to moderately elongate, compressed, anus slightly before midbody. **Eyes well developed.** Snout moderate to short, projecting slightly beyond tip of lower jaw. Anterior nostril in a short tube, near tip of snout; **posterior nostril located below mideye level, either on side of head above lip, on lip and covered with a flap, or opening inside mouth.** **Upper lip without an upturned fleshy flange; lower lip with or without a downturned fleshy flange.** Teeth small and conical or long and needle-like, in 2 to several series on jaws, and 1 or 2 long rows on vomer; large fangs never present. **Gill opening reduced to a small, round, pore-like opening.** Dorsal and anal fins well developed, confluent with caudal fin; **dorsal fin begins over or slightly behind gill opening.** **Pectoral fins present or absent.** Scales absent. **Lateral line incomplete, usually reduced to 1 or 2 pores at anterior end of canal in front of pectoral fin.** **Colour:** variable, most often brown, and frequently countershaded with white ventrally; 1 species with a pale nuchal band.



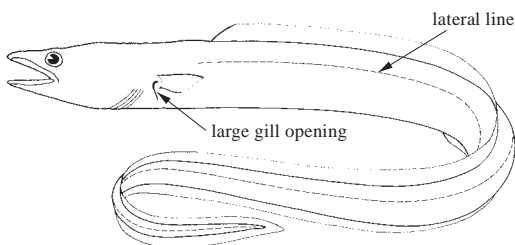
Habitat, biology, and fisheries: Chlopsids are small, cryptic eels inhabiting coral reefs, seagrass beds, and rubble. They are seldom seen except at rotenone stations. Some species occasionally turn up in trawls, but their retiring habits and preference for rough bottoms place them beyond the reach of most collecting methods. They are of no importance to fisheries.

Remarks: This family was formerly known as the Xenocongridae. A few species are common, but most are quite rare.

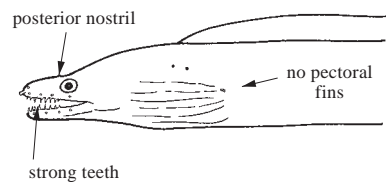
Similar families occurring in the area

Congridae: those chlopsids with pectoral fins are most likely to be confused with congrid; congrid have a complete lateral line, however, and a larger gill opening.

Muraenidae: muraenids always lack a pectoral fin, and the posterior nostril is at or above the upper margin of the eye; enlarged, fang-like teeth are usually present.

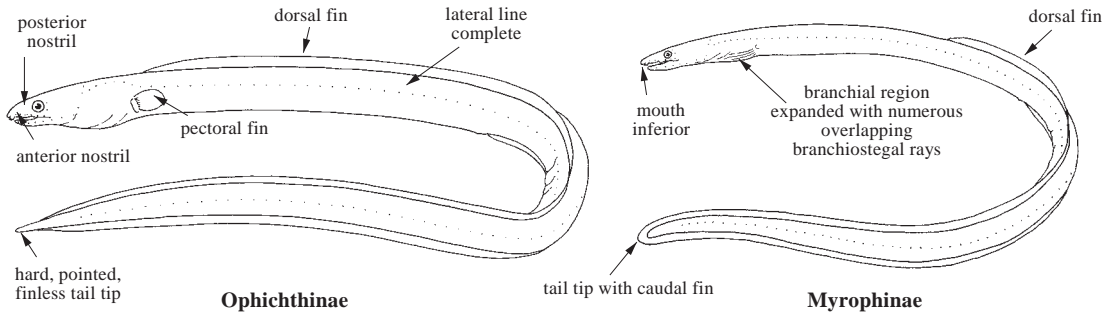


Congridae

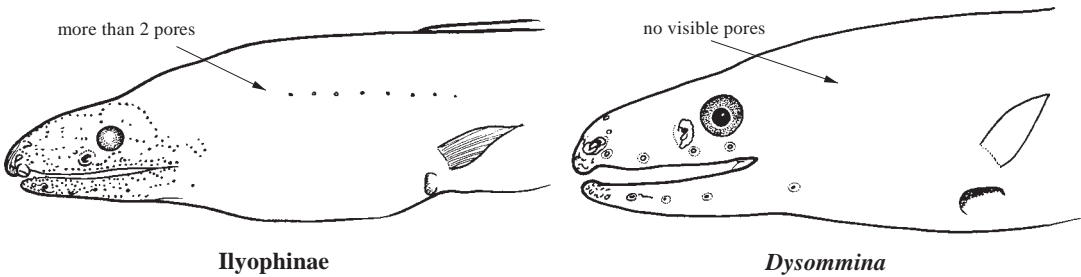


Muraenidae

Ophichthidae: also have the posterior nostril low on the side of the head or on the lip, but they have a complete lateral line. Those of the subfamily Ophichthinae lack a caudal fin, and the tip of the tail is hard and pointed. Those of the subfamily Myrophinae have a caudal fin, but they have an expanded branchial basket with numerous branchiostegal rays, most of which are not attached to the hyoid bones.



Synphobranchidae (Ilyophinae): some have a reduced lateral line and resemble chlopsids; they also have the posterior nostril low on the side of the snout, further enhancing the resemblance. Most ilyophines, however, have more than 2 lateral-line pores; the only exception is *Dysommima*, which has no open pores. Most ilyophines have a single row of vomerine teeth, each tooth composed of 2 fused teeth. Most chlopsids have 2 rows of vomerine teeth; in those that have 1 row, the teeth are simple, not compound.



Key to the species of Chlopsidae occurring in the area

- 1a. Strongly bicoloured, brown above and white below; dorsal-fin origin posterior to gill opening; preanal length 34 to 36% total length ***Chlopsis bicolor***
- 1b. Plain or weakly bicoloured; dorsal-fin origin over gill opening; preanal length 29-32% total length ***Chlopsis olokun***

List of species occurring in the area

The symbol is given when species accounts are included.

- Chlopsis bicolor* Rafinesque, 1810.
- Chlopsis olokun* (Robins and Robins, 1966).

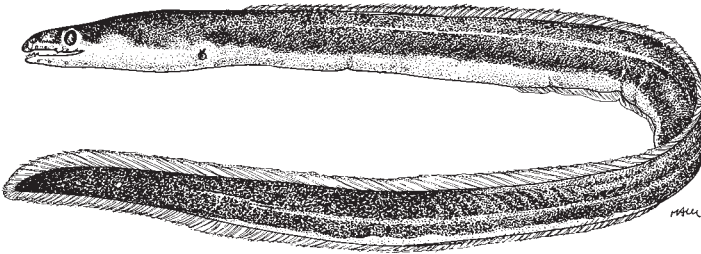
Reference

Blache, J. 1972. Larves leptocéphales des poissons anguilliformes dans le golfe de Guinée (Zone Sud). 2e Note: Les espèces adultes de Xencongridae et leurs larves. *Cahiers ORSTOM, série Océanographie*, 10 (3): 219–241.

***Chlopsis bicolor* Rafinesque, 1810**

En – Bicoloured false moray.

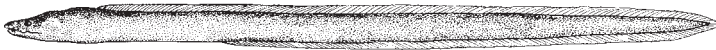
Maximum size about 24 cm. Benthic on shelf and upper slope, to depths of 350 m. In the area, off Morocco; elsewhere, in the Mediterranean and western Atlantic.



***Chlopsis olokun* (Robins and Robins, 1966)**

En – Plain false moray.

Maximum size about 30 cm. Benthic on shelf and upper slope, to depths of 200 m. Senegal to the Congo.

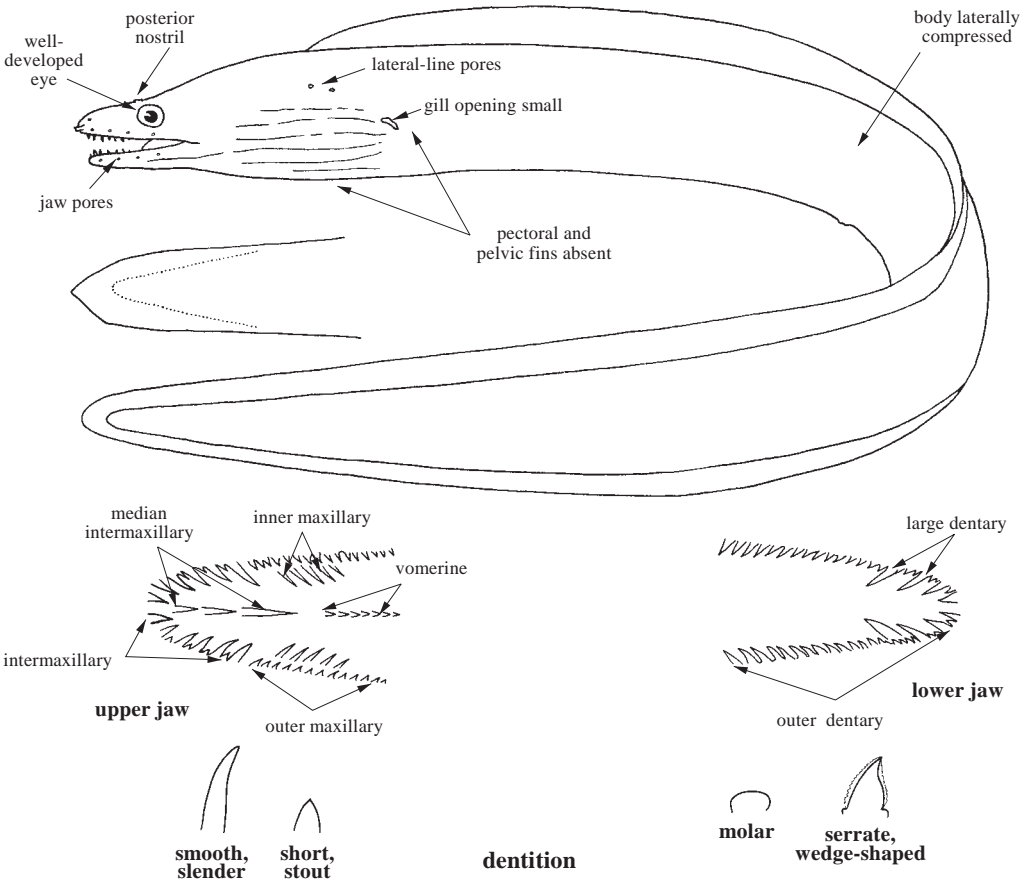


MURAENIDAE

Moray eels

by D.G. Smith, National Museum of Natural History, Washington, DC, USA and
A. Brito, Universidad de La Laguna, Tenerife, Spain

D **Diagnostic characters:** Small to very large eels, maximum size from 20 cm to 375 cm total length, most commonly from 50 to 150 cm. **Body elongate, muscular, and laterally compressed.** **Dorsal profile of head above and behind eye often raised** due to the development of strong head muscles. Eye well developed, above and near midgape. Snout short to elongate. Anterior nostril tubular, near tip of snout; **posterior nostril above or before eye, a simple pore or in a tube.** Mouth large, gape usually extending behind posterior margin of eye, lips without flanges. Teeth numerous and strong, with smooth or serrate margins, ranging from blunt rounded molars to long, slender, sharply pointed, and sometimes depressible canines; jaws short to elongate, usually about equal. On upper jaw, intermaxillary (anterior) teeth in 1 or 2 peripheral rows and usually a median row of 1 to 3 teeth which are the longest in the mouth (sometimes missing in large specimens); maxillary (lateral) teeth in 1 or 2 rows on side of jaws; vomerine teeth (on roof of mouth) usually short and small, in 1 or 2 rows or in a patch, or sometimes absent. Dentary (lower jaw) teeth in 1 or more rows; in many species in the subfamily Muraeninae the first 4 teeth are larger, sometimes forming a short inner row. **Gill opening a small round hole or slit at midside.** Dorsal and anal fins variously developed, from long fins with dorsal fin usually beginning on head and anal fin immediately behind anus (subfamily Muraeninae), to both fins restricted to tail tip (subfamily Uropterygiinae); dorsal and anal fins continuous with caudal fin around tail tip; **pectoral and pelvic fins absent.** **Scales absent.** **Lateral-line pores absent on body except for a few (usually 1 or 2) above and before gill opening (branchial pores);** head pores usually 3 near tip of snout, 4 along upper jaw, and 6 on lower jaw; no pores behind eye or in supratemporal commissure. **Colour:** variable, from nearly uniform to distinctive patterns of spots, blotches, bars, and/or reticulations.



Habitat, biology, and fisheries: Morays are small to very large eels (to 375 cm total length) inhabiting mainly tropical and subtropical waters. Many are found in shallow-water rock and coral reef habitats, where they find protection in holes and crevices; others live above sand or mud bottoms at depths to 500 m; a few species are found in brackish-water tidal creeks, mangrove areas, or in rivers. They are scavengers and predators, feeding on fish and various invertebrates. If provoked or handled carelessly, their powerful jaws and strong teeth will cause deep lacerations, but usually they do not leave their hiding places to attack swimmers. Morays are caught by spear, hook-and-line or longlines, traps, trawls, and occasionally by dredge. In general, they are not sought commercially, but may be occasionally caught and sold in fish markets. They are eaten in many parts of the world, some locally in the area where artisanal fisheries exist with fish traps; consumption of morays 4 kg or larger may result in ciguatera poisoning, which is sometimes fatal.

Remarks: The species of morays in the Atlantic are well known, but the generic nomenclature for the family is not established. The generic classification used by Böhlke *et al.* (1989) is followed for these accounts.

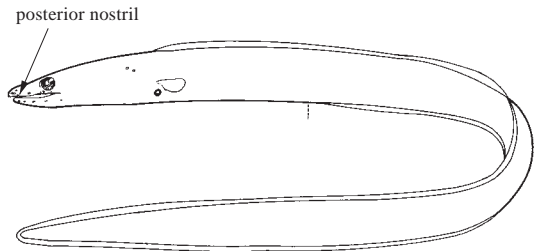
Similar families occurring in the area

Few eels are likely to be confused with morays. The combination of elevated head profile, high posterior nostril, lack of pectoral fins, and reduced lateral line is not found in any other family.

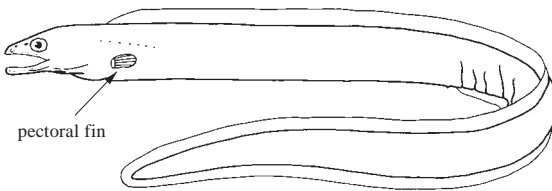
Chlopsidae (formerly *Xencongridae*): superficially similar to morays, but posterior nostril below mideye level or on lip rather than above eye; pectoral fins sometimes present; vomerine tooth series widely divergent (except *Catesbya*) rather than along midline.

Myrocongridae: similar in appearance to morays but pectoral fins present.

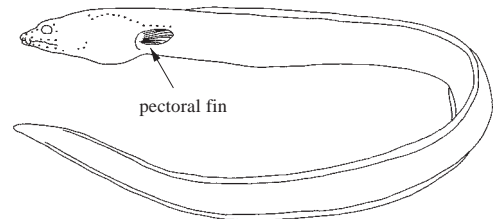
Ophichthidae: somewhat similar in appearance, but posterior nostril always low on side of head, on lip, or opening inside mouth; pectoral fins usually present, caudal fin absent in most.



Chlopsidae



Myrocongridae



Ophichthidae

Identification note: Morays are notoriously difficult to identify because of great morphological variability. Characters used include fin positions, tail length (position of anus), jaws and dentition, nostril condition, and colour pattern. Both colour pattern and dentition may change greatly with growth, and the presence of the fins is sometimes difficult to determine (the beginning of the dorsal fin is sometimes not discernible externally; the anal fin condition can best be determined by its presence or absence just behind the anus). Vertebral counts, while not useful for field identification, are consistent for a species and are important characters for defining species; they are included in the key for reference.

Key to the species of Muraenidae occurring in the area

- 1a. Dorsal fin beginning near or before midbody, anal fin beginning immediately behind anus (Fig. 1) **(subfamily Muraeninae) → 2**
- 1b. Dorsal and anal fins restricted to posterior end of body near tail tip, anal fin beginning far behind anus (Fig. 2) **(subfamily Uropterygiinae) → 22**

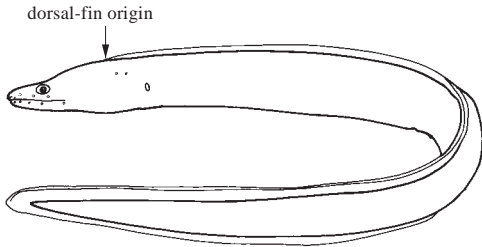


Fig. 1

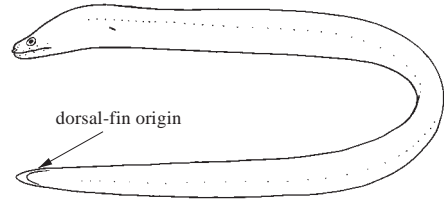


Fig. 2

- 2a. Dorsal fin beginning shortly behind level of anus; uniform brown with pale head and tail tip (red-orange in life); vertebrae 124 to 135 ***Monopenchelys acuta***
- 2b. Dorsal fin beginning well before anus; colour variable **→ 3**
- 3a. Some teeth rounded and molariform (at least the vomerine teeth), no canine teeth **→ 4**
- 3b. No molariform teeth, some canine teeth present **→ 5**
- 4a. Body, head, and fins either plain dark brown, or dark brown with small pale spots, especially in smaller individuals; vertebrae 118 to 123 ***Echidna peli***
- 4b. Body, head, and fins covered with large, irregular dark spots, the interspaces forming a chain-like pattern of pale reticulations; vertebrae 114 to 122 ***Echidna catenata***
- 5a. Jaws elongate and arched, meeting only at their tips; elongate fangs exposed when mouth is closed; dorsal fin begins above and slightly before gill opening (Fig. 3) **→ 6**
- 5b. Jaws not arched, closing completely or with slight gap; teeth not exposed when mouth is closed; dorsal fin begins well before gill opening (Fig. 4) **→ 8**



Fig. 3



Fig. 4

- 6a. Posterior nostril large and elongate in adults and well before eye (small, round, or oval and above eye in young); fewer than 6 inner dentary teeth; pale with darker reticulations in small individuals, uniform brown in larger ones; vertebrae 141 to 148 ***Enchelycore nigricans***
- 6b. Posterior nostril a rounded pore above anterior margin of eye; 6 or more inner dentary teeth; colour not as above **→ 7**

- 7a. Colour uniform brown, jaw pores set in conspicuous white spots; 6 to 13 inner dentary teeth; vertebrae 128 to 140 ***Enchelycore carychroa***
- 7b. Colour pattern of pale spots or blotches on brown body; jaw pores not noticeably white; 10 to 14 inner dentary teeth; vertebrae 146 to 158 ***Enchelycore anatina***

- 8a. Posterior nostril in a prominent tube, at least as long as anterior nostril; gill opening frequently in a conspicuous black spot. → **9**
- 8b. Posterior nostril in a short tube or more frequently flush or nearly so with head profile; gill opening with body coloration or indistinctly dark → **13**

- 9a. Ground colour dark brown with large yellow ocellated spots with small darker spots within; these ocelli sometimes nearly or completely absent, leaving only scattered small brown spots and numerous very small pale spots; branchial spot may be reduced to a black margin around the gill opening, but some pigment always present here; vertebrae 139 to 148 ***Muraena helena***
- 9b. Colour not as above → **10**

- 10a. Body dark purplish black, with minute, widely separated, pale spots on body and fins and also scattered irregular black spots; eye white in life; black spot in gill opening present but not especially noticeable; vertebrae 137 to 143 ***Muraena augusti***
- 10b. Colour not as above; gill opening in a large, dark spot → **11**

- 11a. Ground colour light brown, with large, orange brownish to dark brown spots, never ocellated; vertebrae 151 to 158 ***Muraena robusta***
- 11b. Ground colour dark brownish black, with pale spots → **12**

- 12a. Posterior nostril large, conspicuous, and flap-like, about 3 times length of anterior nostril, with spotted colour pattern; vertebrae 122 to 129 ***Muraena pavonina***
- 12b. Posterior nostril about twice length of anterior nostril, white; vertebrae 121 to 127 ***Muraena melanotis***

- 13a. Teeth with serrate edges → **14**
- 13b. Teeth smooth → **15**

- 14a. Maxillary teeth uniserial; 2 branchial pores (exceptionally 1 pore on only 1 side); jaw pores not noticeably white; vertebrae 149 to 158 ***Gymnothorax maderensis***
- 14b. Maxillary teeth biserial; 1 branchial pore (exceptionally 2 pores on only 1 side); some jaw pores, principally the posteriormost, in white spots; vertebrae 130 to 131 ***Gymnothorax bacalladoi***

- 15a. Pores along upper and lower jaws set in conspicuous white spots; vertebrae 130 to 138 ***Gymnothorax mareei***
- 15b. Pores along upper and lower jaws not set in white spots → **16**

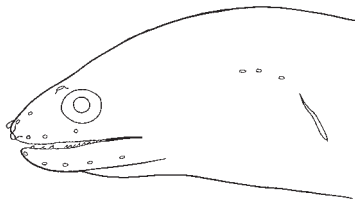
- 16a. Maxillary teeth in 2 rows, an outer row of smaller teeth and an inner row of fewer, larger teeth; intermaxillary teeth in 5 rows across, an outer series around edge of jaw, a median row of 2 or 3 teeth on the midline, and an intermediate series of about 2 to 4 teeth on each side between the outer and median teeth, the midline teeth the largest and the outer teeth the smallest → 17
- 16b. Maxillary teeth usually in 1 row, sometimes with 1 to 4 inner teeth opposite anterior end of outer row, but never with a fully developed inner row; intermaxillary teeth in 3 rows across, an outer series on each side and a median series (median series may be absent in larger specimens) → 18

- 17a. Body and head dark, covered with small pale spots or vermiculations (yellow in life); occasionally colour reversed, with dark spots or vermiculations on pale background; vertebrae 121 to 125 ***Gymnothorax miliaris***
- 17b. Colour uniform dark, head darker, without pale spots or vermiculations; vertebrae 136 to 146 ***Gymnothorax unicolor***

- 18a. Small pale spots arranged in irregular polygons on a dark background; vertebrae 134 to 142 ***Gymnothorax polygonius***
- 18b. Colour not as above → 19

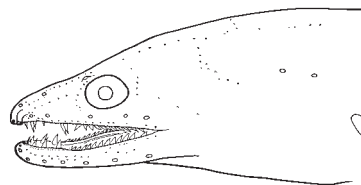
- 19a. Colour dark brown or blackish, with scattered pale spots and blotches; often with 3 or 4 (occasionally 5) branchial pores; vertebrae 140 to 148 ***Gymnothorax afer***
- 19b. Colour not as above; always with 2 branchial pores → 20

- 20a. Three pores along upper jaw (Fig. 5a); median intermaxillary teeth absent; body colour pale green. ***Gymnothorax walvisensis***
- 20b. Four pores along upper jaw (Fig. 5b); median intermaxillary teeth usually present; body colour usually mottled, when uniform, the colour brown → 21



(after Prokofiev and Kukuev)

a) *Gymnothorax walvisensis*



(after Prokofiev and Kukuev)

b) *Gymnothorax moringa*, *G. vicinus*

Fig. 5 lateral view of head showing pores

- 21a. Contrasting pattern of overlapping small dark spots on pale background, the spots generally larger than the interspaces, producing an irregular mottled or reticulated pattern; corner of mouth without a conspicuous dark spot; vertebrae 134 to 142 ***Gymnothorax moringa***
- 21b. Colour varying from uniform grey or brown to highly patterned with overlapping dark spots, the pattern generally more diffuse than that of *G. moringa*; a small dark spot at corner of mouth; vertebrae 128 to 140 ***Gymnothorax vicinus***

- 22a.** Tail very short, anus at two-thirds total length; jaws elongate, the lower protruding; snout short, eye above anterior third of jaw; 13 to 16 broad dark bands on body and tail; vertebrae 145 to 157 ***Channomuraena vittata***
- 22b.** Tail about 1/2 total length, anus near midbody; jaws not elongate; snout moderate, eye above midjaw; body variably uniform or patterned → **23**
- 23a.** A sensory pore immediately adjacent to posterior nostril (Fig. 6a) → **24**
- 23b.** No sensory pore immediately adjacent to posterior nostril (Fig. 6b) → **25**

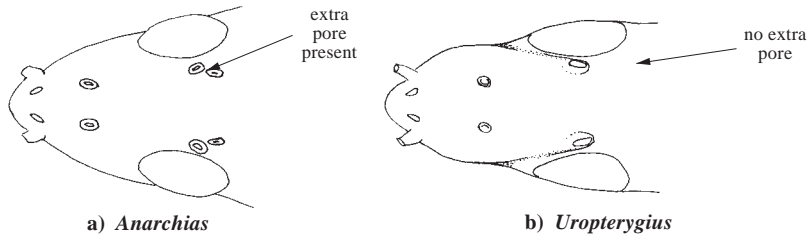



Fig. 6

- 24a.** Total vertebrae 112 to 117; predorsal vertebrae 113 to 115; 5 to 8 inner maxillary teeth ***Anarchias longicauda***
- 24b.** Total vertebrae 104 to 113; predorsal vertebrae 94 to 105; 2 to 5 inner maxillary teeth ***Anarchias similis***
- 25a.** Total vertebrae 117 to 126; predorsal vertebrae 100 to 110; preanal vertebrae 105 to 115 ***Uropterygius macularius***
- 25b.** Total vertebrae 127 to 135; predorsal vertebrae about 117; preanal vertebrae about 121 ***Uropterygius wheeleri***

List of species occurring in the area

The symbol  is given when species accounts are included.

-  *Anarchias longicauda* (Peters, 1877).
-  *Anarchias similis* (Lea, 1913).
-  *Channomuraena vittata* (Richardson, 1845).
-  *Echidna catenata* (Bloch, 1795).
-  *Echidna peli* (Kaup, 1856).
-  *Enchelycore anatina* (Lowe, 1838).
-  *Enchelycore carychroa* Böhlke and Böhlke, 1976.
-  *Enchelycore nigricans* (Bonnaterre, 1788).
-  *Gymnothorax afer* Bloch, 1795.
-  *Gymnothorax bacalladoi* Böhlke and Brito, 1987.
-  *Gymnothorax maderensis* (Johnson, 1862).
-  *Gymnothorax mareei* Poll, 1953.
-  *Gymnothorax miliaris* (Kaup, 1856).
-  *Gymnothorax moringa* (Cuvier, 1829).
-  *Gymnothorax polygonius* Poey, 1875.
-  *Gymnothorax unicolor* (Delaroche, 1809).
-  *Gymnothorax vicinus* (Castelnau, 1855).
-  *Gymnothorax walvisensis* Prokofiev in Prokofiev and Kukuev, 2009.

- *Monopenchelys acuta* (Parr, 1930).
- *Muraena augusti* (Kaup, 1856).
- *Muraena helena* Linnaeus, 1758.
- *Muraena melanotis* (Kaup, 1859).
- *Muraena pavonina* Richardson, 1845.
- *Muraena robusta* Osório, 1911.
- *Uropterygius macularius* (Lesueur, 1825).
- *Uropterygius wheeleri* Blache, 1967.

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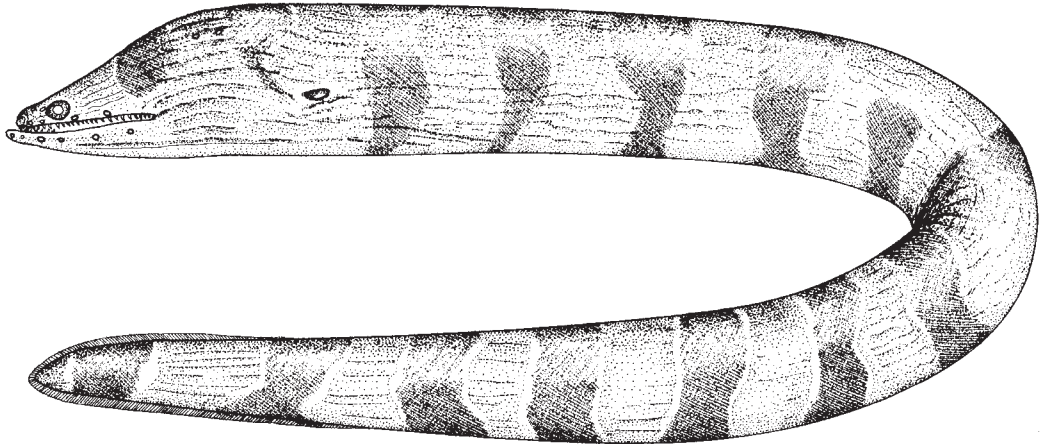
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Channomuraena vittata (Richardson, 1845)

Frequent synonyms / misidentifications: None / None.

FAO names: En – Broadbanded moray; Fr – Muréne anneau; Sp – Morena cinturones.



Diagnostic characters: Body strong, muscular. Head with occipital region somewhat elevated; **posterior nostrils with a tube**, placed above anterior margins of eyes; **lower jaw projecting beyond the upper**; teeth small but pointed, **multiserial**, particularly those on upper jaw which increase from irregularly 3 to 6 rows with age. **Vertical fins confined to posterior part of tail**. Anus placed far posteriorly, the preanal distance two-thirds of total length. Total number of vertebrae 146 to 155. **Colour: yellowish brown, with dark brown cross-bands and partial bands**; pale interspaces between bands usually edged with lighter yellowish than the spaces themselves.

Size: Maximum to 150 cm.

Habitat, biology, and fisheries: An uncommon bottom-dwelling species in rocky, shallow waters at depths to at least 40 m. Caught incidentally in insular artisanal fisheries. Separate statistics are not reported for this species. Taken by hook-and-line, in fish traps, and speared. Probably consumed occasionally, but apparently not often marketed.

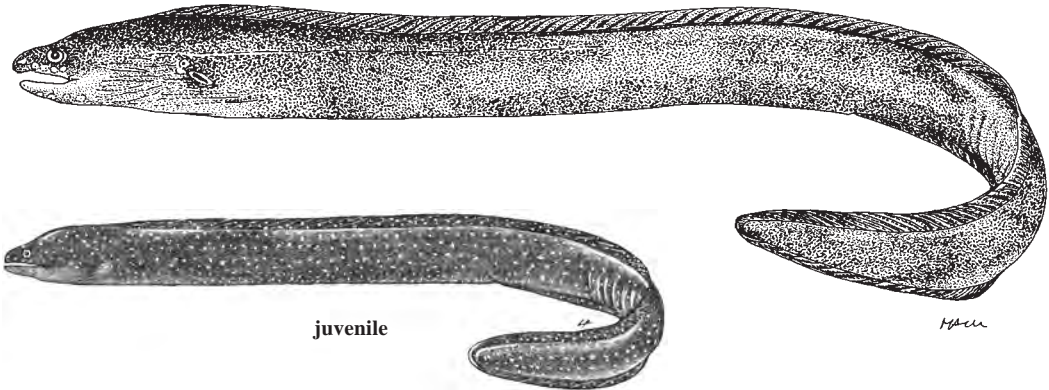
Distribution: In the area, from the islands of Cape Verde, Annobon and São Tomé, and Ascension. Also in the western Atlantic and Indo-West Pacific.



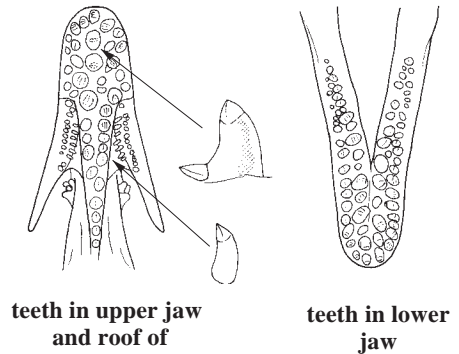
***Echidna peli* (Kaup, 1856)**

Frequent synonyms / misidentifications: None / None.

FAO names: En – Pebbletooth moray; Fr – Murène serpent; Sp – Moreneta.



Diagnostic characters: Body strong, muscular, moderately compressed. Head with occipital region somewhat elevated; **posterior nostril with a short tube; teeth without serrations** along their anterior and posterior margins; upper jaw bearing anteriorly a large patch of **low, broad, pointed to blunt intermaxillary teeth** continuous with the biserial to uniserial vomerine dentition (on roof of mouth), and posteriorly 2 rows of more slender maxillary teeth, those in inner row the more elongated and pointed, dentary tooth patches (in lower jaw) biserial. **Dorsal fin originating on head, before gill opening.** Total number of vertebrae 118 to 123. **Colour:** juveniles generally **dark with irregular small, pale spots** scattered over head and body. Adults becoming more nearly **uniform dark brown or reddish brown** except that the **pores on jaws are set in pale spots.**



Size: Maximum to 100 cm; sexually mature females have been reported at 50 to 59 cm.

Habitat, biology, and fisheries: A common species found in rocky shallow-water habitats to at least 20 m depth. Feeds on crustaceans, small shrimp and young crabs. Occasionally caught throughout its range. Separate statistics are not reported for this species. Taken with trawls, traps, and on hook-and-line. Not often seen in markets but occasionally consumed.

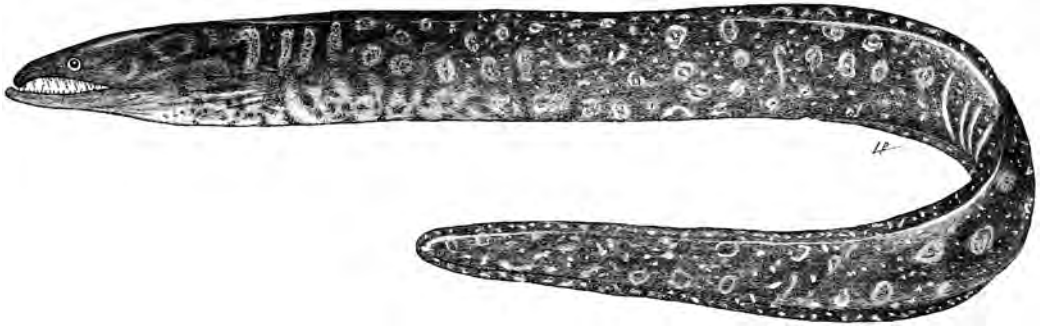
Distribution: West coast of Africa from Mauritania to Cape Lopez; also from the islands of Cape Verde and from São Tomé and Annobón in the Bay of Biafra.



Enchelycore anatina (Lowe, 1838)

Frequent synonyms / misidentifications: *Lycodontis anatinus* (Lowe, 1841) / None.

FAO names: En – Fangtooth moray; Fr – Murène des îles; Sp – Morena isleña.



Diagnostic characters: Body strong, muscular, moderately compressed. Head with occipital region somewhat elevated; **posterior nostril a simple round or oval opening above anterior margin of eye.** **Jaws arched so that many long, fang-like teeth are exposed along sides when mouth is closed;** teeth in upper jaw bi- to triserial, in lower jaw biserial. **Dorsal-fin origin above or slightly before gill opening.** Total number of vertebrae 146 to 158 (153 to 158 in specimens studied from the eastern Atlantic, except the single St Helena specimen, which has 146). **Colour:** body colour medium to dark brownish, lighter ventrally on head and anterior half of body; **small pale spots on head, larger irregular pale spots and blotches on body and fins.**

Size: Maximum to 120 cm.

Habitat, biology, and fisheries: Occurs in depths of 0 to 50 m on rocky bottoms. Feeds on crustaceans and fishes. Caught incidentally. Separate statistics are not reported for this species. Taken occasionally by hook-and-line and by traps. Not often seen in markets, but consumed locally.

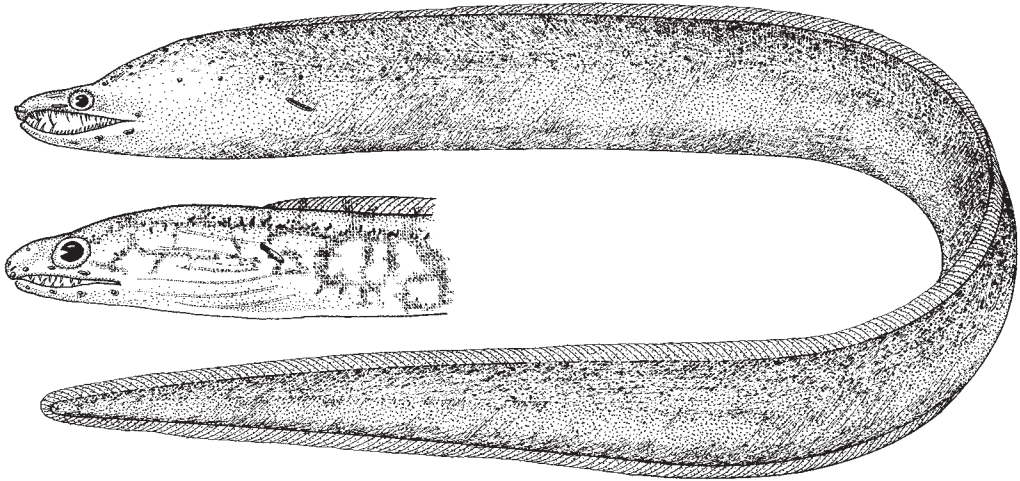
Distribution: An insular species in the eastern Atlantic from the islands of the Azores, Madeira, the Canaries, Cape Verde, and St Helena. Also western Atlantic from Bermuda to Brazil; one record from eastern Mediterranean. The taxonomic status of the St Helena population needs to be confirmed.



Enchelycore nigricans (Bonnaterre, 1788)

Frequent synonyms / misidentifications: None / None.

FAO names: **En** – Viper moray; **Fr** – Murène noire; **Sp** – Morena picopato negra.



Diagnostic characters: Body strong, muscular, moderately compressed. Head with occipital region somewhat elevated; **posterior nostril a rounded opening above anterior margin of eye in young, but soon elongating forward to become a long, open, oval structure; jaws arched so that many long, fang-like teeth are exposed along sides when mouth is closed; a few enlarged canines forming a second, inner, series on lower jaw anteriorly. Dorsal-fin origin above or only slightly in advance of gill opening.** Total number of vertebrae 141 to 148. **Colour:** **young have a reticulated pattern as shown in the insert above, whereas adults become uniformly chestnut brown or brown faintly mottled with darker brown.**

Size: Maximum to 100 cm.

Habitat, biology, and fisheries: A locally common species inhabiting shallow waters of rocky and coral areas in depths recorded to at least 30 m. Stomach contents include cephalopod parts and parts of fishes. Separate statistics are not reported for this species. Taken by hook-and-line, and in traps. Most probably consumed occasionally, but apparently not often sold in markets.

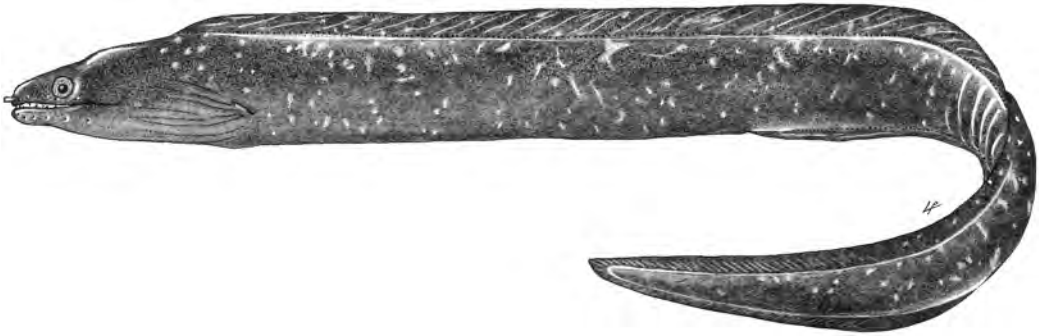
Distribution: Senegal to Gabon and from the islands of Cape Verde and the Bay of Biafra and Ascension Island. Elsewhere, in the western Atlantic from Bermuda, Bahamas, and Florida to Brazil.



***Gymnothorax afer* Bloch, 1795**

Frequent synonyms / misidentifications: *Lycodontis afer* (Bloch, 1795) / None.

FAO names: En – Dark moray; Fr – Morène obscure; Sp – Morena oscura.



Diagnostic characters: Body strong, muscular, moderately compressed. Head with occipital region somewhat elevated; **posterior nostril a simple opening without tube**; **lateral line with 2 to 4 pores above and before gill opening** (most other muraenid species in the area with 1 or 2 pores); **teeth without serrations** on their anterior and posterior margins; teeth in jaws uniserial. **Dorsal fin originating on head, before anteriormost branchial lateral-line pore**. Total number of vertebrae 140 to 148. **Colour: dark brown or blackish overall with scattered irregular yellowish spots and blotches** on body and dorsal fin, occasionally numerous and interconnecting (smaller individuals), more often few in number and difficult to discern, sometimes totally absent (large individuals). Fins edged with black.

Size: Maximum to 100 cm.

Habitat, biology, and fisheries: The most common member of the genus found on the tropical west coast of Africa in shallow waters. Inhabits rocky bottoms to at least 45 m depth. Feeds on crustaceans, fish, and cephalopods. Occasionally caught throughout its range; a locally abundant species. Separate statistics are not reported for this species. Caught with trawls, traps, and on hook-and-line. Consumed locally, but not often seen in markets.

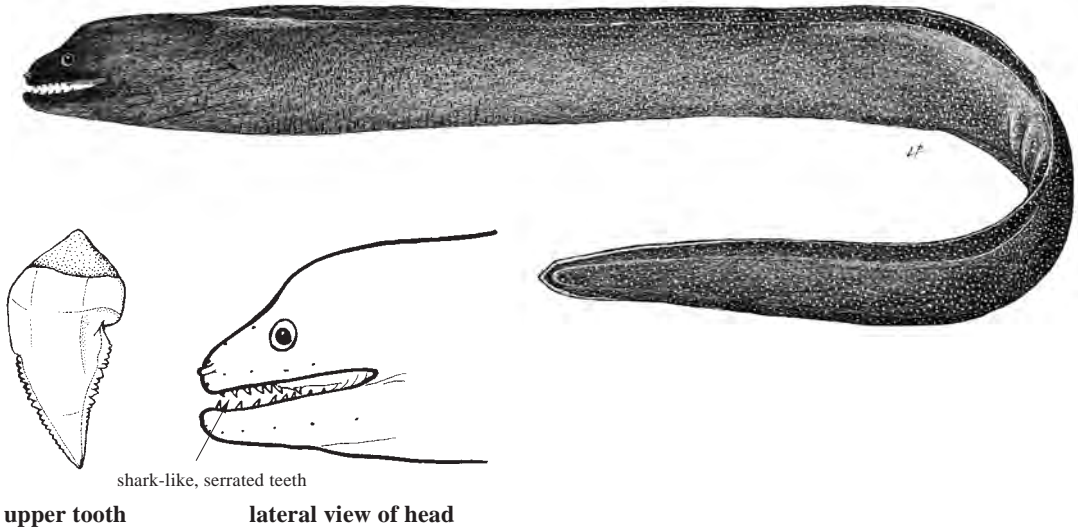
Distribution: West coast of Africa, from Mauritania to Angola, and the Cape Verde Islands, and the islands of the Bay of Biafra.



Gymnothorax maderensis (Johnson, 1862)

Frequent synonyms / misidentifications: None / None.

FAO names: En – Sharktooth moray; Fr – Murène de Madère; Sp – Murión verde.

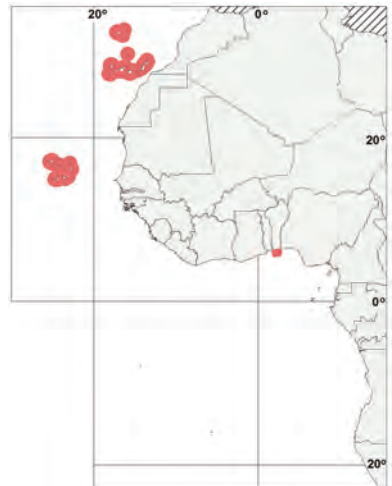


Diagnostic characters: Body strong, muscular, moderately compressed. Head with occipital region somewhat elevated; **posterior nostril a simple pore** without tube before **upper edge of eye**; **teeth shark-like in appearance, with strong serrations** along both anterior and posterior margins, uniserial throughout. **Dorsal fin originating on head a short distance before gill opening**, posterior to branchial lateral-line pores. Total number of vertebrae 149 to 158. **Colour:** overall body colour **green or yellowish green in life, fading to a light yellowish to medium or dark brown in preservative, everywhere covered with fine spots and reticulations**, smallest and close-set on head, larger on body and fins, appearing dark in light individuals, light in dark ones; **head noticeably dusky. Fins with light yellowish margins.**

Size: Maximum to 130 cm.

Habitat, biology, and fisheries: Inhabits deep waters among rocks and corals, at depths of 120 to 300 m. Separate statistics are not reported for this species. Taken with hook-and-line, longline, and in deep traps. Consumed locally, but not often seen in markets; the white flesh said to be of excellent quality.

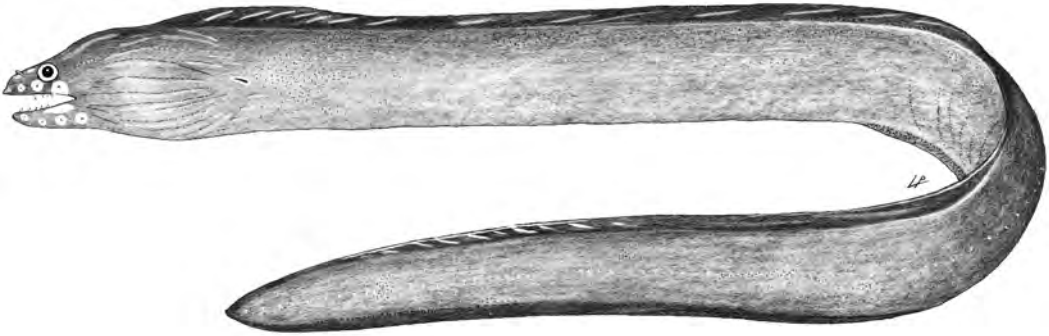
Distribution: Known from scattered localities in the area: Madeira, Canary and Cape Verde Islands, Meteor Seamount, and Benin. Also western Atlantic from Bermuda and North Carolina to northern Caribbean.



***Gymnothorax mareei* Poll, 1953**

Frequent synonyms / misidentifications: *Lycodontis mareei* (Poll, 1953) / *Gymnothorax unicolor*.

FAO names: En – Spotjaw moray; Fr – Murène cobra; Sp – Morena boca manchada.



Diagnostic characters: Body strong, muscular, moderately compressed. Head and snout short, occipital region elevated; **posterior nostril a simple opening without tube**; **teeth without serrations** on their anterior and posterior margins; upper jaw teeth biserial except posteriorly, lower jaw teeth uniserial except at tip of jaw. **Dorsal fin originating on head, before anteriormost branchial lateral-line pore**. Total number of vertebrae 130 to 138. **Colour:** medium brown overall, somewhat lighter ventrally and in throat and lower jaw regions. **Upper and lower jaw pores set in conspicuous white spots**; **a longitudinal white bar on posterior half of lower jaw** just above the row of pores.

Size: Maximum to 40 cm.

Habitat, biology, and fisheries: Inhabits rocky and rock-sand bottoms in shallow water to at least 25 m. Feeds on small crustaceans and gastropods. Has been confused with *Gymnothorax unicolor* which is found only on offshore islands. Occasionally caught throughout its range. Separate statistics are not reported for this species. Caught with trawls, traps, and on hook-and-line. Probably consumed occasionally, but not often seen in markets.

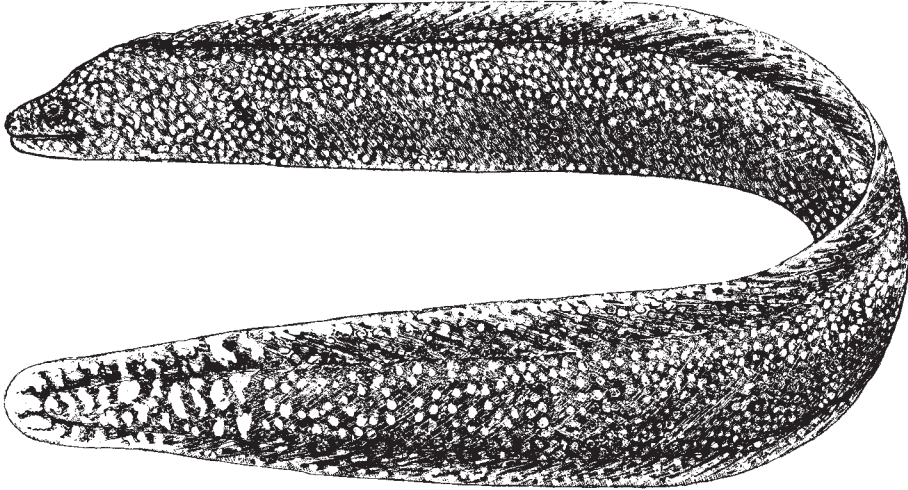
Distribution: West coast of Africa from Senegal to Angola; also from islands in the Bay of Biafra and St Helena.



***Gymnothorax miliaris* (Kaup, 1856)**

Frequent synonyms / misidentifications: *Muraena miliaris* (Kaup, 1856); *Lycodontis miliaris* (Kaup, 1856) / None.

FAO names: En – Goldentail moray; Fr – Murène dorée; Sp – Morena dorada.

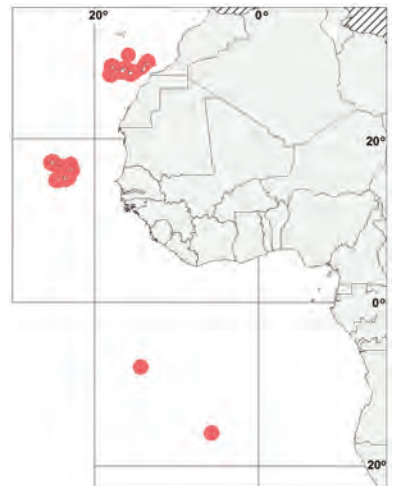


Diagnostic characters: Body strong, muscular, moderately compressed. Head with occipital region somewhat elevated; **posterior nostril tubular but the tube low**, only about one third to one half the length of anterior nostril tube; **teeth without serrations** on their anterior and posterior margins; upper jaw teeth in 2 to irregularly 3 rows; lower jaw teeth biserial anteriorly. **Dorsal-fin origin on head, before anteriormost branchial lateral-line pore**. Total number of vertebrae 117 to 126 (121 to 125 in specimens studied from the eastern Atlantic). **Colour:** highly variable. Common form illustrated above; **dark brown to purple ground colour, everywhere covered with small to minute light yellowish spots** that become larger at **tip of tail, which is always pale**. Other individuals have a pale background with brown spots, dashes, circles, or semicircles. Occasional specimens are uniformly pale with very few widely scattered dark markings.

Size: Maximum to 70 cm.

Habitat, biology, and fisheries: An insular species inhabiting coral reefs and rocky shorelines at depths to 60 m. Stomach contents include parts of crabs and small fish. Occasionally caught throughout its range. Separate statistics are not reported for this species. Taken with trawls, in traps, and on hook-and-line. Consumed occasionally, but not often seen in markets.

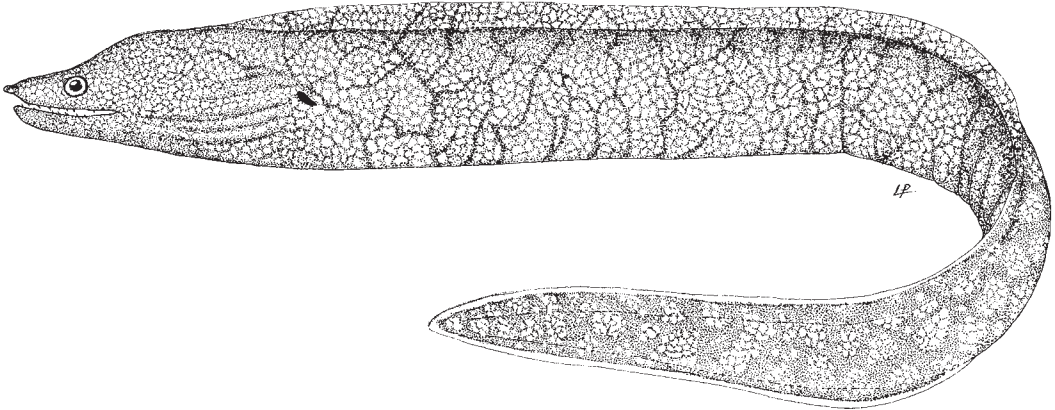
Distribution: In the area, only known from Canary, Cape Verde, St Helena, and Ascension Islands. Also western Atlantic from Bermuda, Bahamas, and Florida to Brazil.



***Gymnothorax polygonius* Poey, 1875**

Frequent synonyms / misidentifications: None / None.

FAO names: En – Polygon moray; Sp – Morena de polígona.

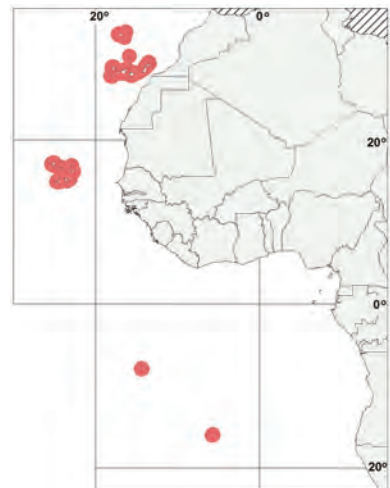


Diagnostic characters: Body strong, muscular, moderately compressed. Head with occipital region somewhat elevated: **posterior nostril a simple opening without tube; teeth without serrations** on their anterior and posterior margins; teeth uniserial (plus 2 inner teeth on upper jaw only). **Dorsal fin originating on head before anteriormost branchial lateral-line pore.** Total number of vertebrae 134 to 142. **Colour:** narrow dark brown lines delimiting pale areas of polygonal or indeterminate shapes; numerous small, pale spots within the polygons; on tail dark bars and pale interspaces continued onto fins; dorsal and anal fins with a pale margin, that of anal fin more conspicuous.

Size: Maximum size to 110 cm.

Habitat, biology, and fisheries: Lives in moderately deep waters, mainly 90 to 300 m, but rare records from 30 and 600 m. Locally common, taken by trawl and hook-and-line. Separate statistics are not reported for this species. Of local commercial importance at least in Canary and Cape Verde islands.

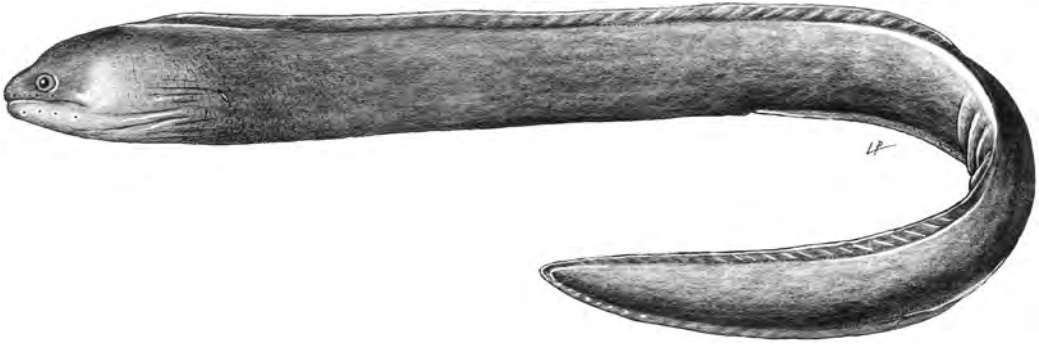
Distribution: In the area, at Madeira, Canary, Cape Verde and St Helena islands. Also western Atlantic from North Carolina to Brazil.



Gymnothorax unicolor (Delaroche, 1809)

Frequent synonyms / misidentifications: *Lycodontis unicolor* (Delaroche, 1809) / None.

FAO names: En – Brown moray; Fr – Murène brune; Sp – Morena negra.

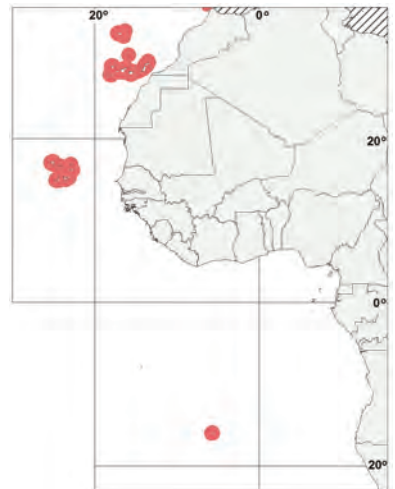


Diagnostic characters: Body strong, muscular, moderately compressed. Head and snout short, occipital region somewhat elevated; **posterior nostril a simple opening without tube; teeth without serrations** on their anterior and posterior margins; upper jaw teeth biserial, lower jaw teeth biserial anteriorly, uniserial far posteriorly. **Dorsal fin originating on head just before anteriormost branchial lateral-line pore.** Total number of vertebrae 136 to 146. **Colour:** **body and fins uniform medium to dark brown**, anterior part of **head (to mouth angle) darker, followed by lighter area**; mouth angle dark; fins with light yellowish margins.

Size: Maximum to 100 cm.

Habitat, biology, and fisheries: A relatively common species, found in shallow water on rocky bottoms, commonly to depths of 50 m but occasionally to 300 m. Stomach contents include small crabs and gastropods. Caught throughout its range with traps and hook-and-line. Separate statistics are not reported for this species. Consumed fresh locally in the area, relatively common in markets.

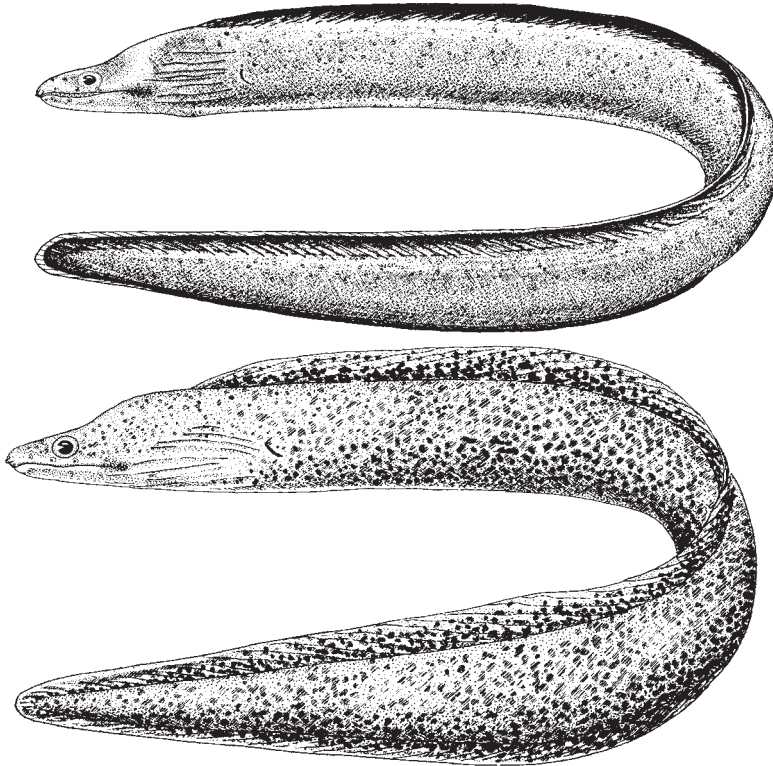
Distribution: Madeira, Canary, Cape Verde, and St Helena islands; also in the Azores.



***Gymnothorax vicinus* (Castelnaud, 1855)**

Frequent synonyms / misidentifications: *Lycodontis vicinus* (Castelnaud, 1855) / None.

FAO names: En – Purplemouth moray; Fr – Murène jaune; Sp – Morena de boca púrpura.



Diagnostic characters: Body strong, muscular, moderately compressed. Head with occipital region somewhat elevated; **posterior nostril a simple opening without tube; teeth without serrations** on their anterior and posterior margins; teeth uniserial (plus 2 inner teeth on upper jaw only). **Dorsal fin originating on head before anteriormost branchial lateral-line pore.** Total number of vertebrae 128 to 140 (133 to 136 in eastern Atlantic specimens studied). **Colour:** variable, often with rather distinct **greenish mottlings overall, sometimes nearly uniformly dark grey with small darker freckling.** Dorsal and anal fins with **narrow white edges, black submarginally;** corner of mouth with a characteristic small dark brown patch.

Size: Maximum to 122 cm.

Habitat, biology, and fisheries: Inhabits shallow rocky and coral reef areas, also seagrass beds at depths to 70 m; sometimes encountered in the open. Reported to be aggressive without provocation; may cause serious wounds. Occasionally caught throughout its range. Separate statistics are not reported for this species. Taken by hook-and-line, in fish traps, and speared. Locally consumed in the area, but not often seen in markets.

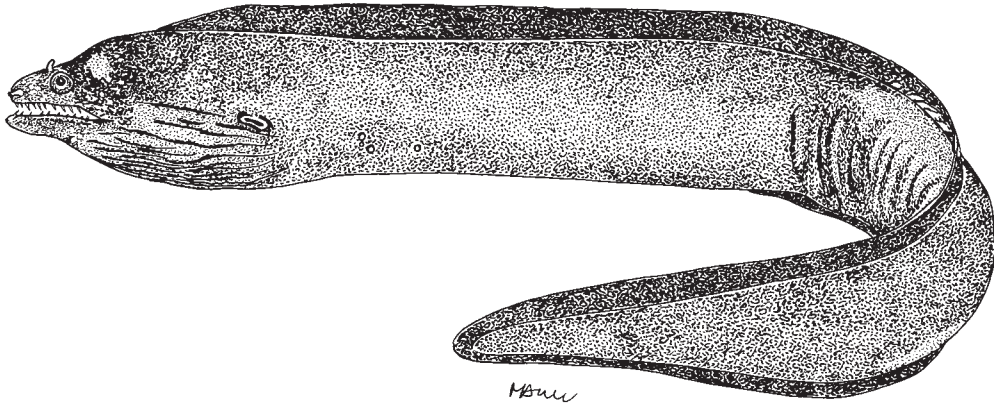
Distribution: Known from the Cape Verde, Canary, Bay of Biafra, and Ascension islands; records from the Azores, Madeira, and St Helena are erroneous. Also in the western Atlantic, from Bermuda, the Bahamas, and Florida south to Brazil.



***Muraena augusti* (Kaup, 1856)**

Frequent synonyms / misidentifications: *Muraena bettencourti* Osório, 1911 / *Muraena helena* Linnaeus, 1758.

FAO names: En – White-eyed moray; Fr – Murène aux yeux blancs; Sp – Morena negra.

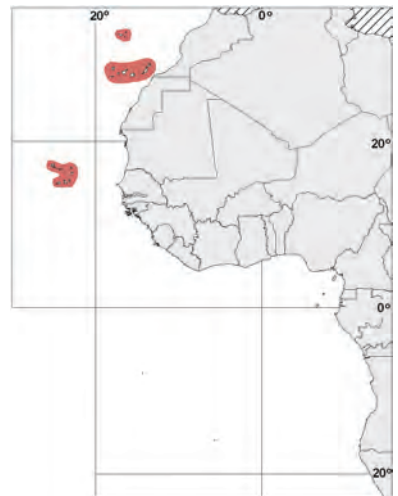


Diagnostic characters: Body strong, muscular, moderately compressed. Head with occipital region somewhat elevated; **posterior nostril tubular, about as long as anterior nostril**, above anterior margin of eye; **teeth without serrations** on their anterior and posterior margins; all jaw teeth uniserial. **Dorsal-fin origin on head, before anteriormost branchial lateral-line pore**. Total number of vertebrae: 137 to 143. **Colour:** body **dark purplish black**; **minute, widely separated, ocellated, light spots** present on body and fins, sometimes not visible anteriorly on head; larger, irregular, black spots also present; **no light edge on fins**; tip of tail dark; **eyes white in life**.

Size: Maximum size 100 cm.

Habitat, biology, and fisheries: A common species, living on rocky bottoms at depths of 0 to 250 m, most frequently to 50 m; occasionally encountered in the open in daytime. Feeds on fish, crustaceans, and cephalopods. Separate statistics not reported. Taken with hook-and-line and traps. Consumed fresh locally, commonly found in island fish markets.

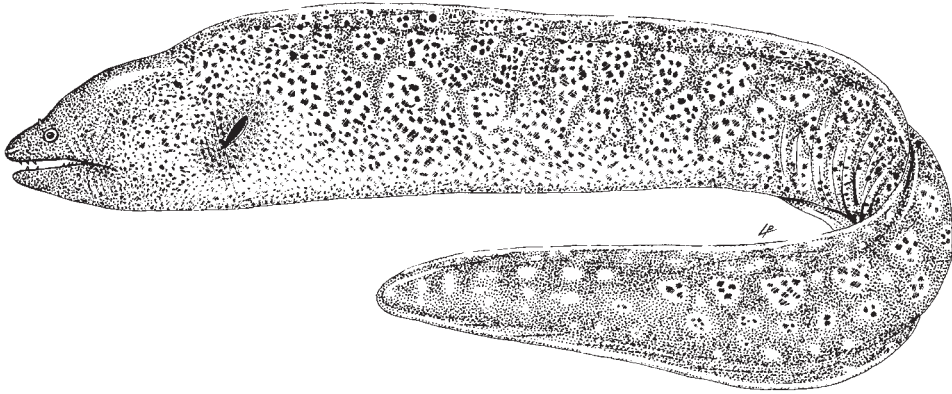
Distribution: In the area, Madeira, Canary, and Cape Verde islands; also Azores.



Muraena helena Linnaeus, 1758

Frequent synonyms / misidentifications: None / None.

FAO names: En – Mediterranean moray; Fr – Murène de Méditerranée; Sp – Morena mediterránea.



Diagnostic characters: Body strong, muscular, moderately compressed. Head with occipital region somewhat elevated; **posterior nostril tubular**, about as long as anterior nostril, above anterior margin of eye; **teeth without serrations** on their anterior and posterior margins; all jaw teeth uniserial. **Dorsal-fin origin on head, before anteriormost branchial lateral-line pore.** Total number of vertebrae 139 to 148. **Colour:** brown with large pale yellow spots, each of which contains smaller brown spots, forming a “rosette” pattern; pale areas becoming smaller posteriorly with fewer brown spots, sometimes white or yellow blotches only at end of tail; head lighter brown with various pale spots and reticulations; gill opening in a diffuse darker brown area.

Size: Maximum to 150 cm.

Habitat, biology, and fisheries: A common species, occurring from shallow-water rocky habitats to depths as great as 800 m, more commonly to 300 m. Occasionally encountered in the open. Feeds on fish, crustaceans, and cephalopods. Separate statistics are not reported for this species. Taken by trawl, hook-and-line, or in traps. Reported to be marketed dried-salted in some localities (Senegal, Mauritania), and also fresh; commonly found in island fish markets. The white flesh is said to be of excellent quality.

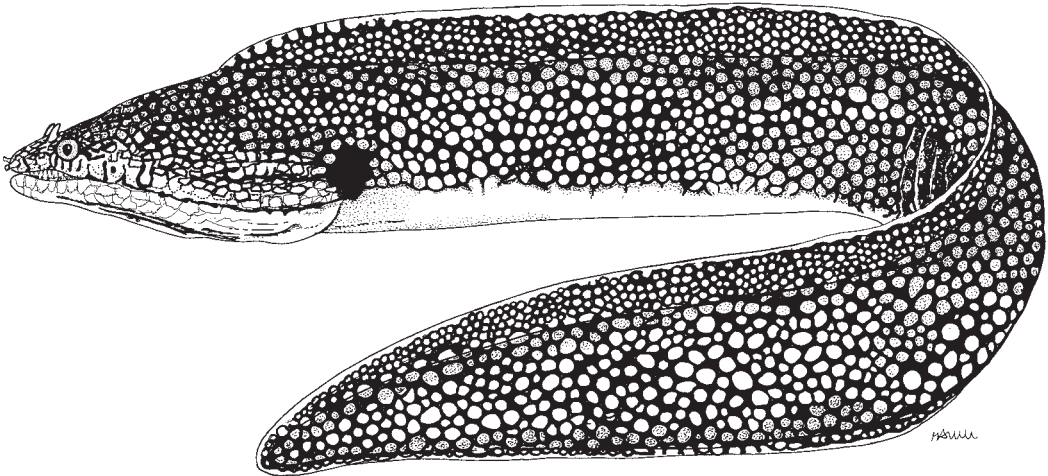
Distribution: In the area, known from Madeira, Canary, and Cape Verde islands, and the west coast of Africa from Morocco to Senegal; also the Azores, Mediterranean and the European coast as far as the British Isles.



***Muraena melanotis* (Kaup, 1859)**

Frequent synonyms / misidentifications: None / None.

FAO names: En – Honeycomb moray; Fr – Murène à pois; Sp – Morena de lunares.



Diagnostic characters: Body strong, muscular, moderately compressed. Head with occipital region somewhat elevated; **posterior nostril tubular, longer than anterior nostril**, above anterior margin of eye; **teeth without serrations** on their anterior and posterior margins; in specimens less than 50 cm, upper jaw teeth biserial, lower jaw teeth biserial anteriorly; in larger specimens all jaw teeth mostly uniserial. **Dorsal-fin origin on head before anteriormost branchial lateral-line pore**. Total number of vertebrae 121 to 127. **Colour:** dark brownish black with pale round spots as large as or larger than eye (sometimes smaller on head), spots usually very close together, giving a honeycomb appearance; belly pale with few or no spots or marks visible from gill opening to anus; posterior nostril tube white. **Gill opening in bold black blotch**.

Size: Maximum to 100 cm.

Habitat, biology, and fisheries: Inhabits shallow, rocky bottoms to depths of 45 m. *Muraena melanotis* and *M. robusta* are the most common species of *Muraena* in the tropical eastern Atlantic. Stomach contents mostly crustaceans, but also eats fishes. Occasionally caught throughout its range. Separate statistics are not reported for this species. Taken with hook-and-line, traps, and by trawls. Consumed locally, but not often seen in markets.

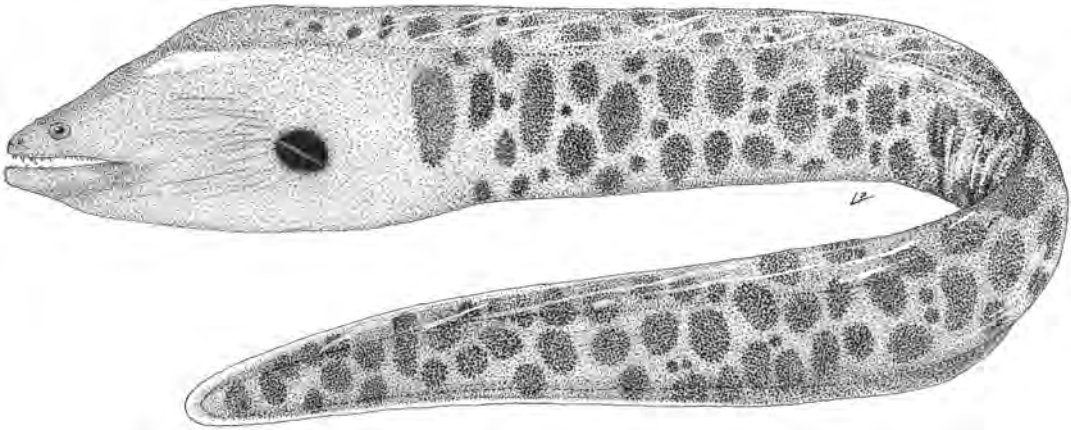
Distribution: West coast of Africa from Mauritania to Angola; also from the islands of Cape Verde and the Bay of Biafra; records from Canary and St Helena islands are erroneous.



***Muraena robusta* Osório, 1911**

Frequent synonyms / misidentifications: None / None.

FAO names: En – Stout moray; Fr – Murène robuste; Sp – Morena robusta.



Diagnostic characters: Body strong, muscular, moderately compressed. Head with occipital region somewhat elevated; **posterior nostril tubular, about as long as anterior nostril**, above anterior margin of eye; **teeth without serrations** on their anterior and posterior margins; jaw teeth uniserial. **Dorsal-fin origin on head before anteriormost branchial lateral-line pore**. Total number of vertebrae 151 to 158. **Colour:** medium to dark greyish to brownish body with brownish orange spots behind gill opening, irregular in size and placement, darker and more contrasting on tail. Head lighter grey or brown with darker reticulations visible; **gill opening in dark brown to black blotch**. Margins of fins light posteriorly on tail. In fresh specimens, inside of mouth and throat region bright to dirty gold colour. Young specimens are lighter overall with more contrasting pattern of spots; very large specimens are much darker overall, the spots visible only on posterior part of tail, dark around gill opening always noticeable.

Size: Maximum to 150 cm.

Habitat, biology, and fisheries: A common species found in rocky, shallow-water habitat to depths of 68 m. Stomach contents include crustaceans and fishes. Occasionally caught throughout its range. Separate statistics are not reported for this species. Taken by hook-and-line, traps, and trawls. Consumed locally, but not often seen in markets.

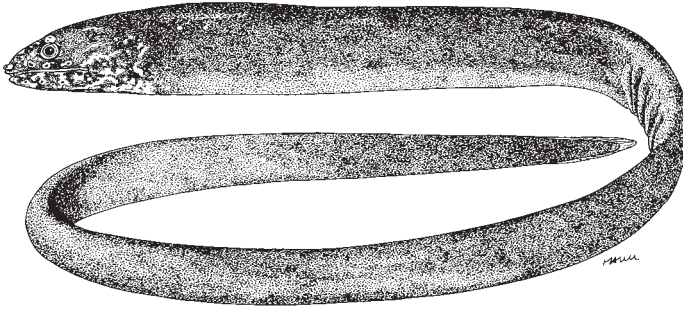
Distribution: West coast of Africa from Mauritania to Angola; also from the islands of Cape Verde and the Bay of Biafra; records from Canary Islands erroneous. Also western Atlantic from North Carolina to Colombia.



***Anarchias longicauda* (Peters, 1877)**

En – Pygmy moray; **Sp** – Morenita del confite.

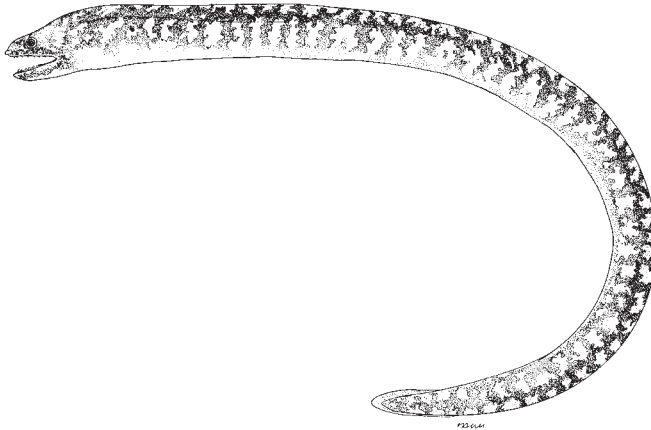
Maximum size to 25 cm. Benthic at depths of 10 to 100 m. Too small to be consumed or of commercial importance. West coast of Africa from Morocco to the Congo, Madeira, Cape Verde and Canary islands, and the islands of the Bay of Biafra; also Azores and western Mediterranean. *Anarchias grassi* (Roule, 1916) and *A. euryurus* (Lea, 1913) are synonyms.



***Anarchias similis* (Lea, 1913)**

En – Pygmy moray.

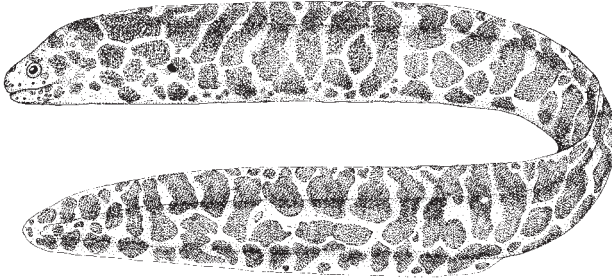
Maximum size to 20 cm. Benthic on rock and sand at depths from 5 to 100 m. Too small to be consumed or of commercial importance. In the area, known only from Annobon; elsewhere, western Atlantic from Bermuda and Florida to Brazil.



***Echidna catenata* (Bloch, 1795)**

En – Chain moray; **Sp** – Morena cadena.

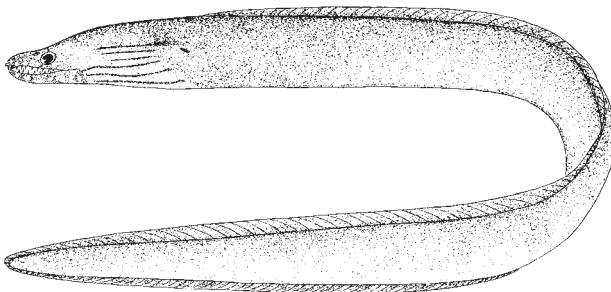
Maximum size to 70 cm. Benthic in areas of rock or rock and sand to depths of 20 m. Sometimes seen in very shallow water where it feeds on crabs; also feeds on small fishes. Of no commercial importance, although it has some value as an aquarium fish. In the area, known only from Ascension Island; records from west Africa (Angola and Cape Verde Islands) are apparently in error; elsewhere, tropical western Atlantic.



***Enchelycore carychroa* Böhlke and Böhlke, 1976**

En – Chestnut moray.

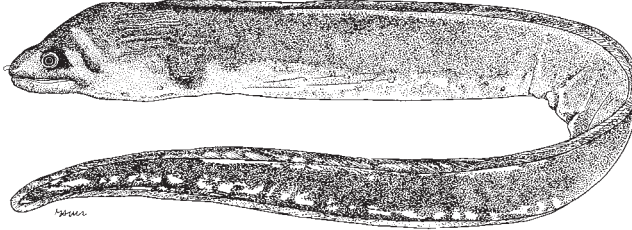
Maximum size 34 cm. Shallow coral reefs and rocks to depths of 20 m, occasional to 60 m. Too small to be consumed or of commercial importance. In the area, known only from Ascension and St Helena Islands, and a single uncertain record from Fernando Poo (Bay of Biafra); also widespread in the tropical western Atlantic.



***Gymnothorax bacalladoi* Böhlke and Brito, 1987**

En – Canary moray; **Fr** – Murène canarienne; **Sp** – Murión.

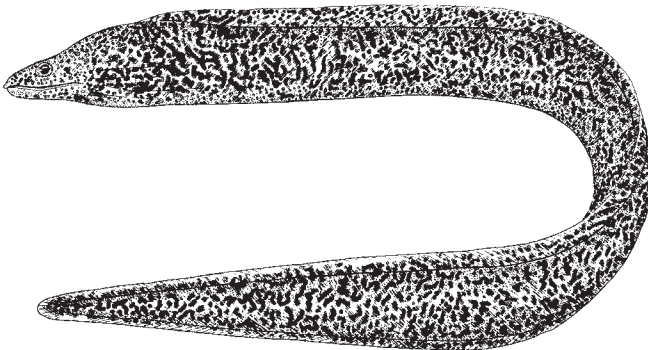
Maximum size to 44 cm. Benthic on rocky and rubble bottoms from 5 to 20 m. Feeds on crustaceans and small fishes. Madeira, Canary and Cape Verde islands. Caught incidentally in traps and hook-and-line; of no commercial importance.



***Gymnothorax moringa* (Cuvier, 1829)**

En – Spotted moray; **Fr** – Murène tachetée; **Sp** – Morena manchada.

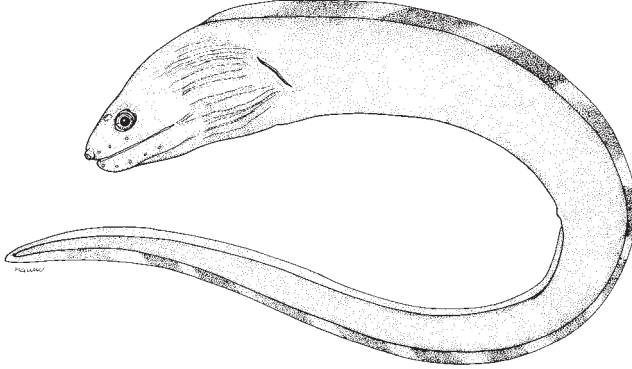
Maximum size to 100 cm (questionably reported from 200 to 300 cm at Ascension Island). Common on shallow coral reef, rock and seagrass habitats, found at depths from 0 to 50 m (1 record at 200 m). Occasionally encountered in the open; reported to be aggressive without provocation; dangerous when handled alive. Used as food in some areas, but large individuals reported to be ciguatoxic. Occasionally caught by trawl, seine, trap, and hook-and-line; of local commercial importance in St Helena. In the area only at St Helena and Ascension Islands. Also widespread in the western Atlantic.



***Gymnothorax walvisensis* Prokoviev and Kukuev, 2009**

En – Walvis moray.

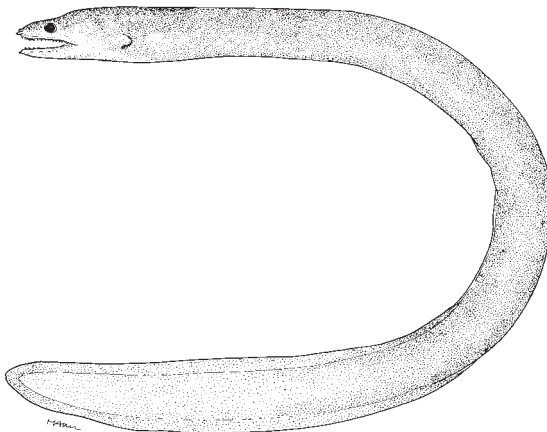
Maximum size at least 413 mm. Known only from the holotype, collected at Walvis Ridge, southeastern Atlantic (exact coordinates unknown).



***Monopenchelys acuta* (Parr, 1930)**

En – Redface eel.

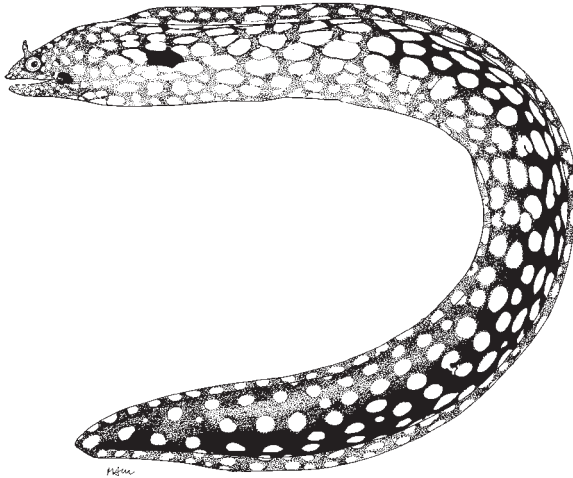
Maximum size to 21 cm. Lives on coral heads, rocky ledges and rubble bottoms at moderate depths from 13 to 45 m. Rare. Too small to be consumed; of no commercial importance. Circumtropical distribution; in the area, known from Ascension Island; also western Atlantic islands of the Bahamas and Caribbean; Indo-Pacific from Hawaii, Fiji, Seychelles, Comoros, and Agalega islands.



***Muraena pavonina* Richardson, 1845**

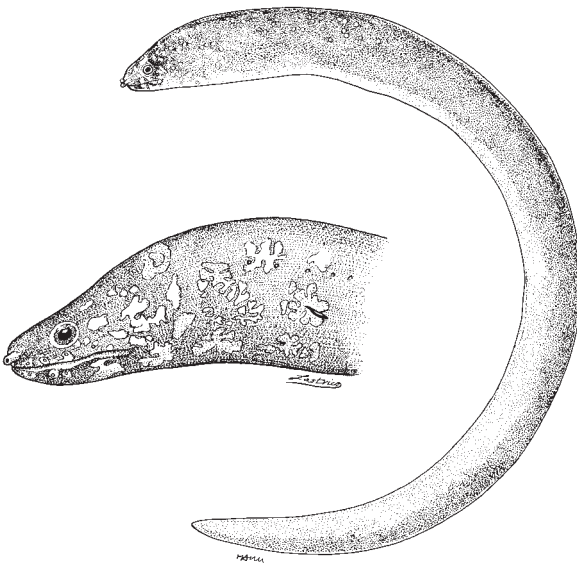
En – Flagged moray.

Maximum size at least 67 cm. In the area, from Ascension Island. Elsewhere, Brazil.

***Uropterygius macularius* (Lesueur, 1825)**

En – Marbled moray.

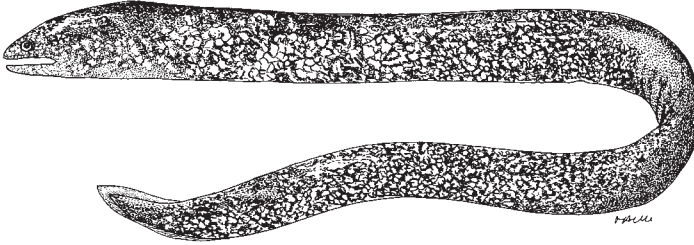
Maximum size 30 cm. Lives on coral or rocky bottoms from 0 to 137 m, most commonly at 15 to 30 m. Too small to be consumed, of no commercial importance. In the area, known only from Ascension Island; also widespread in the tropical western Atlantic.



***Uropterygius wheeleri* Blache, 1967**

En – Jigsaw moray.

Maximum size 55 cm. Lives in shallow waters. Known from the Cape Verde Islands, the coast of Senegal, and the islands of the Bay of Biafra.



MYROCONGRIDAE

Thin morays

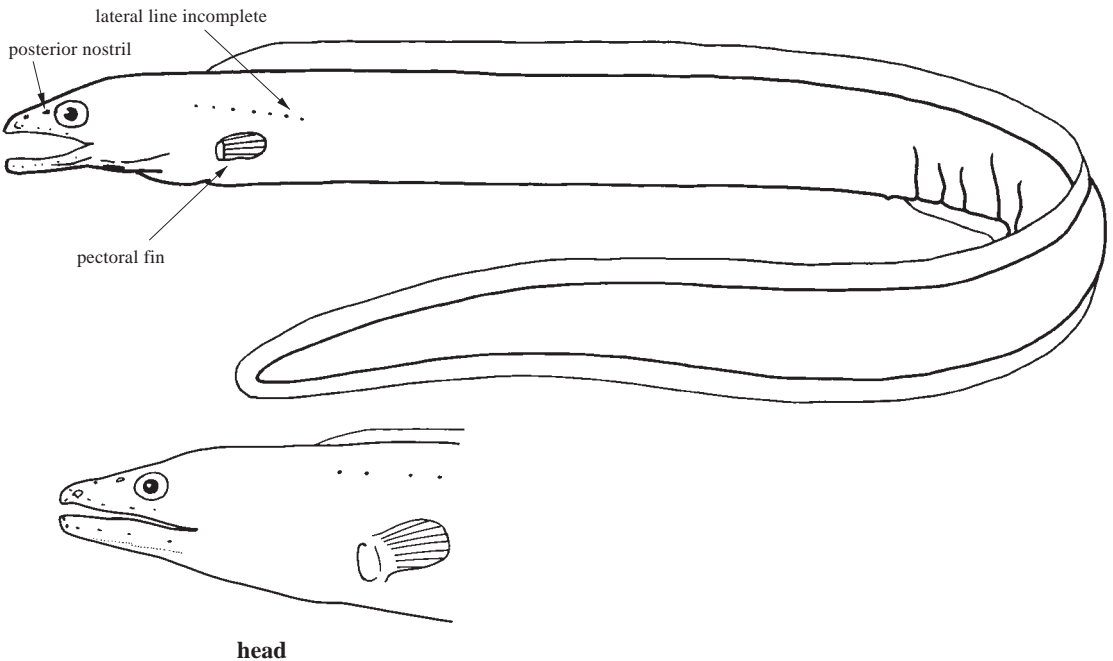
by D.G. Smith, National Museum of Natural History, Washington, DC, USA

A single species occurring in the area.

Myroconger compressus Günther, 1870

Frequent synonyms / misidentifications: None / None.

FAO names: En – Red eel.



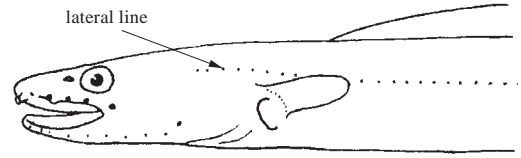
Diagnostic characters: Body moderately elongate, strongly compressed; anus slightly anterior to midbody; tip of tail blunt, soft. Head stout, well muscled. Eye well developed. Snout somewhat depressed. Mouth moderately large, gape ends behind rear margin of eye; jaws nearly equal; no fleshy flanges on lips. Teeth numerous, moderate in size, sharp, in several rows on jaws; teeth on vomer in a long band of 1 to 3 rows. Anterior nostril tubular, just behind tip of snout; **posterior nostril** oval, with a low raised rim, **located in front of upper part of eye**. Dorsal and anal fins well developed, confluent around tail; dorsal fin originates in front of pectoral-fin base. **Pectoral fins well developed**, broadly rounded, their base spanning entire gill opening. Gill opening oblique, small but not greatly restricted or pore-like. Scales absent. **Lateral line on body incomplete, approximately 5 to 7 pores at front of canal, from slightly before to slightly behind pectoral fins**; pores present on upper and lower jaws and front of snout. **Colour:** preserved specimens light brown, without markings; in life, possibly yellow or reddish.

Size: Maximum about 54 cm.

Similar families occurring in the area

Myroconger is most easily confused with the Congridae, Chlopsidae and Muraenidae.

Congridae: congrids have a complete lateral line, and the base of the pectoral fins does not span the entire gill opening. In most congrids, the posterior nostril is at the level of the middle rather than the top of the eye.

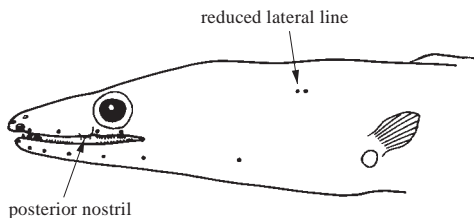


Congridae

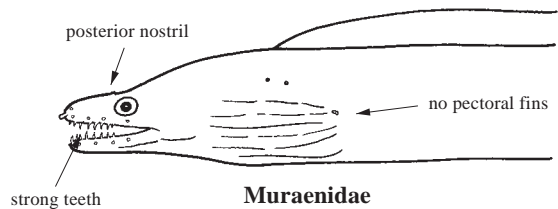
Chlopsidae: chlopsids have an incomplete lateral line, but they usually have only 1 or 2 pores instead of 5 to 7; in addition, their posterior nostril is opposite the lower part of the eye or even on the lip, and the gill opening is restricted and pore-like.

Muraenidae: muraenids have the posterior nostril high on the head, but they lack pectoral fins. Many have strong, fang-like teeth.

Other eel families all have specialized characters that easily separate them from *Myroconger*.



Chlopsidae



Muraenidae

Habitat, biology, and fisheries: Little is known about the biology of this eel. Specimens have been captured in trawls at moderate depths. It is common and of no importance to fisheries.

Distribution: Originally described from St Helena and for many years known only from the holotype. A second specimen was collected off Senegal, and several have since been collected from seamounts in the eastern tropical Atlantic.

Reference

Smith, D.G. 1984. A redescription of the rare eel *Myroconger compressus* (Pisces: Myrocongridae), with notes on its osteology, relationships and distribution. *Copeia*, 1984(3): 585–594.

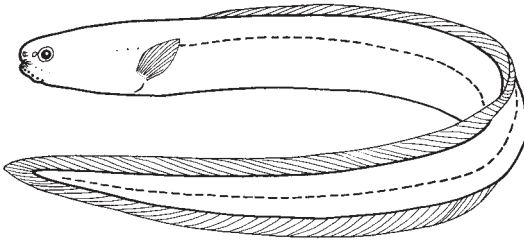


SYNAPHOBRANCHIDAE

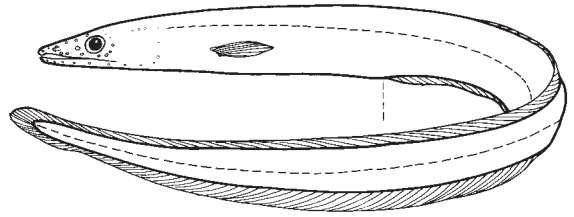
Cutthroat eels

by D.G. Smith, National Museum of Natural History, Washington, DC, USA

Diagnostic characters: Small to medium-sized eels, the largest species reaching 1.8 m, but most less than 1 m. Body stout to elongate, anus usually well in front of midbody. Head variable. Eye well developed to reduced. Snout may be short and blunt or moderately elongate. Mouth usually large, gape extending behind rear margin of eye; lips without a fleshy flange; jaws nearly equal, sometimes snout projects slightly beyond lower jaw and sometimes vice versa. Anterior nostril tubular, near tip of snout; **posterior nostril on side of snout**, at or below mideye level. **Teeth usually small and conical, in 1 to several rows on jaws and vomer; some species have enlarged, compound teeth on vomer, but large fangs never present.** **Gill openings low on body, below pectoral fins (when present); sometimes the gill openings of the 2 sides united in a ventral slit.** Dorsal and anal fins well developed, confluent with caudal fin. Pectoral fins present or absent. **Scales present or absent.** Lateral line variable, often complete, sometimes reduced to a few pores at anterior end and sometimes no pores at all. **Colour:** plain brown or grey, sometimes countershaded. No distinctive markings.



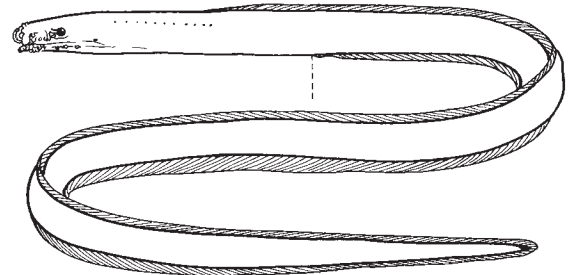
Simenchelys parasitica



Synphobranchus kaupii

Habitat, biology, and fisheries:

Synphobranchids are benthic eels, some living in very deep water. *Simenchelys* is a scavenger, feeding on dead fish and sometimes burrowing into the carcass; this habit led to the mistaken idea that it is a parasite. Synphobranchines are more generalized predators, living on small fishes and invertebrates. Most synphobranchines live in fairly deep water, and some species are quite common in their depth range. Ilyophines, with a few exceptions, are rare and seldom seen. Many of them seem to live in specialized habitats that are difficult to sample. The Ilyophinae is the most speciose subfamily, judging from the great variety of leptocephali that have been collected; most of these larvae cannot be identified with a known adult, indicating that many species still await discovery. Synphobranchids are of little or no importance to fisheries, although they are sometimes taken in deep trawls.



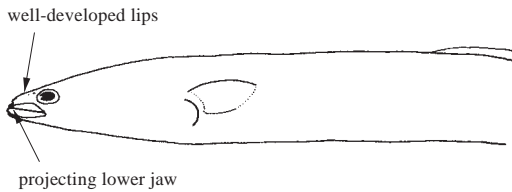
Dysomma brevirostre

Remarks: The Synphobranchidae is divided into 3 subfamilies. The Simenchelyinae contains a single genus and species, *Simenchelys parasitica*. It is distinguished by its peculiar snub-nosed appearance, caused by the extreme shortening of the jaws. Aside from this feature, it is relatively generalized, with a moderately elongate body, well-developed fins, and the anus slightly ahead of midbody. It is covered with small, embedded scales. The Synphobranchinae contains those species most typical of the family. They are relatively generalized eels, except for the tendency of the gill openings on each side to converge toward the ventral midline. Most species have embedded scales, the eye and fins are well developed, and the jaws are moderately elongate. The Ilyophinae is the most speciose and morphologically diverse of the synphobranchid subfamilies. Ilyophines show great variety in body shape, dentition, presence or absence of pectoral fins, eye size, and ornamentation of the snout. Most lack scales. In some species, the anus is located far forward, nearly under the pectoral fins.

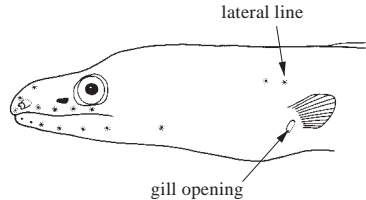
Similar families occurring in the area

Anguillidae: the only other eels that have scales. Anguillids have prominent fleshy flanges on the lips, and the lower jaw projects beyond the upper.

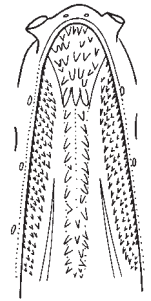
Chlopsidae: chlopsids have the posterior nostril low on the side of the snout and bear a superficial resemblance to some synphobranchids, especially the scaleless ilyophines, but they have a lateral gill opening, only 2 pores in the lateral line (just above and anterior to the gill opening), and usually two rows of simple (not compound) vomerine teeth.



Anguillidae



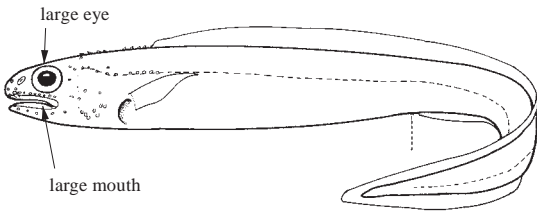
Chlopsidae



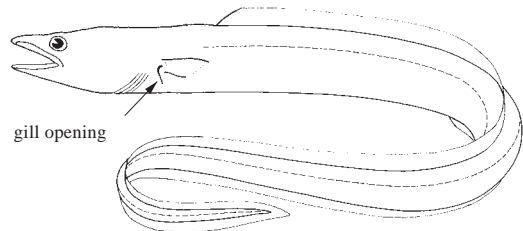
roof of mouth

Colocongridae: have a short, blunt snout somewhat like *Simenchelys*, but they have a larger eye and mouth, lack scales, and the anus is far behind midlength.

Congridae: some of the more generalized synphobranchids may be mistaken for congrid. Congrids lack scales and have the gill opening more lateral in position and closer to the pectoral fins. Many, though not all, congrid have fleshy flanges on the lips. Most have the posterior nostril at or above mideye, and the gill openings are lateral rather than ventral.



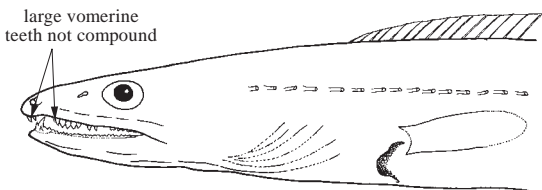
Colocongridae



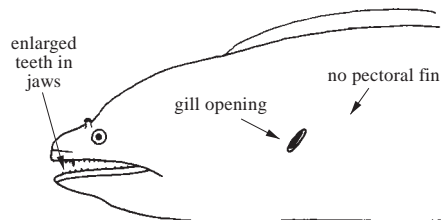
Congridae

Muraenesocidae: have a large mouth and enlarged teeth on the vomer, as do some ilyophines. In muraenesocids, however, the enlarged teeth are single and not compound as in ilyophines.

Muraenidae: lack pectoral fins, as do some ilyophines, but the gill opening is very small and pore-like. Muraenids usually have enlarged teeth, but these are on the jaws and intermaxillary plate; the vomerine teeth are small. Muraenids have 1 or 2 pores in the lateral line, at the anterior end of the canal.

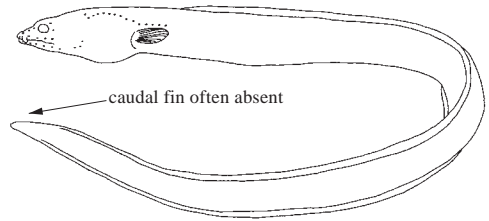


Muraenesocidae



Muraenidae

Ophichthidae: in many ophichthids the caudal fin is absent, and the tip of the tail is hard and pointed. Ophichthids have the posterior nostril low on the snout, but in most species it is actually on the lip or within the mouth; in synphobranchids, the nostril is always above the lip. Those ophichthids with the nostril above the lip have a swollen throat with many overlapping branchiostegal rays, detached from the hyal bones and forming a basket-like structure. In synphobranchids, the throat is not swollen; the branchiostegals are less numerous and are attached to the hyal bones. Ophichthids usually have a median supraorbital pore, which synphobranchids lack.



Ophichthidae

Key to the species of Synphobranchidae occurring in the area

Note: The species of *Synphobranchus* can be difficult to identify. The distinguishing characters are not always clear. The scale shape can be ambiguous, and the dorsal origin is variable because some of the anterior pterygiophores do not bear rays. Sometimes the vertebral count is the only way to identify a specimen with certainty.

- 1a. Head anterior to eyes extremely short, mouth a sphincter-like slit with gape not extending posterior to anterior nostril (Fig. 1). *Simenchelys parasitica*
- 1b. Head more elongate, mouth extends to level of posterior edge of eye or beyond → 2
- 2a. Gill openings on the 2 sides united as a longitudinal slit on ventral midline (Fig. 2); scales present → 3
- 2b. Gill openings separate, although they may be closely approximated (Fig. 3); scales present or absent → 6



Fig. 1

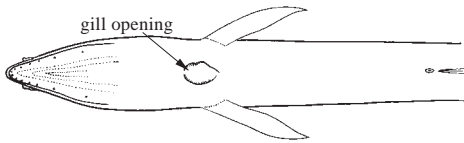


Fig. 2

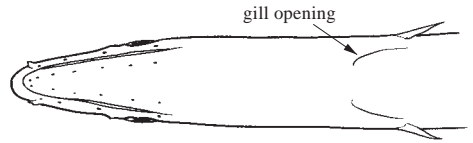
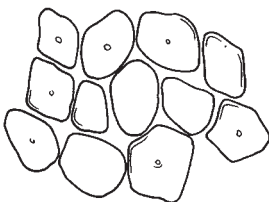
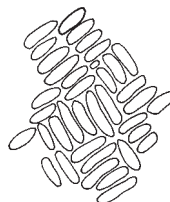


Fig. 3

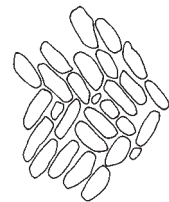
- 3a. Dorsal-fin origin above pectoral fin *Histiobranchus bathybius*
- 3b. Dorsal-fin origin above or behind anus. → 4
- 4a. Scales rounded (Fig. 4a) *Synphobranchus oregoni*
- 4b. Scales elongate to oval (Figs 4b, c) → 5



a) *Synphobranchus oregoni*



b) *Synphobranchus kaupii*



c) *Synphobranchus affinis*

Fig. 4

- 5a. Scales very elongate (3 to 4 times as long as wide), small, regularly arranged in aligned clusters of 4 or 5 set at right angles to other such groups (Fig. 4b); vertebrae 143 to 153; dorsal-fin origin well behind level of anus (Fig. 5a); vomerine teeth uniserial but zig-zag anteriorly ***Synaphobranchus kaupii***
- 5b. Scales oval, not so regularly arranged (Fig. 4c); vertebrae 128 to 140; dorsal-fin origin at or just posterior to level of anus (Fig. 5b); vomerine teeth uniserial ***Synaphobranchus affinis***

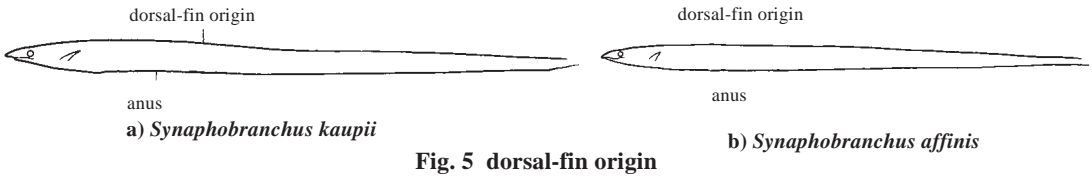


Fig. 5 dorsal-fin origin

- 6a. Pectoral fins absent; scales absent; snout and tip of lower jaw bulbous, heavily ornamented with papillae and ridges (Fig. 6) ***Dysomma brevirostre***
- 6b. Pectoral fins present; scales present or absent; snout and tip of lower jaw without ornamentation → 7
- 7a. Scales absent ***Haptenchelys texis***
- 7b. Scales present → 8

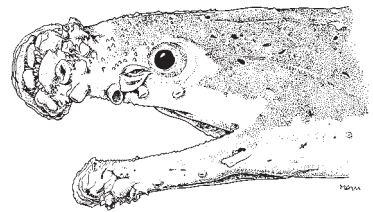


Fig. 6 *Dysomma brevirostre*

- 8a. Distance from tip of snout to base of pectoral fin equal to or greater than distance from pectoral fin to anus; dorsal-fin origin behind anus ***Diastobranchus capensis***
- 8b. Distance from tip of snout to base of pectoral fin less than distance from pectoral fin to anus; dorsal-fin origin above or slightly behind pectoral fin → 9
- 9a. Supraorbital canal with 6 pores, including 2 above eye; infraorbital canal with 8 pores, including 3 behind eye (Fig. 7a) ***Ilyophis blachei***
- 9b. Supraorbital canal with 3 pores, near tip of snout; infraorbital canal with 5 pores, none behind eye (Fig. 7b) ***Ilyophis brunneus***

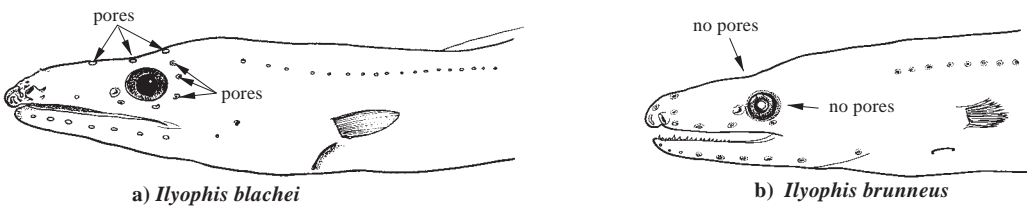













Fig. 7

List of species occurring in the area

The symbol  is given when species accounts are included.

-  *Diastobranchus capensis* Barnard, 1923.
-  *Dysomma brevirostre* (Facciola, 1887).
-  *Haptenchelys texis* Robins and Martin, 1976.
-  *Histiobranchus bathybius* Günther, 1877.
-  *Ilyophis blachei* Saldanha and Merrett, 1982.
-  *Ilyophis brunneus* Gilbert, 1891.
-  *Simenchelys parasitica* Gill, 1879.
-  *Synphobranchus affinis* Günther, 1877.
-  *Synphobranchus kaupii* Johnson, 1862.
-  *Synphobranchus oregoni* Castle, 1960.

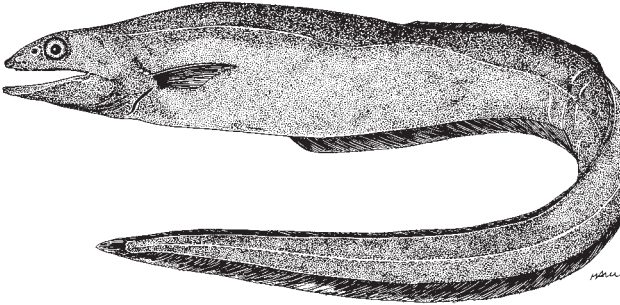
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***Diastobranthus capensis* Barnard, 1923**

En – Basketwork eel.

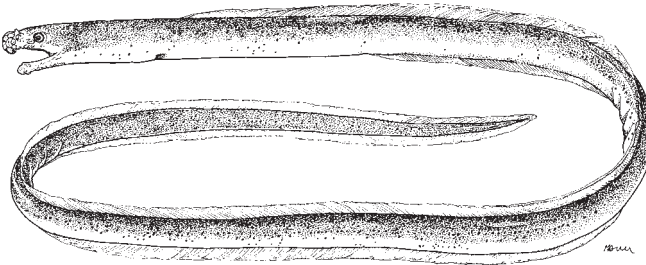
Maximum size 180 cm. Occurs in depths of 183 to 1 750 m; in the area, known only from the southernmost part, off Namibia. Elsewhere, known from scattered localities in temperate latitudes of both northern and southern hemispheres.



***Dysomma brevirostre* (Facciola, 1887)**

En – Batnose eel.

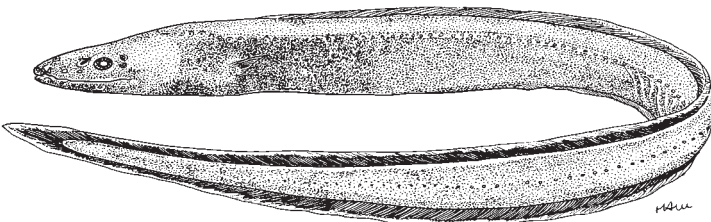
Maximum size 25 cm. In the area, known from Madeira and from larvae in the Gulf of Guinea. Elsewhere, the Mediterranean, western Atlantic, and Hawaii.



***Haptenchelys texis* Robins and Martin, 1976**

En – Naked cut throat eel.

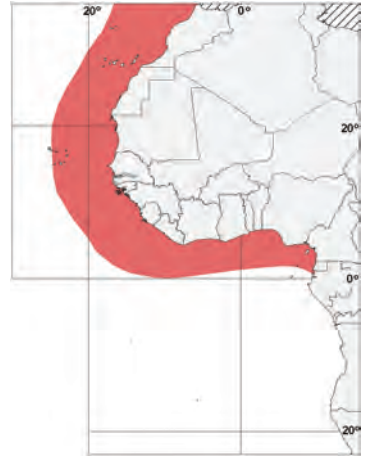
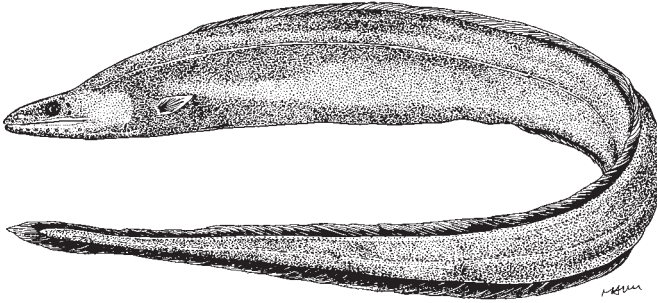
Maximum size 52 cm. Occurs in depths of 2 161 to 4 086 m. In the area, known from Morocco to Mauritania. Elsewhere in the Gulf of Mexico and Caribbean, and the northeastern Atlantic.



***Histiobranchus bathybius* Günther, 1877**

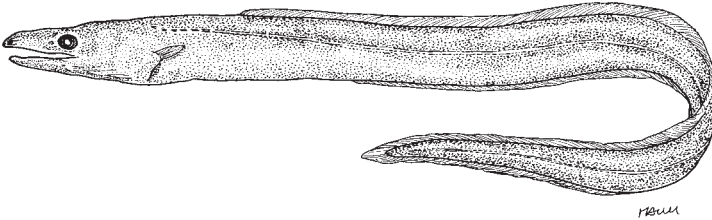
En – Deep-water arrowtooth eel.

Maximum size 75 cm. Occurs in depths of 731 to 4 700 m. Widely distributed in all oceans; in the area known from Morocco to Gabon.

***Ilyophis blachei* Saldanha and Merrett, 1982**

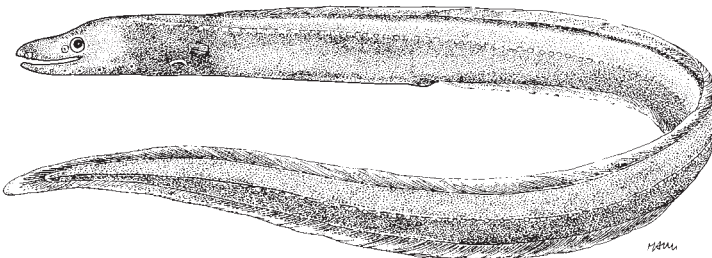
En – Blache's ooze eel.

Maximum size 80 cm. Occurs in depths of 580 to 2 023 m. In the area only from the southernmost extremity off Namibia; elsewhere in the northeastern Atlantic and the southern Indian and Pacific ocean.

***Ilyophis brunneus* Gilbert, 1891**

En – Muddy arrowtooth eel.

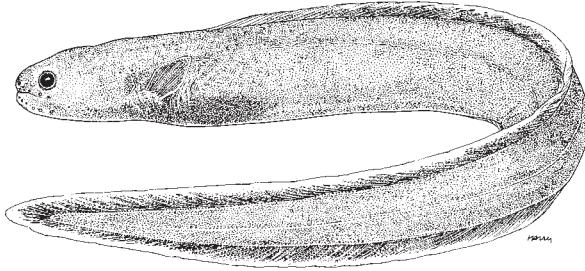
Maximum size 60 cm. Occurs on soft bottoms in depths of 650 to 3 120 m. In the area known from Morocco to Senegal and Angola and Namibia; elsewhere, nearly worldwide.



***Simenchelys parasitica* Gill, 1879**

En – Snubnosed eel.

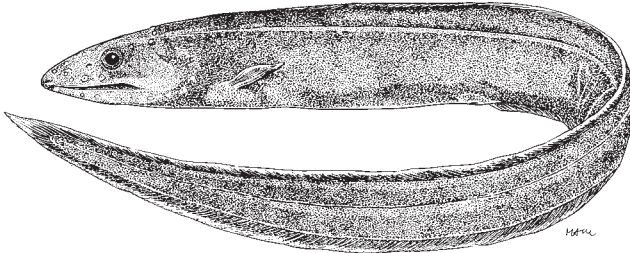
Maximum size to 61 cm. Benthic in depths of 100 to 3 000 m. Feeds largely on dead or dying fishes; despite the name, there is no evidence that it is parasitic on living fishes. Worldwide distribution; in the area known from Senegal to Gibraltar, Canary and Madeira islands.



***Synphobranchus affinis* Günther, 1877**

En – Grey cutthroat eel.

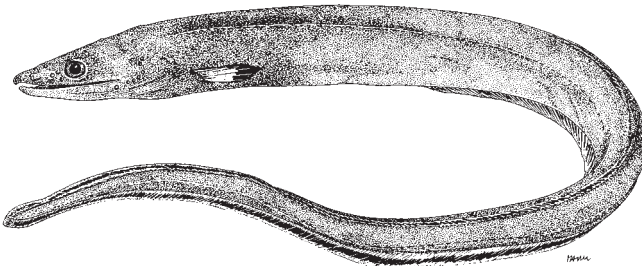
Maximum size 46 cm. Occurs over rocky or rubble bottoms, in depths of 290 to 2 334 m. Feeds on crustaceans and fishes. Worldwide; in the area known from Liberia to Angola.



***Synphobranchus kaupii* Johnson, 1862**

En – Kaup's arrowtooth eel (AFS: Northern cutthroat eel).

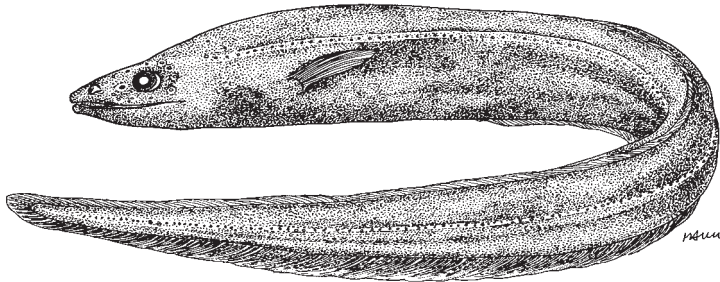
Maximum size 85 cm. Lives on continental slope at depths of 274 to 2 689 m. Feeds on a variety of fishes and invertebrates. In the area, known from Morocco to Angola; has also been recorded off southern Namibia and may occur throughout the area; elsewhere, eastern and western North Atlantic, western South Atlantic, Indian Ocean western Pacific.



***Synphobranchus oregoni* Castle, 1960**

En – Roundscale cutthroat eel.

Maximum size 70 cm. Occurs on soft bottoms at depths of 512 to 1 900 m. In the area known only from the southernmost extremity off Namibia. Elsewhere tropical western Atlantic, Indian Ocean and western Pacific.

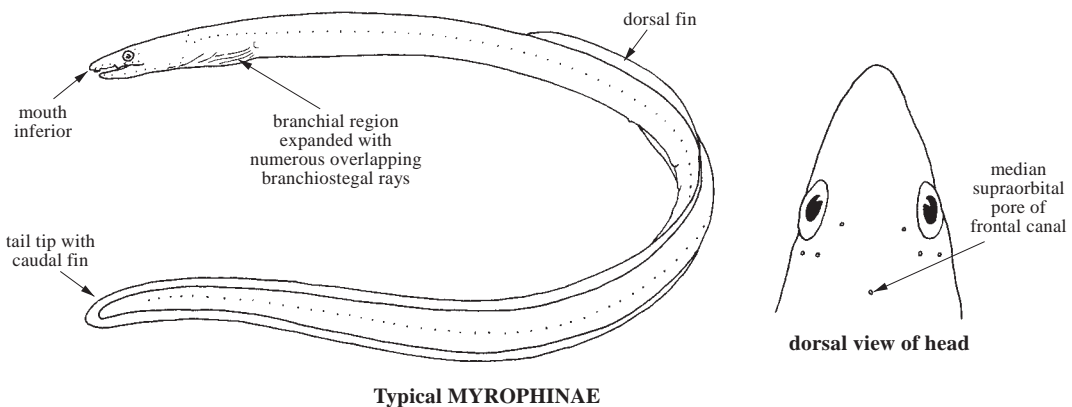
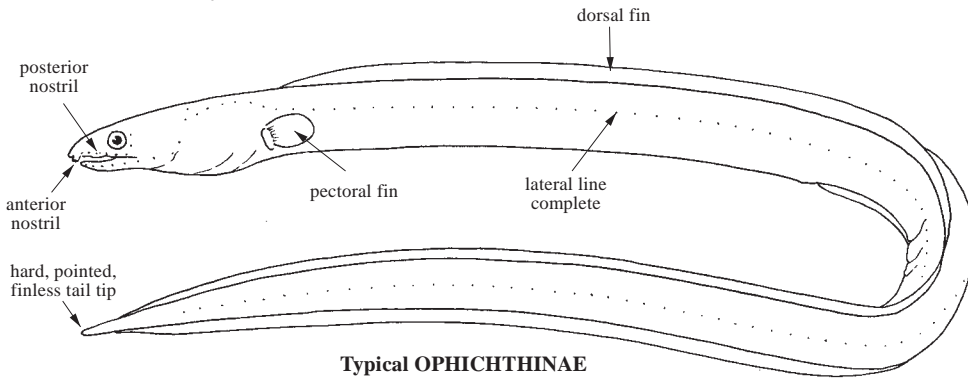


OPHICHTHIDAE

Snake eels (shrimp eels, worm eels and sand eels)

by J.E. McCosker, California Academy of Sciences, California, USA

Diagnostic characters: Elongate eels, snake-like or worm-like, cylindrical anteriorly, cylindrical or compressed posteriorly, most about 50 cm or less, some reaching 250 cm. **Tip of tail hard and pointed in one subfamily.** Snout pointed or rounded, mouth moderate to large, terminal, or inferior. Nostrils widely separated; the anterior nostril usually in a short tube, the **posterior nostril of most species along edge of upper lip or opening within mouth.** Eye size variable, from well developed to rudimentary. Gill openings midlateral to entirely ventral, ranging from constricted (subfamily Myrophinae) to an elongate slit (subfamily Ophichthinae). **Branchial region expanded and reinforced by numerous overlapping branchiostegal rays.** Dorsal and anal fins present or absent, rarely elevated; pectoral fins present or absent; pelvic fins absent; caudal fin present or absent, **when absent tip of tail is often hard and pointed.** Scales absent. Lateral line complete, often with well-developed pores on head and body; **right and left sides connected by a frontal and a temporal canal on head; median pore usually present in frontal canal.** Gas bladder present, often reduced. **Colour:** highly variable, from uniform light or dark to patterns of spots, stripes, bands, bars, or saddles; usually darker on dorsal surface.



Habitat, biology, and fisheries: The Ophichthidae is the most diverse and speciose family of true eels, occupying tropical and subtropical habitats including nearshore sand and mud bottoms, rivers and streams, estuaries and coral reefs, ranging from the sandy intertidal to midwater depths of 800 m and to more than 1 000 m in the benthos. However, most live shallower than 200 m. They are often extremely abundant and probably are important forage items for many species. Ophichthids are more characteristic of continental waters than of islands. Their sharp snouts and tails and their often muscular and cylindrical bodies are well

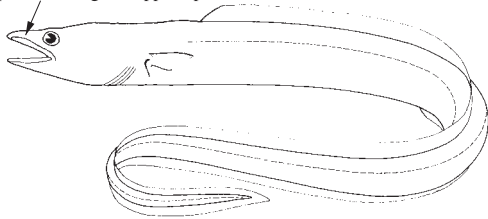
adapted for burrowing, and many species spend most of their adult lives buried in the shallow sediment. Some come out at night to forage over the bottom and juveniles and adults are sometimes collected at the surface around a light. Like all eels, ophichthids have a pelagic leptocephalus larva. Various species of larger ophichthids, subfamily Ophichthinae, are caught throughout the area, however, no directed fishery exists for them. They are taken by trawl or by hook-and-line but are undesirable for consumption due to the numerous intramuscular bones. Although not particularly aggressive, some of the larger snake eels will bite if handled carelessly. The biodiversity and taxonomy of ophichthid eels, particularly in the western Atlantic, is not well known, and several species are known from but a single individual. It is important that specimens that are not readily identifiable using this treatment, particularly from deep water, be deposited in museums for further study.

Similar families occurring in the area

All ophichthids differ from other eels in having numerous overlapping branchiostegal rays. Most ophichthids differ from most other eels in having the posterior nostril within the lip or opening inside the mouth. Most members of the subfamily Ophichthinae are further distinguished from all other eels by their hard, pointed, finless tail tip. Members of the subfamily Myrophinae have a caudal fin, however they are distinguished from other eels by their posterior nostril condition and the presence of a median pore in the transverse frontal canal on the head.

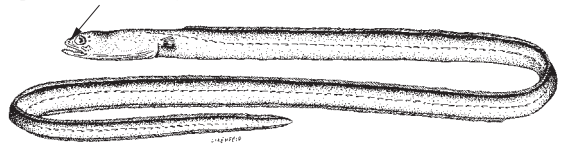
Congridae: some congrids, particularly the garden eels (subfamily Heterocongrinae), have a reduced caudal fin, but some caudal-fin rays are nearly always present and the tail tip is not hard and pointed. The heterocongrines are further distinguished by their short snout and the prominent upturned flange on the upper lip.

upturned flange of upper lip



Congridae

posterior nostril at eye level

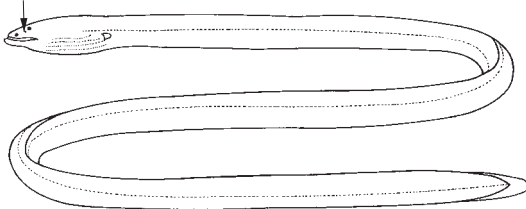


Heterocongrinae

Moringuidae: moringuids are also burrowing eels and may superficially resemble some of the small-eyed ophichthids. Moringuids have a caudal fin, the posterior nostril is at the level of the eye, and they lack the numerous and overlapping branchiostegal rays.

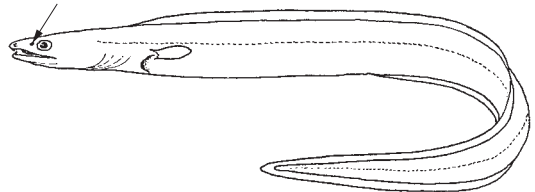
Muraenesocidae: they differ in having the posterior nostrils at the level of the eye and a median series of very large teeth, flanked by a row of small teeth, along the vomer.

posterior nostril at eye level



Moringuidae

posterior nostril at eye level



Muraenesocidae

Key to the species of Ophichthidae occurring in the area

Note: vertebral counts, while not useful for field identification, are important characters for defining species; vertebrae listed in the key represent total vertebrae.

- 1a. Tail tip flexible, caudal-fin rays not buried, confluent with dorsal and anal fins (Fig. 1a) → 2
- 1b. Tail tip a hard or fleshy finless point (Fig. 1b) → 6



Fig. 1 tail tip

- 2a. Gill opening midlateral, a constricted opening (Fig. 2); frontal, postorbital, and supratemporal pores present → 3
- 2b. Gill opening midlateral to entirely ventral, unconstricted (Fig. 3); frontal, postorbital, and supratemporal pores absent → 5

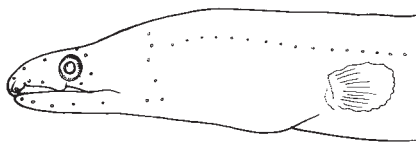


Fig. 2 lateral view of head

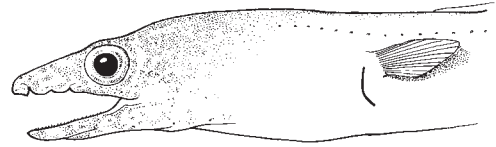


Fig. 3 lateral view of head

- 3a. Posterior nostril before eye, above upper lip and not covered by a flap (Fig. 4a); pectoral fin absent; body elongate, its depth 36 to 100 times in total length; coloration beige to grey overall, fins colourless; vertebrae 170 to 217 → 4
- 3b. Posterior nostril along lip, covered by a flap and opening into mouth (Fig. 4b); pectoral fin well developed; body moderately elongate, its depth 22 to 36 times in total length; coloration uniform tan to grey, overlain dorsally with fine dark punctations, fins colourless; vertebrae 146 to 154. ***Myrophis plumbeus***

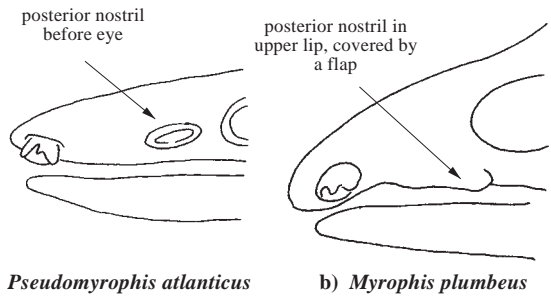


Fig. 4 posterior nostril

- 4a. Body elongate, its depth 36 to 62 times in total length; dorsal-fin origin before midtrunk; vertebrae 170 to 174 ***Pseudomyrophis atlanticus***
- 4b. Body extremely elongate, its depth 66 to 100 times in total length; dorsal-fin origin behind midtrunk; vertebrae 206 to 217 ***Pseudomyrophis nimius***
- 5a. Body elongate, its height behind gill openings 24 to 35 times in total length; coloration grey dorsally, pale ventrally, median fins basally pale with black margin; pores before and behind eye within white spots; vertebrae 149 to 152. ***Echelus myrus***
- 5b. Body moderately elongate, its height behind gill openings 17 to 24 times in total length; overall coloration brown to brownish black, slightly darker dorsally, median fin margins clear, except near caudal where black; no cephalic pores within white spots; vertebrae 149 to 157 ***Echelus pachyrhynchus***

- 6a. Dorsal fin generally elevated, its origin on nape above supraoccipital (Fig. 5); pectoral fin absent; gill openings inferior, parallel or converging forward, isthmus narrower than gill opening length → 7
- 6b. If present, dorsal fin arises behind nape; pectoral fin present or absent; gill openings inferior or lateral → 9

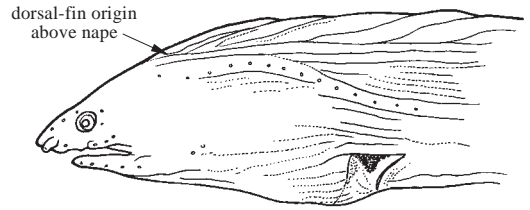


Fig. 5 lateral view of head (*Callechelys*)

- 7a. Body uniform brown to black, not striped or marbled; fins colourless; vertebrae 162 to 165 *Callechelys leucoptera*
- 7b. Body not uniformly coloured, but with longitudinal stripes, marbling, or a combination of both; fins either striped or spotted like body → 8
- 8a. Body coloration strongly delineated with alternating black and white stripes running the length of the body; vertebrae 155 to 165 *Callechelys bilinearis*
- 8b. Body covered with numerous brown to black spots; vertebrae 179 to 186 . . *Callechelys guineensis*
- 9a. Pectoral fins absent or vestigial; median fins reduced or absent; coloration without large spots → 10
- 9b. Pectoral fins present, generally as large as or larger than eye (a small flap in 2 genera); median fins generally elevated; coloration variable, may be spotted or striped → 25
- 10a. All fins absent; snout sharply pointed; coloration tan in preservative, pale green to pallid in life, not significantly darker dorsally → 11
- 10b. Median fins present, although sometimes very low and difficult to observe; snout shape variable, ranging from pointed and elongate to short and blunt; coloration either uniform tan or distinctly darker dorsally → 17

- 11a. Posterior nostril opening inside mouth, with or without a flap (Fig. 6a); anterior nostril not tubular; eye small to minute. → 16
- 11b. Posterior nostril opening outside mouth, with a flap (Fig. 6b); anterior nostril tubular; eye moderately developed → 12
- 12a. Supratemporal pores 3; preopercular pores 3 (Fig. 7a) → 13
- 12b. Supratemporal pores 5 (sometimes 6); preopercular pores 3 or 4 (Fig. 7b) → 14

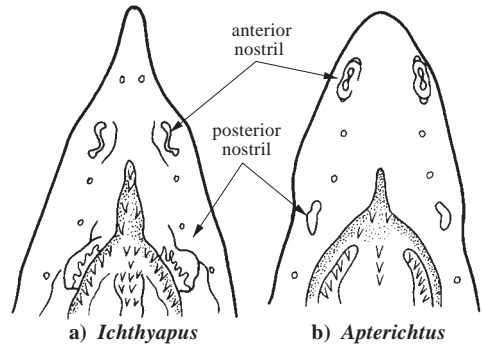


Fig. 6 ventral view

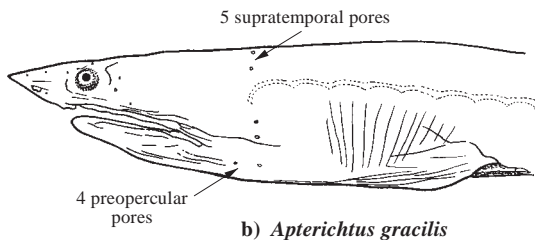
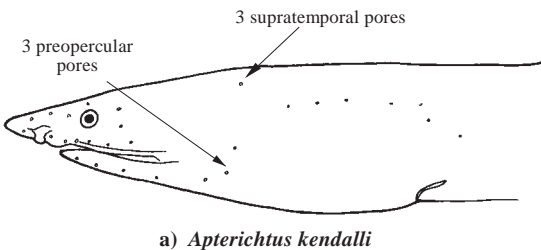


Fig. 7 lateral view of head

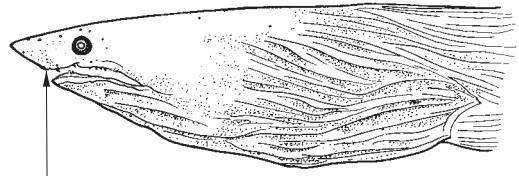
- 13a. Preanal length 44 to 48% of total length; 5 to 7 vomerine teeth; vertebrae 137 to 144
 *Apterichtus kendalli*
- 13b. Preanal length 49 to 51% of total length; 3 or 4 vomerine teeth; vertebrae 150 to 157
 *Apterichtus anguiformis*

- 14a. Vomerine teeth numerous, 10 to 15 in a single or irregularly biserial row; vertebrae 132 to 139
 *Apterichtus caecus*
- 14b. Vomerine teeth absent or 1 to 3 at most → 15

- 15a. Posterior nostril within upper lip, not notably visible as an external opening; anterior nostril in a pronounced tube; vertebrae 129 to 132 *Apterichtus gracilis*
- 15b. Posterior nostril above margin of upper lip, visible externally; anterior nostril within a short tube; vertebrae 147 to 151 *Apterichtus monodi*

- 16a. Head and trunk 35 to 40% of total length; vertebrae 125 to 129 *Ichthyapus ophioneus*
- 16b. Head and trunk 41 to 43% of total length; vertebrae 121 to 126 *Ichthyapus insularis*

- 17a. Anterior nostril not tubular, but with a groove surrounding it (Fig. 8); pectoral fin absent; tail 37 to 43% of total length; overall coloration olive-tan, darker dorsally, fins colourless; vertebrae 132 to 136 . . . *Hemerorhinus opici*
- 17b. Anterior nostril within a tube; pectoral fin present or absent; tail either shorter, equal to, or longer than head and trunk; coloration variable, may be plain, spotted, or striped. → 18



anterior nostril not tubular

Fig. 8 lateral view of head (*Hemerorhinus opici*)

- 18a. Pectoral fin absent or vestigial; median fins may be reduced; coloration without large spots → 19
- 18b. Pectoral fin present, generally as large as or larger than eye (a small flap in 2 genera); median fins generally elevated; coloration variable, may be spotted or striped → 25

- 19a. Body appears entirely finless, or the only fin a short dorsal, originating midhead and extending about 3 head lengths behind it; trunk extremely elongate; tail very short, more than 3 in total length; coloration in preservative uniform tan, slightly darker dorsally; vertebrae 187 to 216 *Phaenomonas longissima*
- 19b. Median fins continuous nearly to tail tip; trunk moderately to extremely elongate; tail less than 3 in total length → 20

- 20a. Tail shorter than head and trunk; a minute, lappet-like pectoral fin present in upper corner of gill opening (Fig. 9); dorsal-fin origin in advance of midhead; coloration brown dorsally, pale ventrally, fins colourless → 21
- 20b. Tail equal to or longer than head and trunk; pectoral fin absent; dorsal-fin origin behind midhead; coloration uniform tan or tan with fine punctations dorsally; fins colourless → 22

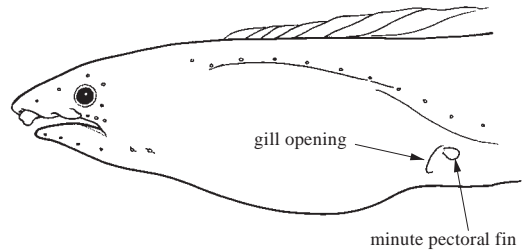


Fig. 9 lateral view of head (*Bascanichthys*)

- 21a. Tail 1.1 times in trunk and 2.1 to 2.2 times in total length; vertebrae 189 to 196 *Bascanichthys paulensis*
- 21b. Tail 1.5 times in trunk and 2.6 times in total length; vertebrae 225 to 226 *Bascanichthys ceciliae*
- 22a. Dorsal-fin origin less than 2 head lengths behind snout (7 to 17% of total length); coloration uniform tan with fine dark punctations dorsally; vertebrae 149 to 191 → 23
- 22b. Dorsal-fin origin more than 2 head lengths behind snout (20 to 21% of total length); coloration uniform yellow to tan; vertebrae 133 to 138 → 24
- 23a. Dorsal-fin origin 7 to 10% of total length behind snout; vertebrae 183 to 191 *Dalophis boulengeri*
- 23b. Dorsal-fin origin 11 to 17% of total length behind snout; vertebrae 149 to 162 *Dalophis cephalopeltis*
- 24a. Preanal length about equal to tail length, 50 to 54% of total length; vertebrae 133 to 134 *Dalophis obtusirostris*
- 24b. Preanal length less than tail length, 45% of total length; vertebrae 138 *Dalophis multidentatus*

- 25a. Papillae on upper lip (Fig. 10); snout short, greater than 3.5 times in upper jaw; coloration yellowish, darker dorsally, body and tail overlain with 17 large brown spots arising below the lateral line and meeting across the dorsal fin; vertebrae 114 to 117 *Brachysomophis atlanticus*
- 25b. Lips entire, although narial barbels may be present; snout longer, less than 3 times in upper jaw; coloration not as above → 26

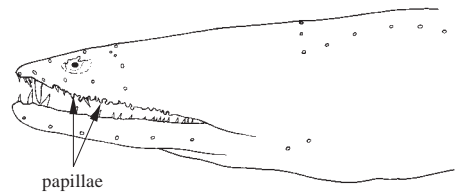


Fig. 10 lateral view of head (*Brachysomophis atlanticus*)

- 26a. Teeth molariform or granular; pectoral fin broad-based (Fig. 11) → 27
- 26b. Teeth pointed; pectoral-fin base restricted, opposite upper half of gill openings (Fig. 12) → 28



Fig. 11 lateral view of head (*Myrichthys*)

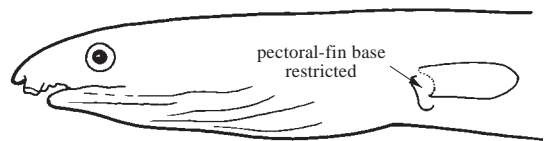


Fig. 12 lateral view of head

- 27a. Dorsal-fin origin above or in advance of gill openings by less than the pectoral-fin length; 3 preopercular pores; coloration yellowish, body and tail overlain with 13 to 18 large dark spots which meet across the dorsal fin; head with numerous small dark spots on snout, jaws and cheeks; vertebrae 155 to 162 ***Pisodonophis semicinctus***
- 27b. Dorsal-fin origin well in advance of gill openings by more than the pectoral-fin length; 2 preopercular pores; coloration yellow-orange, overlain above lateral line with 20 to 25 brown spots with bright centers, those spots interspersed with paler spots with bright centres below the lateral line; vertebrae 151 to 159 ***Myrichthys pardalis***

28a. Pectoral fin rudimentary, smaller than or equal to eye (Fig. 13); head and trunk slightly longer than tail; coloration dark dorsally, pale ventrally, overlain with 2 rows of dark spots, 16 to 20 in each row; in life the spots are notably orange; vertebrae 129 to 136 ***Quassiremus ascensionis***

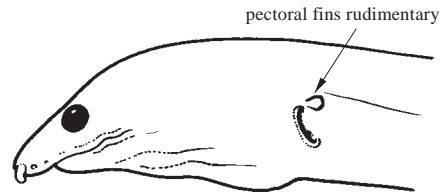


Fig. 13 lateral view of head (*Quassiremus ascensionis*)

28b. Pectoral fin developed, larger than eye; head and trunk longer than or nearly equal to tail; coloration not as above → 29

29a. Eye before middle of upper jaw; some jaw teeth long and fang-like. → 30

29b. Eye over middle of upper jaw; jaw teeth not long and fang-like → 33

30a. Snout short, 11 to 14 times in head length (Fig. 14); vomerine teeth biserial; coloration uniform tan, darker dorsally, overlain with numerous small, brown, eye-sized spots; jaw pores within dark spots; median fins basally pale, their margins dark; vertebrae 134 to 142 ***Echiophis punctifer***



Fig. 14 lateral view of head (*Echiophis punctifer*)

30b. Snout longer, 6 times or less in head length (Fig. 15); vomerine teeth uniserial; coloration uniform grey throughout, paler ventrally, median fins pale basally with black margins; a series of small white spots dorsally on head associate with pore tracts → 31

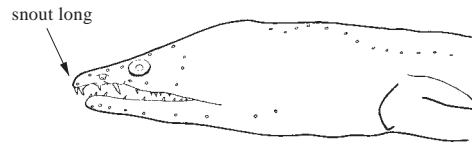


Fig. 15 lateral view of head (*Mystriophis*)

31a. Predorsal distance 24% of total length; vertebrae 141 ***Mystriophis* sp.**

31b. Predorsal distance 12 to 19% of total length → 32

32a. Predorsal distance 16.3 to 19% of total length; preanal distance 45.5 to 48.7 % of total length; vertebrae 136 to 144 ***Mystriophis crosnieri***

32b. Predorsal distance 12.5 to 16.3% of total length; preanal distance 40.4 to 44.3% of total length; vertebrae 154 to 158 ***Mystriophis rostellatus***

33a. Tail slightly shorter than head and trunk; pectoral fin reduced, 6 or more times in head length → 34

33b. Tail longer than head and trunk; pectoral fin 6 times or less in head length → 36

34a. Snout tip blunt (Fig. 16); narial barbels pendant and conspicuous; maxillary teeth biserial, nearly equal in size, not in a broad patch posteriorly; coloration pale, overlain with 19 to 23 large brown, pale-bordered saddle-like spots dorsally; small spots on head, fins, and between the large body spots; vertebrae 157 to 161 ***Herpotoichthys regius***

34b. Snout tip pointed (Fig. 17); narial barbels absent; maxillary teeth small and numerous, an anterior uniserial row followed by an inner, broad, multiserial patch; coloration tan, darker dorsally, overlain dorsally with numerous small dark spots and finer dark spots on snout, jaws, and nape; fins colourless; vertebrae 194 to 199 ***Xyrias guineensis***

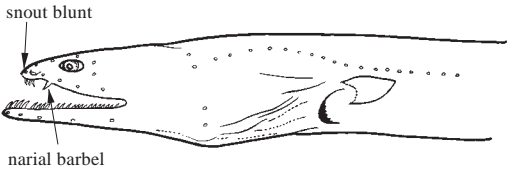


Fig. 16 lateral view of head
(*Herpotoichthys regius*)

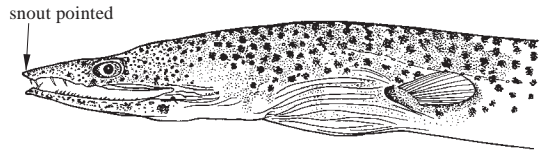


Fig. 17 lateral view of head
(*Xyrias guineensis*)

35a. Snout very long, attenuate, clavate at tip, its length less than 4 times in head; jaws of adults slender and elongate, incapable of closing completely (Fig. 18); coloration brown dorsally, pale ventrally, margin of median fins dark, lateral-line pores in fine black spots; in life ventral coloration silver; vertebrae 199 to 215 ***Ophisurus serpens***

35b. Snout moderate or short, rounded to pointed, 4 or more times in head; jaws not slender and elongate (Fig. 19); coloration not as above **→ 36**

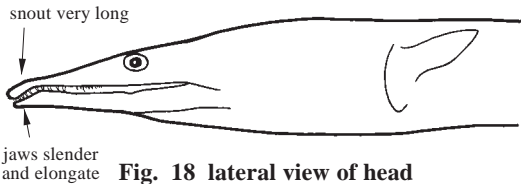


Fig. 18 lateral view of head
(*Ophisurus serpens*)

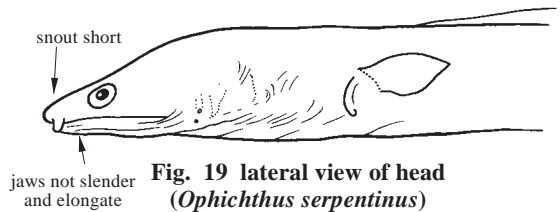


Fig. 19 lateral view of head
(*Ophichthus serpentinus*)

36a. Dorsal fin arises 2 to 4 pectoral-fin lengths behind gill opening; upper jaw teeth biserial; coloration uniform, yellow to dark brown, without dark spots or saddles **→ 37**

36b. Dorsal fin arises above pectoral fins; jaw teeth either biserial or multiserial; coloration either uniform or may be overlain with dark spots or saddles **→ 38**

37a. Coloration uniform yellow to amber, fins pale, anterior nostrils coloured like snout; vertebrae 162 to 167 ***Ophichthus serpentinus***

37b. Coloration uniform brown or dark, fins dark, anterior nostrils pale and contrasting with snout; vertebrae 149 to 153 ***Ophichthus pullus***

38a. Coloration pale, overlain with numerous dark spots on head and large dark spots or saddles along dorsal midline; jaw teeth conical, strong and biserial, the inner row larger **→ 39**

38b. Coloration either pale, brown or dark, but lacking large dark spots or saddles on body; jaw teeth either conical, strong and biserial, or small and multiserial **→ 40**


39a. Pectoral fin small, about 7 times in head length; tail length 51% of total length; coloration tan with 26 or 27 black rings or saddles not meeting ventrally; vertebrae 149 ***Ophichthus leonensis***




39b. Pectoral fin larger, about 4 times in head length; tail longer, 57 to 61% of total length; coloration pale brown dorsally with 25 to 35 large dark spots abutting base of dorsal fin and 20 large dark spots along the lateral midline; vertebrae 161 to 167. ***Ophichthus ophis***

- 40a.** Jaw teeth biserial, conical and strong, the outer row larger; tail is 53% of total length; body coloration tan, darker dorsally, a dark band across nape, behind cheeks, and above gill openings; vertebrae 141 ***Ophichthus* sp. A**
- 40b.** Jaw teeth multiserial, minute, a pointy pavement in 3 irregular rows on jaws; tail 60% of total length; body coloration pale, darker dorsally, a series of bleached spots and bars on snout and nape; vertebrae 147 ***Ophichthus* sp. B**

List of species occurring in the area

Note: The following list represents the status of many but not all of the shallow-water ophichthids from the area. Because their cryptic and fossorial habits make them difficult to observe and collect, it is likely that several undescribed species, particularly from deep water, remain unknown. The taxonomy of many ophichthid species listed in the 1981 FAO ECA ophichthid treatment has been changed, reflecting a better understanding of the Atlantic ophichthids resulting from publication of the 1989 FWNA eel volume and other regional and worldwide revisions. In addition, 1 species of *Mystriophis* and at least 2 species of *Ophichthus* remain to be described (McCosker, in preparation), the western Atlantic species of *Hemerorhinus* is in need of taxonomic attention, and *Pisodonophis semicinctus* will require a new generic name and specific names (McCosker and Anderson, in preparation).

The symbol  is given when species accounts are included.

- Apterichtus anguiformis* (Peters, 1877). To 49 cm. At 10–250 m depth. Mediterranean, Eastern Atlantic south to Cape Verde Island.
- Apterichtus caecus* (Linnaeus, 1758). To 60 cm. At 1–85 m depth. Mediterranean, eastern Atlantic south to Azores and Canary islands.
- Apterichtus gracilis* (Kaup, 1856). To 32 cm. At 75 m, Guinea.
- Apterichtus kendalli* (Gilbert, 1891). To 54 cm. At 30–80 m, St Helena; in the western Atlantic, from the Carolinas, Florida, Bermuda, Bahamas, Lesser Antilles and Brazil.
- Apterichtus monodi* (Roux, 1966). To 50 cm. At 80–150 m, Cape Verde Islands, Senegal to Sierra Leone.
- Bascanichthys ceciliae* Blache and Cadenat, 1971. To 82 cm. Shallow water, Senegal to Angola.
- Bascanichthys paulensis* Storey, 1939. To 62 cm. At 0–24 m, Gulf of Guinea and the Congo; in the western Atlantic from Brazil.
- Brachysomophis atlanticus* Blache and Saldanha, 1972. To 38 cm. At 8–75 m, Cape Verde Islands, Senegal, Príncipe and Gulf of Guinea.
- Callechelys bilinearis* Kanazawa, 1952. To 172 cm. At 0–24 m, an insular species, from St Helena and Ascension Islands; in the western Atlantic from Bermuda, throughout the West Indies, and from islands of Central America and Brazil.
- Callechelys guineensis* (Osório, 1893). To 108 cm. At 0–36 m, Senegal and São Tomé; in the western Atlantic from Florida, Puerto Rico, Bahamas and Venezuela.
- Callechelys leucoptera* (Cadenat, 1954). To 73 cm. Shallow water to 45 m, Senegal to Côte d'Ivoire.
- Dalophis boulengeri* (Blache, Cadenat and Stauch, 1970). To 57 cm. Shallow water, Mauritania, Príncipe, Senegal to Angola.
- Dalophis cephalopeltis* (Bleeker, 1863). To 53 cm. Shallow water and estuaries, Senegal to Angola.
- Dalophis multidentatus* Blache and Bauchot, 1972. To 15 cm. At 50 m, Senegal.
- Dalophis obtusirostris* Blache and Bauchot, 1972. To 39 cm. Shallow water, Mauritania and Senegal.
-  *Echelus myrus* (Linnaeus, 1758).
-  *Echelus pachyrhynchus* (Vaillant, 1888).
-  *Echiophis punctifer* (Kaup, 1859).
- Hemerorhinus opici* Blache and Bauchot, 1972. To 32 cm. Shallow water, Senegal and the Congo.
- Herpetoichthys regius* (Richardson, 1848). To 87 cm. At 15–170 m off St Paul's Rocks, Ascension Island, habitat unknown. St Helena Island and Mauritania.

Ichthyapus insularis McCosker, 2004. To 43 cm. 0–1 m, Ascension Island.

Ichthyapus ophioneus (Evermann and Marsh, 1900). To 48 cm. 0–11m, St Helena Island; in the western Atlantic from Bermuda, Bahamas, Florida and the Greater Antilles.

Myrichthys pardalis (Valenciennes, 1839). To 65 cm. Shallow water, islands of eastern Atlantic, including São Tomé, Cape Verde Islands, Canaries and Annoban, and the Gulf of Guinea.

Myrophis plumbeus (Cope, 1871). To 46 cm. Shallow, brackish waters and rivers. Senegal and the Democratic Republic of the Congo; in the western Atlantic from Suriname, French Guiana and Brazil.

➤ *Mystriophis crosnieri* Blache, 1971.

Mystriophis rostellatus (Richardson, 1848). To 140 cm. Shallow water to 40 m, Mauritania to Namibia.

Mystriophis sp. A. To 54 cm. Habitat unknown, off Angola.

Ophichthus leonensis Blache, 1975. To 23 cm. At 180 m, off Sierra Leone.

➤ *Ophichthus ophis* (Linnaeus, 1758).

Ophichthus pullus McCosker, 2005. To 58 cm. At 105–155 m, off Angola and Guinea-Bissau.

Ophichthus serpentinus Seale, 1917. To 68 cm. At 235–499 m, Namibia to Cape of Good Hope.

Ophichthus sp. A. To be described by McCosker. To 79 cm. At 352 m off Mauritania.

Ophichthus sp. B. To be described by McCosker. To 53 cm. At 93 m off Western Sahara.

➤ *Ophisurus serpens* (Linnaeus, 1758).

Phaenomonas longissima (Cadenat and Marchal, 1963). To 49 cm. At 1–60 m, Cape Verde Islands, St Helena and Ascension Islands, Senegal and Ghana; in the western Atlantic from Brazil.

➤ *Pisodonophis semicinctus* (Richardson, 1848).

Pseudomyrophis atlanticus Blache, 1975. To 26 cm. At 40–100 m, Senegal and the Democratic Republic of the Congo.

Pseudomyrophis nimius Böhlke, 1960. To 37 cm. At 320–755 m, Angola; in the western Atlantic from the northern Gulf of Mexico and off Florida.

Quassiremum ascensionis (Studer, 1889). To 70 cm. At 0–12 m, Ascension Island; in the western Atlantic from Bermuda, Bahamas, Lesser Antilles and Brazil.

Xyrias guineensis (Blache, 1975). To 64 cm. At 75–300 m, Senegal, Guinea-Bissau, and the Democratic Republic of the Congo.

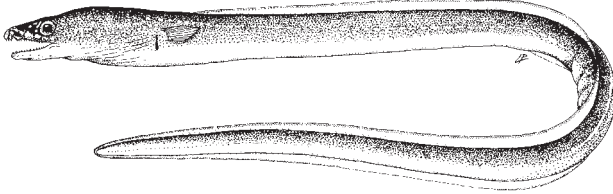
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***Echelus myrus* (Linnaeus, 1758)**

En – Painted eel; **Fr** – Serpention miro; **Sp** – Tieso miro.

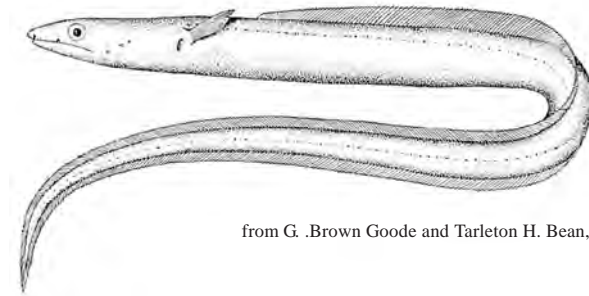
Maximum size to 100 cm. Inhabits shallow waters over mud and sand bottoms, at depths of 3 to 1 490 m. Uncommon, taken by trap, hook-and-line, and by benthic trawling. Of no commercial importance. From the Mediterranean and Bay of Biscay to the Congo.



***Echelus pachyrhynchus* (Vaillant, 1888)**

En – Thick-nosed eel.

Maximum size to 48 cm. Inhabits deep waters over mud and sand bottoms, at depths of 200 to 500 m. Uncommon, taken by benthic trawling. Of no commercial importance. From Morocco to Namibia and Cape Verde Islands.



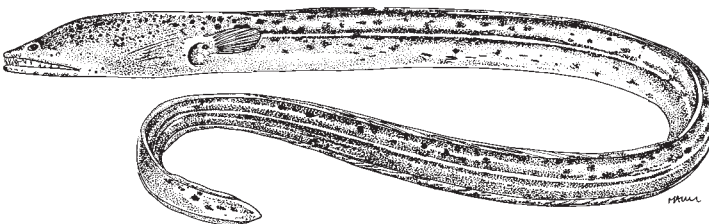
from G. Brown Goode and Tarleton H. Bean, 1896



***Echiophis punctifer* (Kaup, 1859)**

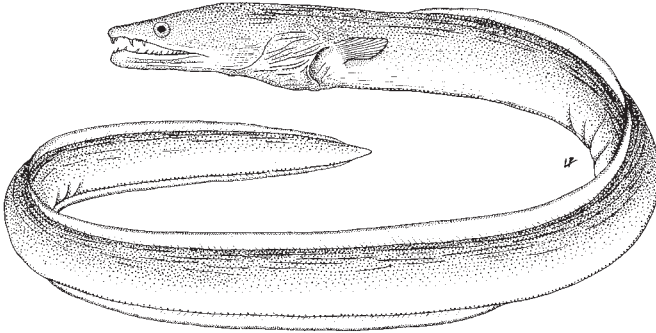
En – Stippled spoon-nose eel (AFS: Snapper eel); **Fr** – Serpention pintillé; **Sp** – Safio dentudo punteado.

Maximum size to 170 cm. Inhabits sand bottoms from shallow lagoons to 100 m. Uncommon, taken by trap, hook-and-line, and by benthic trawling. Of no commercial importance. From Senegal, Sierra Leone, and the Congo; in the western Atlantic from the Gulf of Mexico, the West Indies and Brazil.



Mystriophis crosnieri* Blache, 1971*En** – Spoon-nose eel.

Maximum size to 96 cm. Inhabits sand and mud bottoms, at depths of 75 to 400 m. Uncommon, taken by trap, hook-and-line, and by benthic trawling. Of no commercial importance. From western Mediterranean, Canary Islands, and Senegal to Angola.

***Ophichthus ophis* (Linnaeus, 1758)****En** – Spotted snake eel; **Fr** – Serpention tacheté; **Sp** – Safio de manchas negras.

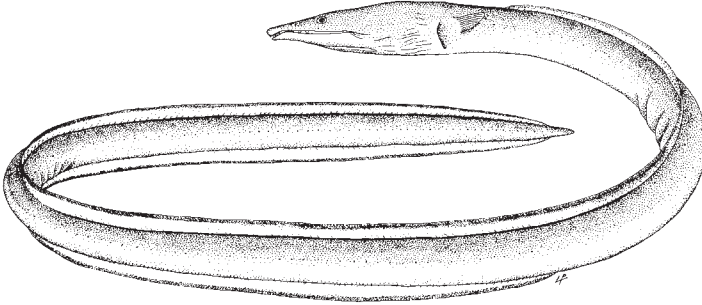
Maximum size to 200 cm. Inhabits shallow waters over sand and rock bottoms, at depths of 10 to 50 m. Uncommon, taken by trap, hook-and-line, and by benthic trawling. Of no commercial importance. From Cape Verde and São Tomé islands and Senegal to Angola and possibly from the western Mediterranean; in the western Atlantic from Florida to Brazil, Bermuda, Cuba, and the Lesser Antilles.



***Ophisurus serpens* (Linnaeus, 1758)**

En – Serpent eel; **Fr** – Serpention à nez long; **Sp** – Culegra de mar.

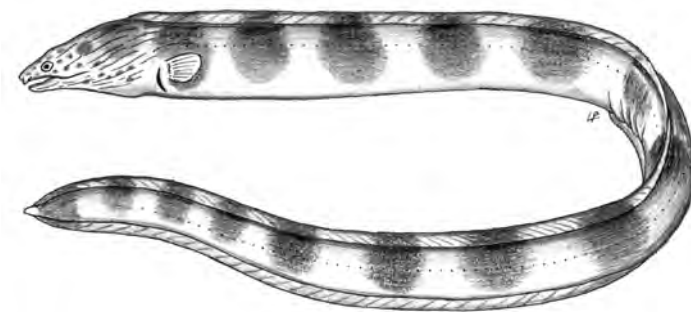
Maximum size to 250 cm. Inhabits sand and mud bottoms, at depths of 0 to 300 m. Uncommon, taken by trap, hook-and-line, and by benthic trawling. Of no commercial importance. From Mediterranean to South Africa; also in western Indian Ocean from Mozambique to South Africa, including offlying islands; and possibly from the western Pacific from Japan to Australasia.



***Pisodonophis semicinctus* (Richardson, 1848)**

En – Saddled snake eel; **Fr** – Serpention à selles; **Sp** – Serp tacada.

Maximum size to 80 cm. Inhabits shallow waters, at depths of 10 to 40 m. Uncommon, taken by trap, hook-and-line, and by benthic trawling. Of no commercial importance. From the Mediterranean south to Angola.



COLOCONGRIDAE

Short-tailed eels

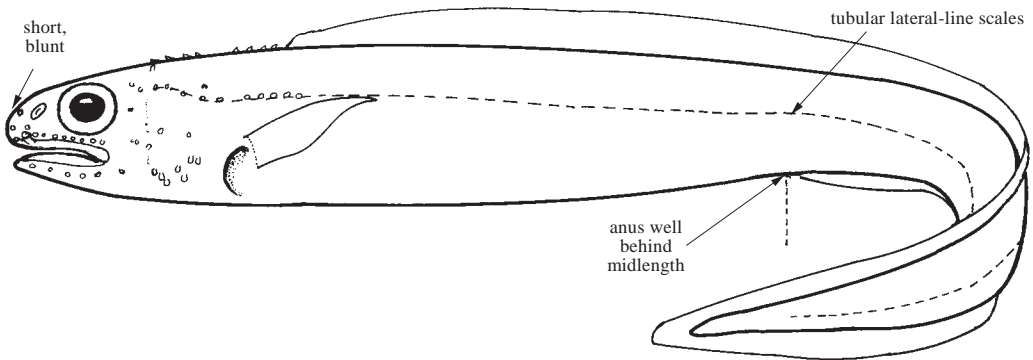
by D.G. Smith, National Museum of Natural History, Washington, DC, USA

A single species occurring in the area.

Coloconger cadenati Kanazawa, 1961

Frequent synonyms / misidentifications: None / None.

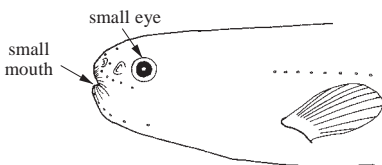
FAO names: None.



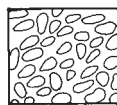
Diagnostic characters: Body short and stubby, deepest shortly behind head, tapering toward tail, strongly compressed posteriorly; tail much shorter than body, anus well behind midlength. Head wide and deep. Eye large, its diameter equal to or greater than snout length. **Snout short and bluntly rounded**, projecting slightly beyond lower jaw; anterior nostril a short tube near tip of snout; **posterior nostril** large, round, with a low, raised rim, **at mideye level**. Mouth moderate, gape ending under rear of eye; no fleshy flanges on lips. Teeth small, conical, in 1 to 3 rows on jaws; intermaxillary teeth in 2 transverse series, posterior series continuous with maxillary teeth, anterior series separated and often incomplete; no teeth on vomer. **Dorsal and anal fins well developed, confluent with caudal fin; dorsal fin beginning slightly behind base of pectoral fin; pectoral fin well developed.** Scales absent. **Lateral line complete, pores in low tubes; head pores numerous, and except for anteriormost few are tubular.** Small dermal papillae on head. Vertebrae 147 to 153. **Colour:** brown or grey, without markings. Sensory pores and papillae often black.

Similar families occurring in the area

These stubby, short-tailed eels are difficult to confuse with anything else. *Simenchelys parasitica* (Synphobranchidae) also has a short, blunt snout, but it has embedded scales and its anus is near midlength; its mouth is much smaller, and it lacks tubular lateral-line pores. Some congrids have short snouts, but they have well developed flanges on the lips, and the anus is slightly before midlength.



Synphobranchidae (*Simenchelys*)



embedded scales



Congridae

Size: Maximum size 50 to 60 cm total length.

Habitat, biology, and fisheries: *Coloconger cadenati* lives on open terrain over muddy bottoms at depths of 270 to 600 m. Little is known about its biology. Although it can be fairly common in its depth range and is sometimes taken in trawls, it is of no commercial importance.

Distribution: Senegal to Democratic Republic of the Congo.



Reference

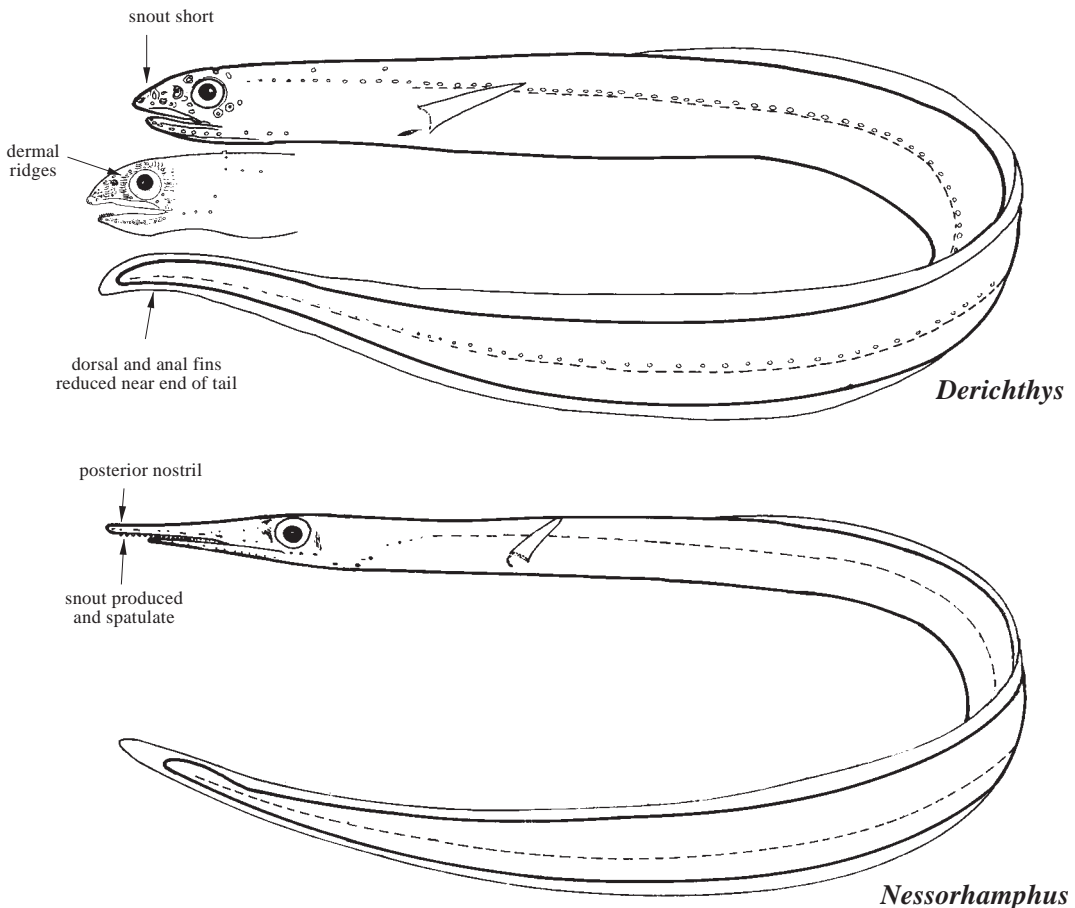
Kanazawa, R.H. 1961. A new eel, *Coloconger cadenati*, and a redescription of the heterocongrid eel, *Taenioconger longissimus* (Günther), both from the coast of Senegal. *Bulletin de l'Institut Fondamental d'Afrique Noire*, (A), 23(1): 108–115.

DERICHTHYIDAE

Longneck eels

by D.G. Smith, National Museum of Natural History, Washington, DC, USA

Diagnostic characters: Small to medium-sized eels, maximum size approximately 60 cm, usually smaller. Body moderately elongate, tail not filamentous, ending in a small caudal fin; anus at or slightly behind midlength. Head variable in form, **snout either short with constricted neck (*Derichthys*) or snout markedly elongate with posterior nostril located far forward (*Nessorhamphus*); a series of short, longitudinal dermal ridges on the head** (presumably sensory in nature) present (*Derichthys*) or absent (*Nessorhamphus*). Eye well developed. Upper jaw extends beyond lower, cleft of mouth ends under or slightly behind eye; lips without upturned or downturned flanges. Teeth small, conical, multiserial. Gill opening small, slit-like, located just in front of and below pectoral fin. Dorsal and anal fins confluent with caudal fin; dorsal fin begins in anterior third of body, slightly behind tip of appressed pectoral fin; anal fin begins immediately behind anus, at or slightly behind midbody; **dorsal and anal fins both become distinctly reduced near end of tail**; pectoral fins present. Scales absent. Lateral line complete, pore system on head well developed. **Colour:** brown, with paler fins; 1 species with a dark midventral streak; no spots, lines, or other distinct markings.

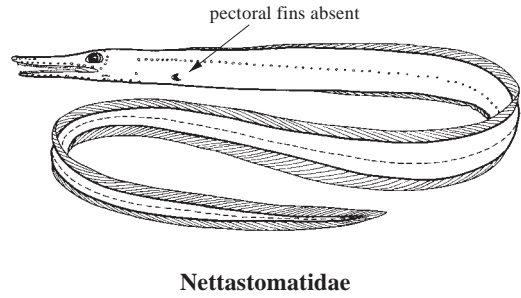
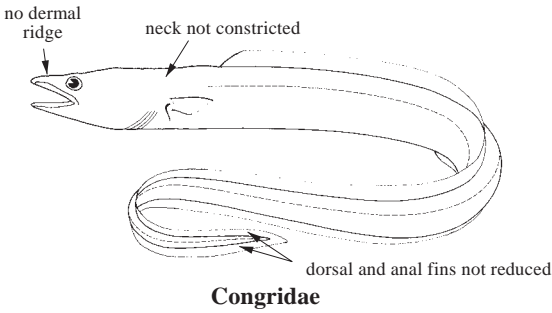


Habitat, biology, and fisheries: Derichthyids are midwater eels inhabiting depths of several hundred metres in all tropical and subtropical oceans. Little is known of their biology. They are seldom seen and are of no importance to fisheries.

Similar families occurring in the area

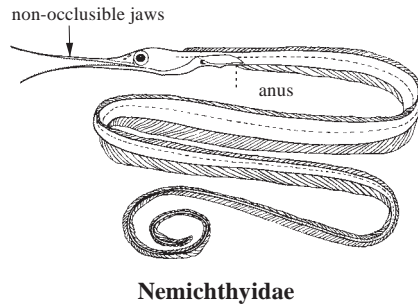
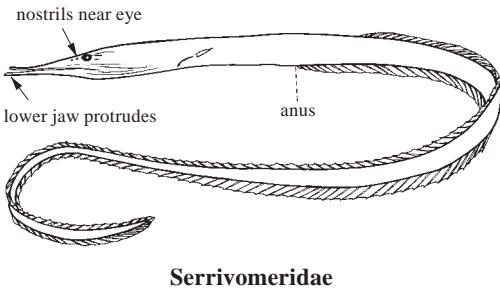
Congridae: *Derichthys* is most likely to be confused with members of the Congridae, although the latter are not midwater eels. *Derichthys* may be readily distinguished by the constricted neck, the short, longitudinal dermal ridges on the head, and the dorsal and anal fins reduced near the end of the tail. Congrids do not have a constricted neck, lack ridges on the head, and the dorsal and anal fins are not reduced near the end of the tail.

Nettastomatidae: *Nessorhamphus* is most likely to be confused with certain members of Nettastomatidae. All nettastomatids lack pectoral fins, however, except *Hoplunnis*, which is distinguished by the enlarged, fang-like teeth on the vomer. The posterior nostril in nettastomatids is highly variable in position, but it is never located nearer to the anterior nostril than to the eye.



Serrivomeridae: jaws equal or lower jaw protrudes; snout not spatulate; both nostrils near eye.

Nemichthyidae: jaws elongate and non-occlusible except in mature males; anus under or shortly behind pectoral fin.



Key to the genera and species of Derichthyidae occurring in the area

- 1a. Snout and lower jaw short, snout approximately equal to eye diameter; tip of snout not produced and spatulate, extends beyond lower jaw by a distance less than eye diameter (Fig. 1) ***Derichthys serpentinus***
- 1b. Snout and lower jaw long, 3 to 6 times eye diameter; tip of snout produced and spatulate, extends beyond lower jaw by a distance equal to or greater than eye diameter (Fig. 2) → 2

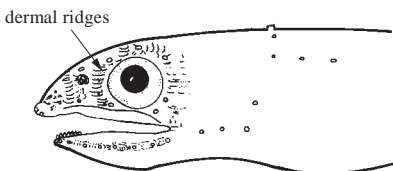


Fig. 1 *Derichthys serpentinus*

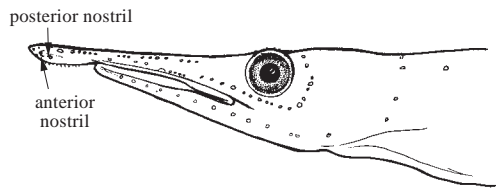


Fig. 2 *Nessorhamphus ingolfianus*

- 2a. Snout shorter, 3 to 4 times pigmented eye diameter; a dark streak running along midventral line (Fig. 3) ***Nessorhamphus danae***
- 2b. Snout longer, about 6 times pigmented eye diameter; midventral line without a dark streak (Fig. 4) ***Nessorhamphus ingolfianus***

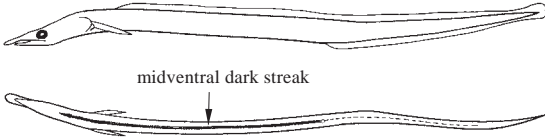


Fig. 3 *Nessorhamphus danae*

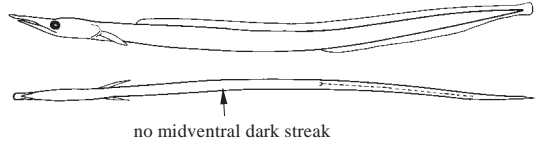





Fig. 4 *Nessorhamphus ingolfianus*

List of species occurring in the area

The symbol  is given when species accounts are included.

 *Derichthys serpentinus* Gill, 1868.

 *Nessorhamphus danae* Schmidt, 1931.

 *Nessorhamphus ingolfianus* (Schmidt, 1912).

References

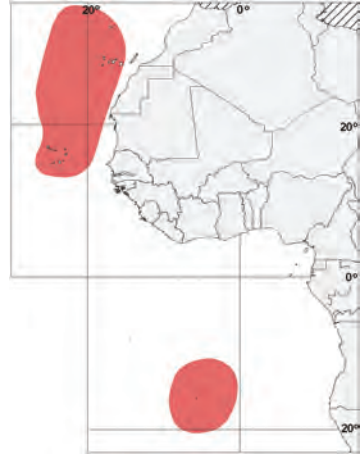
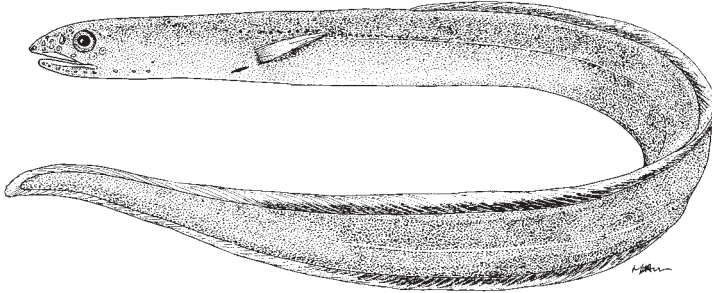
Karmovskaya, E. 1985. Mesopelagic eels of family Derichthyidae (Anguilliformes). *Journal of Ichthyology*, 25(6): 119–134.

Robins, C.H. 1989. Family Derichthyidae. In E.B. Böhlke, ed. *Fishes of the Western North Atlantic, Part 9. Memoirs of the Sears Foundation for Marine Research*, 1(9): 420–431.

***Derichthys serpentinus* Gill, 1884**

En – Narrownecked oceanic eel.

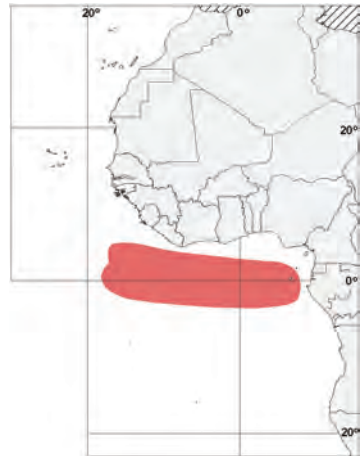
Maximum size 35 cm. Oceanic, mesopelagic; records from around St Helena, Canary, and Cape Verde islands, probably occurs widely in the area.



***Nessorhamphus danae* Schmidt, 1931**

En – Blackbelly spoonbill eel.

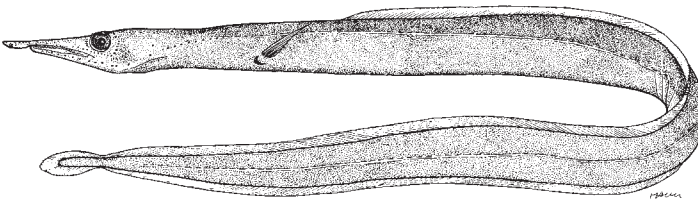
Maximum size at least 29 cm. Equatorial waters in all oceans.



***Nessorhamphus ingolfianus* (Schmidt, 1912)**

En – Duckbill oceanic eel.

Maximum size 60 cm. In the area, north of the equator.



MURAENESOCIDAE

Pike congers

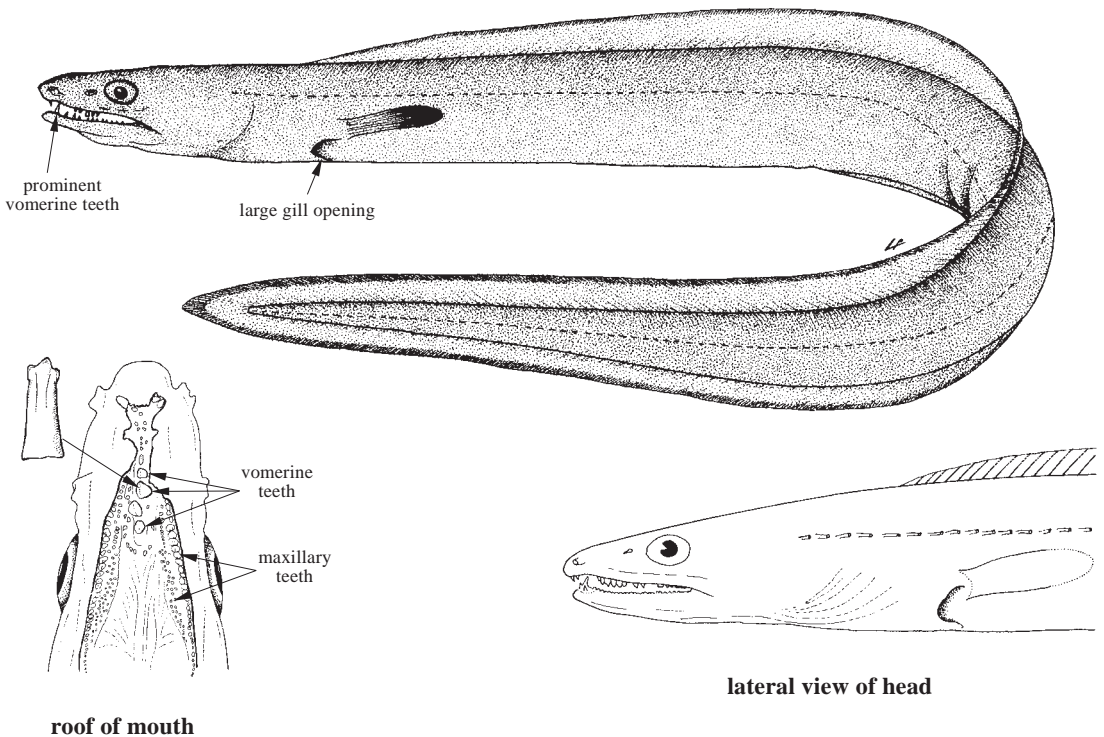
by D.G. Smith, National Museum of Natural History, Washington, DC, USA

A single species occurring in the area.

Cynoponticus ferox Costa, 1846

Frequent synonyms / misidentifications: *Muraenesox ferox* (Costa, 1850); *Phyllogramma regani* Pellegrin, 1934 / None.

FAO names: En – Guinean pike conger; Fr – Murénésoce de Guinée; Sp – Morenocio de Guinea.



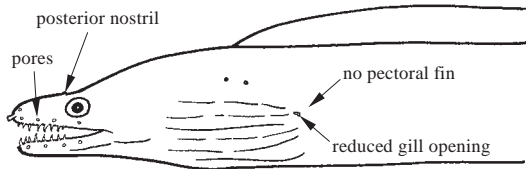
Diagnostic characters: Body moderately elongate, more or less cylindrical in front, compressed along tail. Head moderate. **Eyes well developed.** Snout moderate, projects somewhat beyond tip of lower jaw. Anterior nostril tubular, on side of snout just behind tip; posterior nostril a simple opening in front of eye at approximately mid-eye level. Mouth large, gape ends just behind posterior margin of eye; lips without fleshy flanges. **Teeth large, prominent, sharp; multiserial on jaws; typically in 3 rows on vomer, with a median row of enlarged, compressed canines flanked on each side by a row of much smaller teeth; tip of lower jaw with its enlarged teeth fits into a notch in underside of snout when mouth closed; teeth concealed when mouth closed.** Gill opening a large, oblique slit in front of and below pectoral fin; **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, confluent around tail; dorsal fin begins over or slightly ahead of pectoral-fin base. Pectoral fins well developed. Scales absent. **Lateral line complete, but opening through a complex or branching system of multiple pores rather than a single pore per segment; pores on head not apparent.** Vertebrae: 140 to 147. **Colour:** dark grey-black above, lighter below; pectoral fin black; dorsal and anal fins with a narrow, black edge.

Similar families occurring in the area

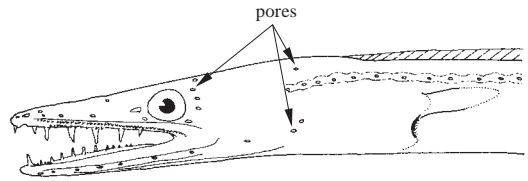
Few other eels have such greatly enlarged fangs on the roof of mouth. Those that do are distinguished as follows:

Muraenidae (all species): pectoral fins absent; gill opening reduced to a small pore; posterior nostril high on head; discrete pores on head.

Netastomatidae (*Hoplunnis punctata*): well-developed pores on head; vomerine fangs conical rather than compressed; lips reduced, maxillary and mandibular teeth exposed when mouth closed; body and head more slender and elongate.



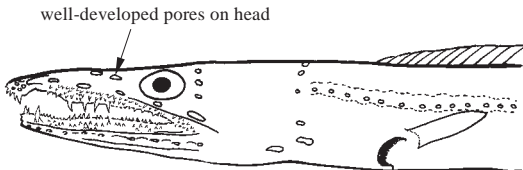
Muraenidae



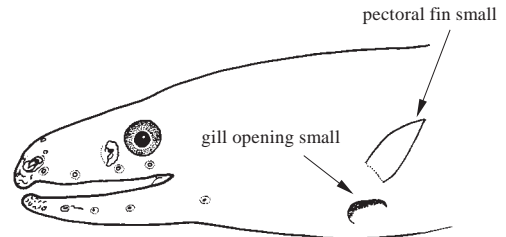
Hoplunnis punctata

Congridae (*Xenomystax congroides*): some enlarged vomerine teeth, but none as massive and compressed as those of *Cynoponticus*; in addition, *Xenomystax* has well-developed pores on head, and teeth exposed when mouth closed. Other congrid species may resemble *Cynoponticus* superficially, but none has such enlarged vomerine fangs.

Synphobranchidae (Ilyophinae): gill opening small, less than interbranchial space; pectoral fin small, less than snout length (greater than snout length in *Cynoponticus ferox*); pores on head.



Xenomystax



Synphobranchidae

Size: Maximum size 2 m.

Habitat, biology, and fisheries: Occurs on sandy or sandy-muddy bottoms at depths of 10 to 100 m. The lower part of the depth range, from 70 to 100 m, is inhabited by very large individuals, greater than 1.5 m total length. Feeds on small and medium-sized fishes and invertebrates. Primary fishing grounds the Gulf of Guinea. Taken by hook-and-line and by bottom trawl; consumed fresh. Separate statistics not reported.

Distribution: West coast of Africa, south to Angola; elsewhere, western Mediterranean.

Reference

Blache, J. 1968. Contribution à la connaissance des poissons Anguilliformes de la côte occidentale d'Afrique. Septième note: la famille des Muraenesocidae. *Bulletin de l'Institut Fondamental d'Afrique Noire*, T. 30, sér. A, No. 2: 690–736.

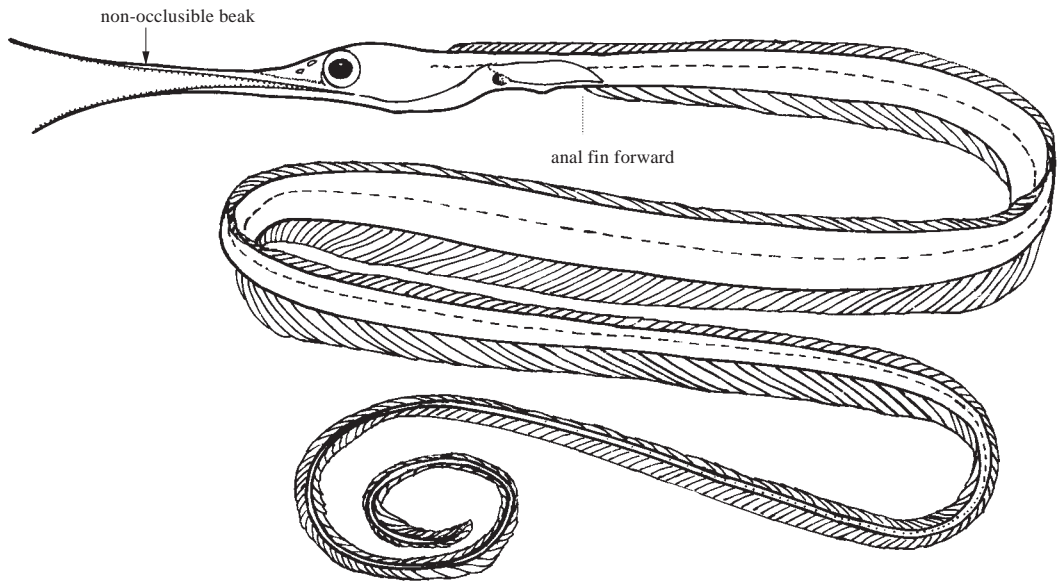


NEMICHTHYIDAE

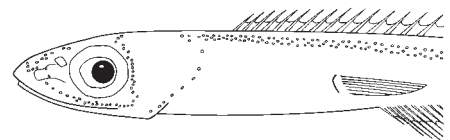
Snipe eels

by D.G. Smith, National Museum of Natural History, Washington, DC, USA

Diagnostic characters: Maximum size approximately 1 m, but much of this consists of the attenuated caudal region. **Body elongate to very elongate**, moderately to strongly compressed; tail moderately attenuate with a small caudal fin, or greatly attenuate and filiform; **anus far forward, either under pectoral fin or less than 1 head length behind it**. Eye well developed. **Jaws and snout produced into a long, non-occlusible beak in females and immatures**, short in mature males; cleft of mouth ends under or slightly behind eye. Teeth small with recurved tips, close-set in diagonal rows. Anterior and posterior nostrils located on side of head, just in front of eye; anterior nostril without a tube in females and immatures, strongly tubular and forwardly directed in mature males. Gill opening crescentic, located in front of and below pectoral fin. Dorsal and anal fins long and confluent with caudal fin when latter is present, **anal fin higher than dorsal fin; dorsal fin begins over or slightly in front of pectoral fin; anal fin begins just behind anus; pectoral fin present**. Scales absent. Lateral line complete, either as a single row of pores or 3 parallel rows of pores; pores on head well developed. **Colour:** variable, may be uniform dark or light brown, reverse countershaded (dark below and light above), completely pale, with or without internal dark bars, and with or without a patch of dark pigment spots below stomach.



Habitat, biology, and fisheries: Nemichthyids live in the midwaters of the world's oceans; adults are found at depths of several hundred to more than 2 000 m; they apparently undergo vertical migration, moving closer to the surface at night. They appear to feed mainly on shrimps and are capable of eating relatively large prey. Mature males lose the characteristic elongated beak along with most of the teeth; the olfactory organs enlarge, and the anterior nostrils become tubular. These degenerative changes suggest that the eels die after spawning. Snipe eels are seldom seen and are of no importance to fisheries.



mature male

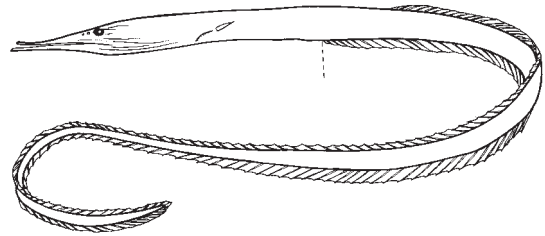
Similar families occurring in the area

Cyematidae: have jaws produced into a similar non-occlusible beak, but they have a short, stubby body and small eyes.



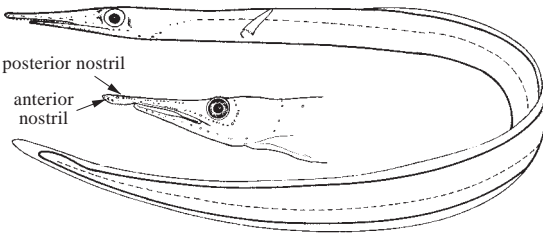
Cyematidae

Serrivomeridae: have prolonged jaws that are fully occlusible; dorsal fin begins over or behind the anus; in nemichthyids, dorsal fin always begins in front of anus; anus located well behind the head, at about the first third or first quarter of total length.



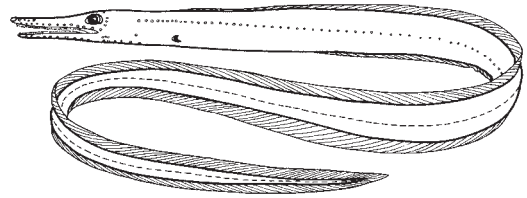
Serrivomeridae

Derichthyidae (*Nessorhamphus*): jaws are occlusible, dorsal fin begins behind the pectoral fin, and anus is located far behind pectoral fin, near midbody. Posterior nostril closer to tip of snout than to eye.



Derichthyidae (*Nessorhamphus*)

Nettastomatidae: have long jaws that are fully occlusible; anus is located well behind pectoral fin.



Nettastomatidae

Key to the species of Nemichthyidae occurring in the area

1a. Caudal region extremely elongated and thread-like (Fig. 1), a distinct caudal fin absent; 3 rows of pores in lateral line (Fig. 2); no dermal ridges on head → 2



Fig. 1 caudal region

1b. Caudal region not thread-like (Fig. 3), a small caudal fin present; 1 row of pores in lateral line (Fig. 4); small, longitudinal dermal ridges on head → 3

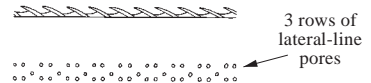


Fig. 2 lateral line



Fig. 3 caudal region

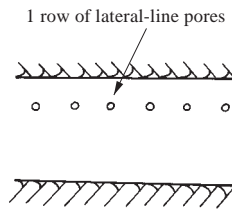


Fig. 4 lateral line

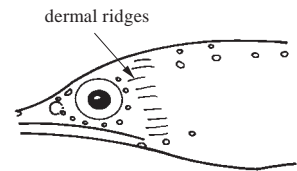


Fig. 5 lateral view of head

- 2a. Body dark brown or counter-shaded; postorbital pores 6 to 17, usually more than 10, arranged in a staggered row (Fig. 6a); preopercular pores 6 to 13 ***Nemichthys scolopaceus***
- 2b. Body pale with a cluster of black spots below stomach and dark subcutaneous vertical bars between vertebrae; postorbital pores 5 to 14, usually fewer than 10, arranged in an even row (Fig. 6b); preopercular pores 2 to 16 ***Nemichthys curvirostris***

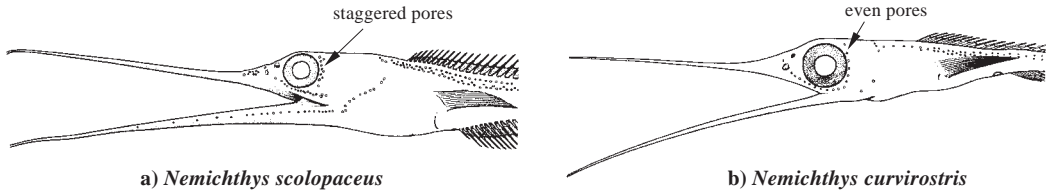


Fig. 6

- 3a. Anus located under pectoral fin (Fig. 7a) ***Labichthys carinatus***
- 3b. Anus located behind pectoral fin (Fig. 7b) → **4**

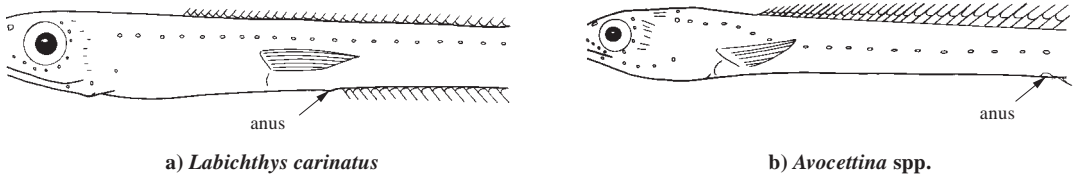







Fig. 7

- 4a. Lateral-line pores 198 to 216 ***Avocettina acuticeps***
- 4b. Lateral-line pores 176 to 201 ***Avocettina infans***

List of species occurring in the area

The symbol  is given when species accounts are included.

-  *Avocettina acuticeps* (Regan, 1916).
-  *Avocettina infans* (Günther, 1878).
-  *Labichthys carinatus* Gill and Ryder, 1883.
-  *Nemichthys curvirostris* (Strömman, 1896).
-  *Nemichthys scolopaceus* Richardson, 1848.

Reference

Nielsen, J.G. & Smith, D.G. 1978. The eel family Nemichthyidae. *Dana Report*, 88: 1–71.

***Avocettina acuticeps* (Regan, 1916)**

En – Southern fintail snipe eel.

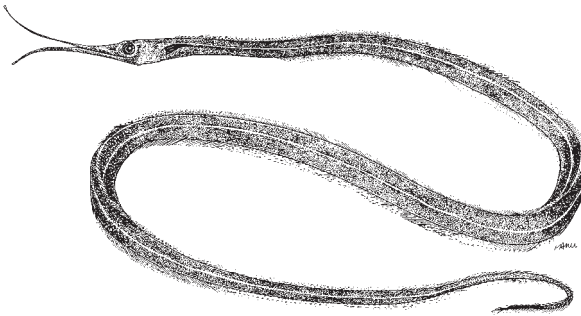
Maximum size about 80 cm. Worldwide in the southern hemisphere; in the area known only from the southernmost part, off Namibia.



***Avocettina infans* (Günther, 1878)**

En – Avocet snipe eel.

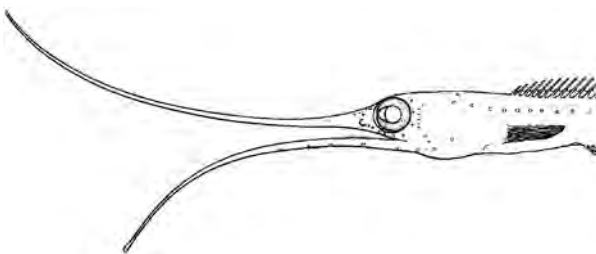
Maximum size about 80 cm. Worldwide, mainly in the northern hemisphere, in depths of 1 200 to 2 000 m; in the area, found north of the equator.



***Labichthys carinatus* Gill and Ryder, 1883**

En – Shortgut fintail snipe eel.

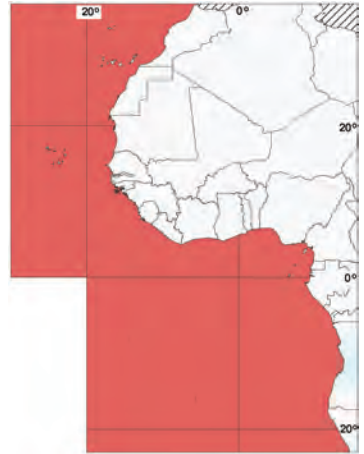
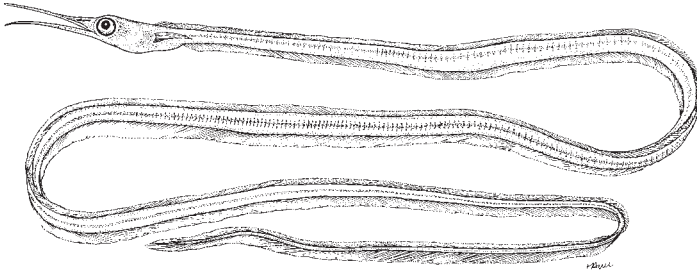
Maximum size about 80 cm. Atlantic, Indian Ocean, central Pacific; in the area, known from off Morocco; to at least 1 500 m depth; uncommon.



***Nemichthys curvirostris* (Strömman, 1896)**

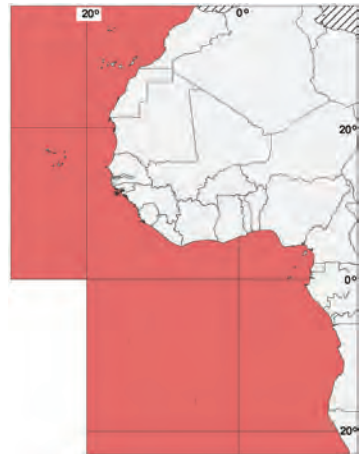
En – Pale threadtail snipe eel.

Maximum size 1 m or more. Worldwide except North Pacific, at depths of 100 to 1 000 m; found throughout the area.

***Nemichthys scolopaceus* Richardson, 1848**

En – Slender snipe eel.

Maximum size 1 m or more. Worldwide from about 55°N to 45°S, in depths of 100 to 1 000 m; found throughout the area.

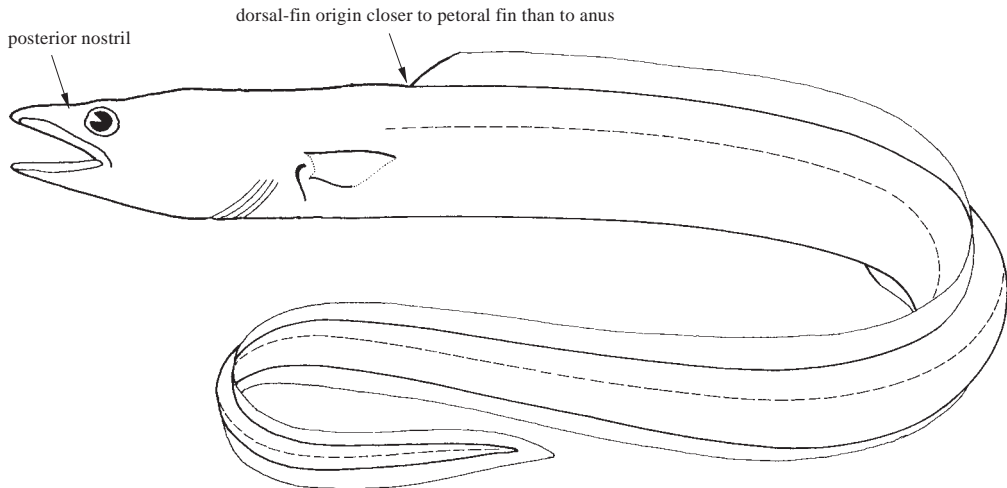


CONGRIDAE

Conger eels

by D.G. Smith, National Museum of Natural History, Washington, DC, USA

Diagnostic characters: Medium-sized to large eels, most growing to 0.5 m, a few species to 2 m total length. Body moderately elongate to extremely elongate, round in cross-section anteriorly, compressed posteriorly; anus usually located at anterior one-half to one-third of total length; tail variable, from blunt and stiffened to long and slender. **Eye well developed, sometimes very large.** Snout variable, from long and pointed to short and pug-nosed; tip of snout usually extends at least slightly beyond tip of lower jaw, except in Heterocongrinae, where lower jaw protrudes. Anterior nostril tubular, near tip of snout; **posterior nostril usually located on side of head in front of eye.** Mouth variable, **gape usually ending at some point beneath eye;** in most species tip of lower jaw fits into space behind intermaxillary tooth patch; flanges on upper and lower lip present or absent. Teeth variable, from small and granular to long and fang-like; in many species, intermaxillary teeth exposed when mouth closed. Branchiostegal rays long but not overlapping ventrally, moderate in number, usually about 8 to 12. Gill opening a crescentic slit, just in front of pectoral fin. **Dorsal and anal fins always present, confluent around tail; dorsal fin begins over or slightly behind pectoral fin, always closer to pectoral fin than to anus;** caudal fin sometimes reduced, but some rays almost always present; pectoral fin usually present, well developed in most species, but reduced or absent in heterocongrines. Scales absent. Lateral line complete. **Colour:** most species plain brown or grey, pale ventrally, vertical fins often edged in black.



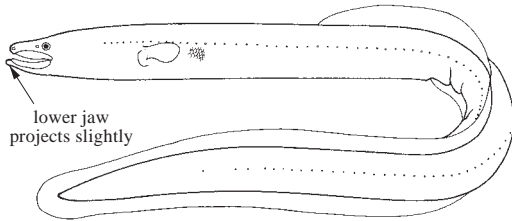
Habitat, biology, and fisheries: Congers are medium-sized to large eels found in tropical to temperate seas worldwide; a few species can reach 2 to 3 m in total length, but most are much smaller. They occur primarily on sand or mud bottoms from the coastline to depths of 2 000 m or more; most species live on the shelf or slope. Many burrow during the day and actively forage at night. The Heterocongrinae are the most distinct of the congrids, and among the few that show conspicuous morphological specializations. These are the so-called garden eels, which live in burrows in coral sand and project the front portion of the body from the burrow to feed on zooplankton. The remaining members of the family are bottom dwellers that feed on a variety of fishes and invertebrates. Some species of *Conger* and a few *Ariosoma* are found in the commercial fishery, but on the whole they are of little importance and separate statistics are not available. They are caught by trawls, traps, and by hook-and-line, and are marketed mostly fresh. Because of their diversity and abundance, congrids probably play a more important role in the ecology of the area than their relatively minor position in the fishery would indicate.

Remarks: The genus *Coloconger* has in the past been included in the Congridae. It is here considered to represent a distinct family and is treated under the Colocongridae. The genus *Xenomystax* has been placed in the Muraenesocidae but is here considered to be a congrid.

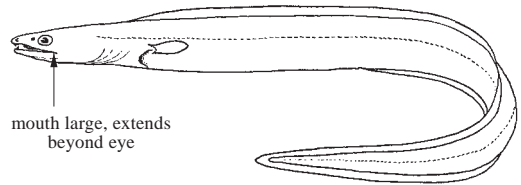
Similar families occurring in the area

Anguillidae: body covered with tiny embedded scales (scaleless in Congridae); lower jaw projecting slightly; dorsal fin begins about midway between pectoral fins and anus or over anus (closer to pectoral tips in Congridae).

Muraenesocidae: mouth very large, extending to beyond eye (mouth in Congridae barely reaches rear margin of eye); vomerine teeth prominent, fang-like (relatively small in Congridae); gill openings nearly meet each other across ventral midline.



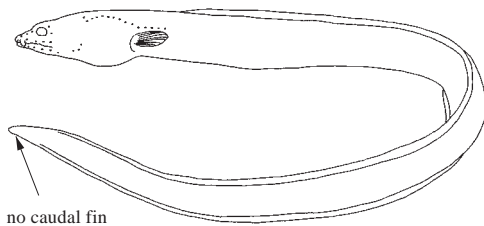
Anguillidae



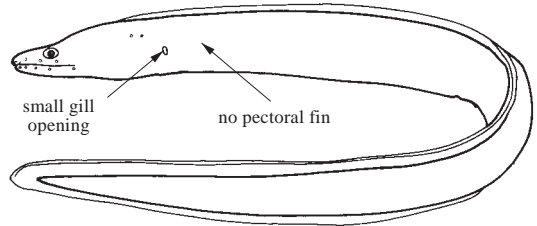
Muraenesocidae

Ophichthidae: in most genera no caudal fin but caudal tip a hard, burrowing point (caudal fin present in most Congridae); posterior nostril usually inside mouth or in some way penetrating upper lip (a simple aperture in Congridae); throat swollen, supported by many branchiostegal rays overlapping in midline; a median frontal pore on head (no such pore in Congridae, although there is a median supratemporal pore).

Muraenidae: no pectoral fins (always present in Congridae); gill opening a small hole (a vertical slit in Congridae); posterior nostril high on head, above eye; lateral line reduced to a few pores above and before gill opening; teeth fang-like or molar-like (usually small and conical in Congridae); typically brightly banded, spotted or mottled.

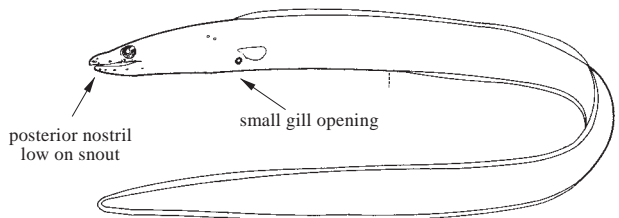


Ophichthidae



Muraenidae

Chlopsidae: gill opening a small hole; vomerine teeth in 2 divergent rows in eastern Atlantic species (a single or several parallel rows in Congridae); lateral line system reduced (prominent in Congridae); posterior nostril low on snout or flap-like; pectoral fins present or absent.



Chlopsidae

Key to the species of Congridae occurring in the area

Note: In some congrids the tip of the tail is frequently lost through injury. This can affect proportional measurements and give unnaturally high values for any proportion based on total length. The key below assumes that the specimen is intact.

1a. Body extremely elongate; mouth very oblique; snout length very short, much less than diameter of eye, anterior nostril enclosed in flange of upper lip (Fig. 1); pectoral fin reduced; caudal fin reduced or absent externally ***Heteroconger longissimus***

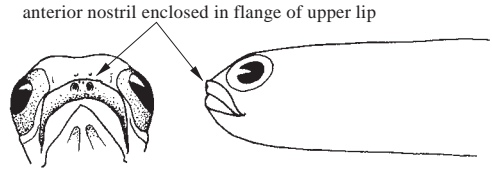


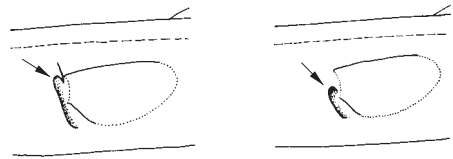
Fig. 1

1b. Body moderately elongate; mouth horizontal or slightly oblique; snout length only slightly less than, to somewhat greater than diameter of eye; anterior nostrils free; pectoral fin well developed; caudal fin present though sometimes reduced → 2

2a. Preanal length usually greater than 40% total length; caudal fin short and tip of tail stiff; posterior nostril below mideye level; dorsal- and anal-fin rays unsegmented; flange present on upper lip **(Bathymyrinae) → 3**

2b. Preanal length usually less than 40% total length; posterior nostril at or above mideye level; dorsal- and anal-fin rays segmented; flange on upper lip present or absent **(Congrinae) → 7**

3a. Upper end of gill opening at or above upper end of pectoral-fin base (Fig. 2a); jaw teeth in 1 or 2 series, forming a cutting edge → 4



a) *Paraconger* b) *Ariosoma*

Fig. 2 pectoral fin

3b. Upper end of gill opening at middle of pectoral-fin base (Fig. 2b); jaw teeth in bands. → 5

4a. Lateral-line pores before anus 50 to 53 ***Paraconger macrops***

4b. Lateral-line pores before anus 34 to 44 ***Paraconger notialis***

5a. Supratemporal, interorbital, and postorbital pores absent (Fig. 3); preanal length 49 to 52% total length ***Ariosoma anale***

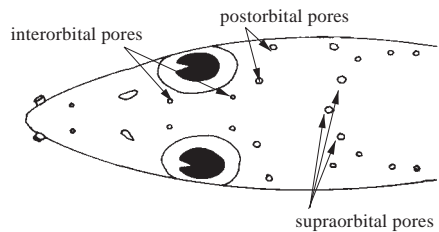


Fig. 3 dorsal view of head

5b. Supratemporal, interorbital, and postorbital pores present (Fig. 3); preanal length 43 to 49% total length → 6

6a. Vertebrae 126 to 130 . . . ***Ariosoma balearicum***
(coast of West Africa)

6b. Vertebrae 140 to 141 ***Ariosoma mellissii***
(St Helena only)

- 7a. Inner row of maxillary and mandibular teeth separated from outer rows by an edentulous groove, maxillary and mandibular teeth exposed when mouth closed (Fig. 4) . . . *Xenomystax congroides*
- 7b. Inner row of maxillary and mandibular teeth not separated from outer rows by an edentulous groove; maxillary and mandibular teeth concealed when mouth closed → 8
- 8a. Maxillary and mandibular teeth in 1 or 2 rows, the outer row forming a cutting edge; upper labial flange well developed (Fig. 5) → 9
- 8b. Maxillary and mandibular teeth in bands or in 2 rows, not forming a cutting edge; upper labial flange reduced or absent. → 10
- 9a. Preanal lateral-line pores 44 to 47; vertebrae 148 to 161; coast of Africa Morocco to Senegal *Conger conger*
- 9b. Preanal lateral-line pores 37 to 42; vertebrae 142 to 145; St Helena *Conger sp.*
- 10a. Tip of tail slightly stiffened and caudal fin somewhat reduced; a narrow upper labial flange present → 11
- 10b. Tip of tail soft and flexible, caudal fin not reduced; upper labial flange rudimentary or absent → 12
- 11a. Preanal lateral-line pores 33 to 34; vertebrae 134 to 141 *Gnathophis mystax* (NW Africa, Madeira, Canary, Cape Verde Islands)
- 11b. Preanal lateral-line pores 36; vertebrae 144 *Gnathophis codoniphorus* (Meteor Seamount)
- 12a. Vomerine tooth patch long, reaching level of posterior end of maxillary tooth patch (Fig. 6) → 13
- 12b. Vomerine tooth patch short, ending before posterior end of maxillary tooth patch → 14
- 13a. Vomerine teeth in a single series (Fig. 6a) *Uroconger syringinus*
- 13b. Vomerine teeth in more than one series (Fig. 6b) *Paruroconger drachi*

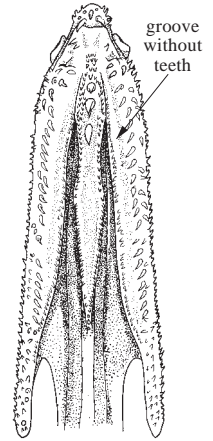


Fig. 4 ventral view of roof of mouth

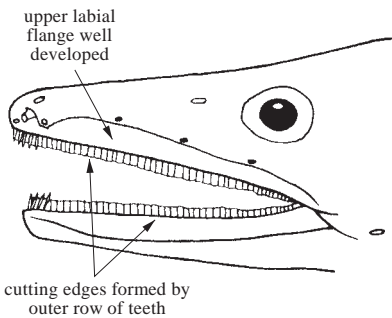
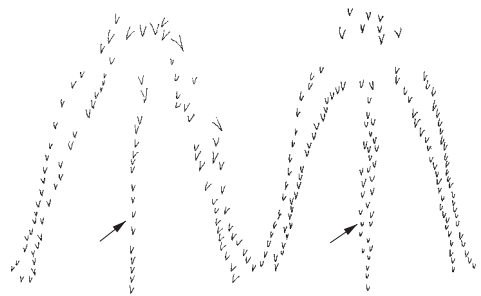


Fig. 5 lateral view of head



a) *Uroconger syringinus* b) *Paruroconger drachi*

Fig. 6 teeth on roof of mouth

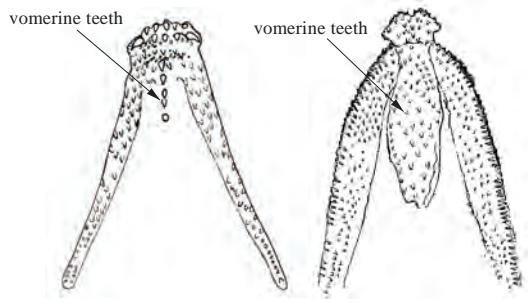
- 14a. Jaws nearly equal; anterior teeth very strong, fang-like (Fig. 7a) ***Bathyroconger vicinus***
- 14b. Upper jaw projecting beyond lower; teeth moderately large or small and granular, but not fang-like (Fig. 7b) → 15



Fig. 7 lateral view of head

- 15a. Teeth moderately large; vomerine teeth in a single row, less than half length of maxillary tooth patch (Fig. 8a) ***Bathycongrus bertini***

- 15b. Teeth small and granular; vomerine teeth in a broad tooth patch more than half length of maxillary tooth patch (Fig. 8b) → 16

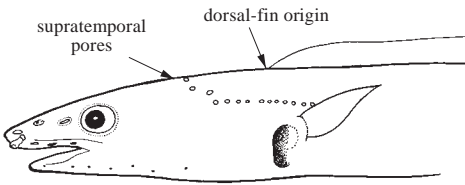


a) *Bathycongrus bertini* b) *Japonoconger africanus*

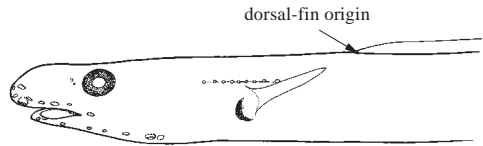
Fig. 8 tooth patches on roof of mouth

- 16a. Dorsal fin begins before pectoral-fin base; supratemporal pores present (Fig. 9a) ***Japonoconger africanus***

- 16b. Dorsal fin begins behind pectoral-fin base; supratemporal pores absent (Fig. 9b) → 17



a) *Japonoconger africanus*



b) *Pseudophichthys splendens*

Fig. 9 lateral view of head

- 17a. Dorsal fin begins behind tip of appressed pectoral fin; upper end of gill opening opposite middle of pectoral-fin base (Fig. 9b) ***Pseudophichthys splendens***

- 17b. Dorsal fin begins before tip of appressed pectoral fin; gill opening below level of pectoral fin (Fig. 10) ***Promyllantor atlanticus***

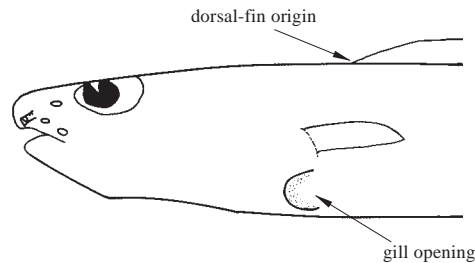




Fig. 10 lateral view of head

List of species occurring in the area


The symbol  is given when species accounts are included.

Subfamily **HETEROCONGRINAE**

 *Heteroconger longissimus* Günther, 1870.

Subfamily **BATHYMYRINAE**

 *Ariosoma anale* (Poey, 1860).

 *Ariosoma balearicum* (Delaroche, 1809).


 *Ariosoma mellissii* (Günther, 1870).

 *Paraconger notialis* Kanazawa, 1961.

 *Paraconger macrops* (Günther, 1870).

Subfamily **CONGRINAE**


 *Bathycongrus bertini* (Poll, 1953).

 *Bathyuroconger vicinus* (Vaillant, 1888).

 *Conger conger* (Linnaeus, 1758).

 *Conger* sp.

 *Gnathophis codoniphorus* Maul, 1972.

 *Gnathophis mystax* (Delaroche, 1809).

 *Japonoconger africanus* (Poll, 1953).

 *Paruroconger drachi* Blache and Bauchot, 1976.

 *Promyllantor atlanticus* Karmovskaya, 2006.

 *Pseudophichthys splendens* (Lea, 1913).

 *Uroconger syringinus* Ginsburg, 1954.

 *Xenomystax congroides* Smith and Kanazawa, 1989.

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Blache, J. 1968. Contribution à la connaissance des poissons Anguilliformes de la côte occidentale d'Afrique. Septieme note: la famille des Muraenesocidae. *Bulletin de l'Institut Fondamental d'Afrique Noire*, T. 30, sér. A, No. 2: 690–736.

Karmovskaya, E.S. 2006. *Promyllantor atlanticus* (Anguilliformes, Congridae), a new species from the continental slope of southwestern Africa. *Journal of Ichthyology*, 46(8): 594–597. [originally in Russian, *Voprosy Ikhtiologii*, 46(5): 594.597]

Maul, G.E. 1972. On a new species of eel of the genus *Gnathophis* (Apodes, Congridae) from the Meteor Seamount. *Bocagiana*, 31: 1–7.

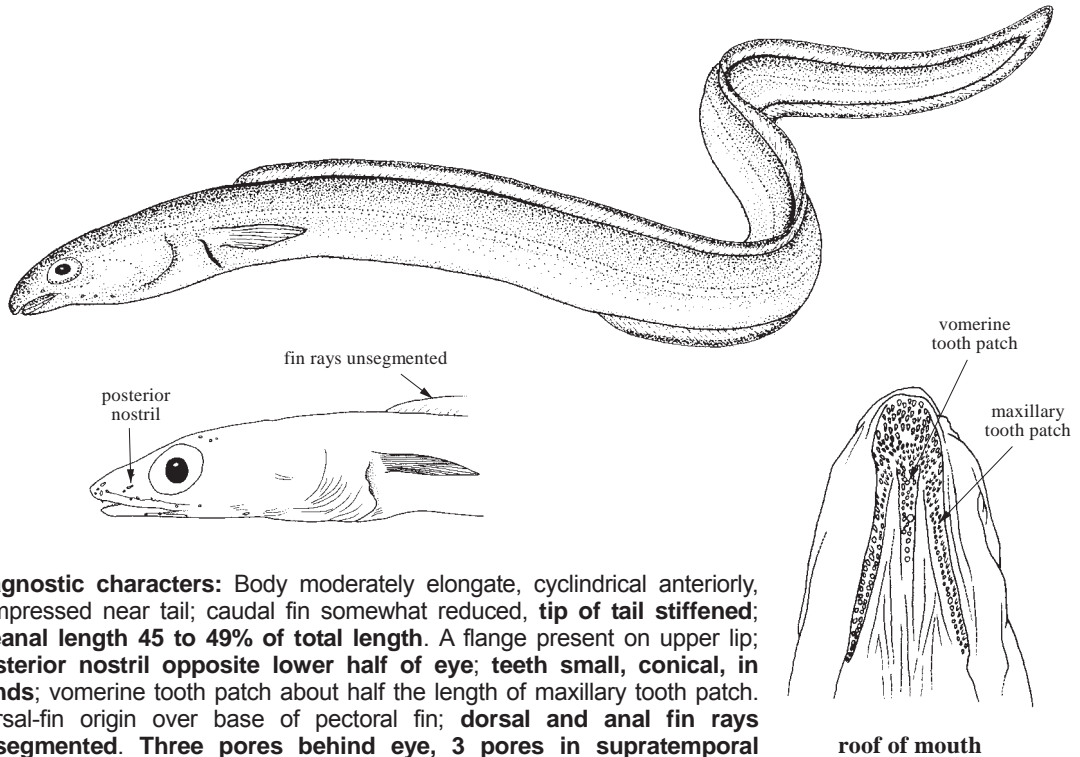
Blache, J. & Bauchot, M.-L. 1976. Contribution à la connaissance des poissons Anguilliformes de la côte occidentale d'Afrique. 16^e note: les familles des Congridae et des Colocongridae. *Bulletin de l'Institut Fondamental d'Afrique Noire*, T. 38, sér. A, No. 2: 369–444.

Smith, D.G. 1989. Family Congridae. In E.B. Böhlke, ed. Fishes of the western North Atlantic, Part 9. *Memoirs of the Sears Foundation for Marine Research*, 1(9): 460–567.

***Ariosoma balearicum* (Delaroché, 1809)**

Frequent synonyms / misidentifications: None / None.

FAO names: En – Bandtooth conger; Fr – Congre des Baléares; Sp – Varga.



Diagnostic characters: Body moderately elongate, cylindrical anteriorly, compressed near tail; caudal fin somewhat reduced, **tip of tail stiffened**; **preanal length 45 to 49% of total length**. A flange present on upper lip; **posterior nostril opposite lower half of eye**; **teeth small, conical, in bands**; vomerine tooth patch about half the length of maxillary tooth patch. Dorsal-fin origin over base of pectoral fin; **dorsal and anal fin rays unsegmented**. **Three pores behind eye, 3 pores in supratemporal commissure**. Vertebrae 120 to 136. **Colour:** light brown, paler below, vertical fins edged in black posteriorly; in life silvery or golden reflections on lower half of flank, crescentic orange area on eye above pupil and red pectoral fin.

Size: Maximum to about 35 cm.

Habitat, biology, and fisheries: Benthic on sand bottoms. Recorded depth range 1 to 752 m, but most common in less than 100 m. Spends much of its time buried in the substratum, which it enters tail-first, leaving only the head exposed. Appears to feed mainly on small benthic invertebrates. Taken incidentally throughout its range. Separate statistics are not reported for this species. Taken by bottom trawls. Probably not often eaten due to its small size, but likely to be taken frequently in trawls.

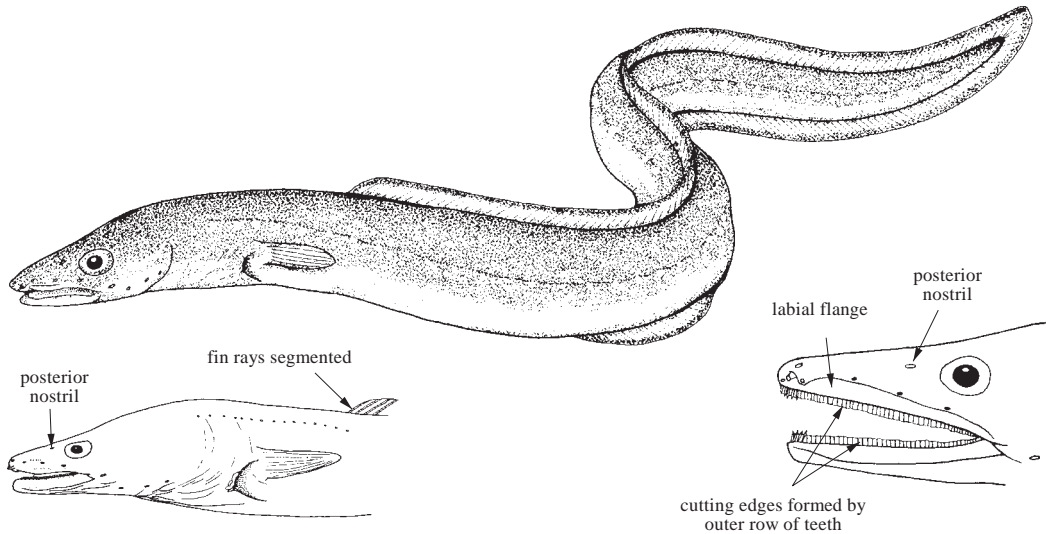
Distribution: In the area, from Gibraltar at least to the mouth of the Congo River, although the southern limits are uncertain. Northward extending into the Mediterranean; also western Atlantic.



***Conger conger* (Linnaeus, 1758)**

Frequent synonyms / misidentifications: None / None.

FAO names: **En** – European conger; **Fr** – Congre d'Europe; **Sp** – Congrio común.



Diagnostic characters: Body elongate, cylindrical anteriorly, compressed posteriorly; **tip of tail flexible** but not greatly attenuate. A well-developed flange on upper lip; **diameter of eye more than 1.75% of total length**; 2 rows of teeth in jaws, the **outer forming a cutting edge** maxilla reaching to below center of eye; **posterior nostril at mideye level**; **upper edge of gill opening opposite about middle of pectoral-fin base**. Dorsal-fin origin slightly ahead to slightly behind tip of appressed pectoral fin; **dorsal and anal-fin rays segmented**; **pectoral-fin rays 17 to 20**. Lateral-line pores anterior to a vertical line at anus 44 to 47. Vertebrae about 148 to 161. **Colour:** brown or grey above, pale ventrally, vertical fins edged in black.

Size: Maximum said to be about 3 m; males generally mature at 50 to 75 cm, females at about 2 m.

Habitat, biology, and fisheries: Occurs from the shoreline to depths of 500 m. Feeds on fishes and invertebrates. Northern part of the area only, uncommon south of Cape Blanc. Its main fishing grounds are outside the area, in the Mediterranean and along the western coasts of Europe. Caught on hook-and-line and in bottom trawls. Marketed mostly fresh and canned.

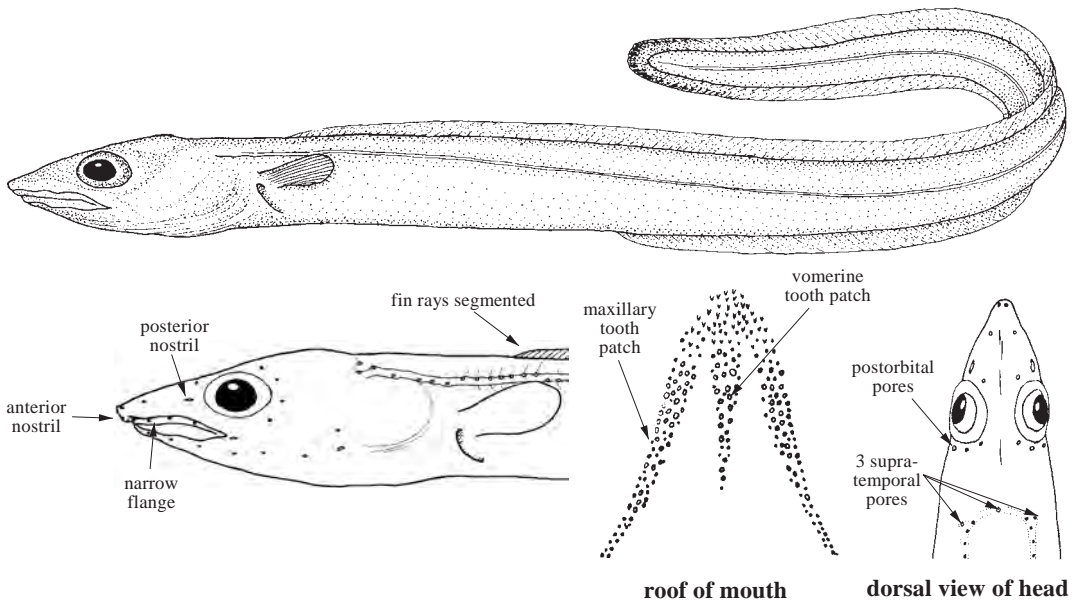
Distribution: In the area, from the Straits of Gibraltar to Dakar, Senegal, including the Canary Islands. Northward extending into the Mediterranean and the western Black Sea, and along the Atlantic coasts of Europe to Norway.



Gnathophis mystax (Delaroche, 1809)

Frequent synonyms / misidentifications: None / None.

FAO names: En – Thinlip conger; Fr – Congre bec-fin; Sp – Congrio dulce.



Diagnostic characters: Body elongate, cylindrical anteriorly, compressed toward tail; tip of tail slightly stiffened. **Preanal length less than 42% of total length. A narrow flange on upper lip; posterior nostril at mideye level;** teeth small, conical, in bands; vomerine tooth patch elongate, slightly more than half the length of maxillary tooth patch. Dorsal-fin origin over pectoral fin; **dorsal and anal-fin rays segmented.** Three pores behind eye; 3 pores in supratemporal commissure; **second and about seventh to thirteenth lateral-line pores open from upper edge of canal, while all others open from lower edge.** Vertebrae 134 to 141. **Colour:** brown, paler below, vertical fins edged in black posteriorly.

Size: Maximum probably not more than 40 cm; common to 35 cm.

Habitat, biology, and fisheries: Benthic on muddy or sandy bottoms in depths of 40 to 800 m, probably most common in the 80 to 400 m range. Crepuscular or nocturnal in habits, much more frequently captured at night; during daytime burrows into the substratum, although cloudy weather or turbid water conditions may bring it out. Feeds on benthic invertebrates and small fishes. Taken incidentally throughout its range. Separate statistics are not reported for this species. Taken in bottom trawls. Probably not often consumed, due to its small size, but can appear frequently in trawls, especially those made at night.

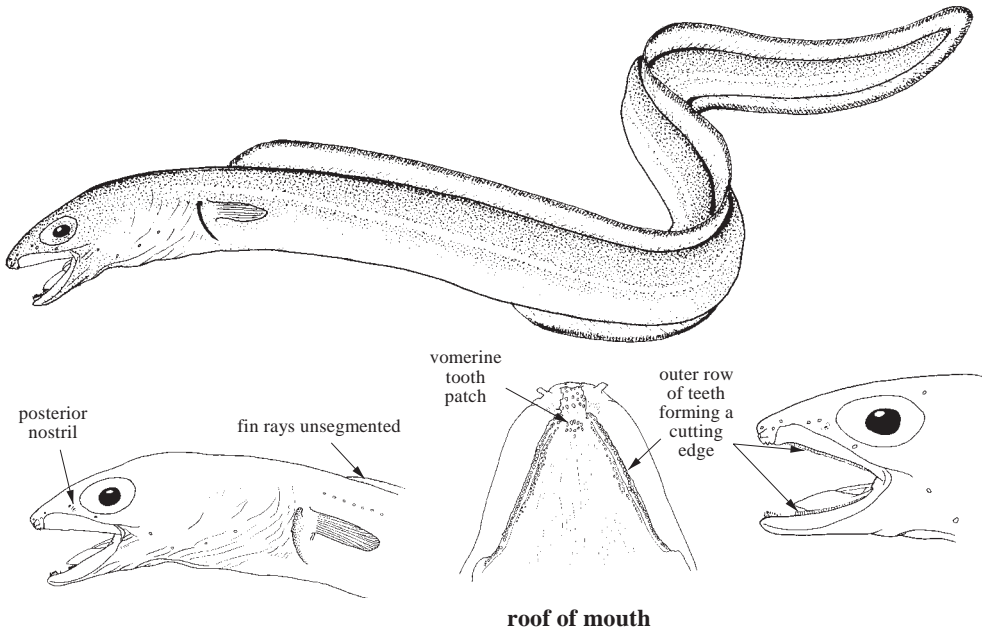
Distribution: In the area, from Gibraltar to about the Tropic of Cancer, including Madeira, Canary and Cape Verde Islands, although the southern limits are uncertain. Northward extending into the Mediterranean and to Portugal.



***Paraconger notialis* Kanazawa, 1961**

Frequent synonyms / misidentifications: None / *Conger macrops* Günther, 1870.

FAO names: En – Guinean conger; Fr – Congre de Guinée; Sp – Congrio de Guinea.



Diagnostic characters: Body moderately elongate, cylindrical anteriorly, compressed posteriorly; caudal fin somewhat reduced, **tip of tail stiffened**; preanal length 41 to 49% of total length. A broad flange on upper lip; **posterior nostril opposite lower half of eye**; **upper edge of gill opening opposite upper end of pectoral-fin base**; teeth in jaws in 2 rows, **those of the outer row larger, compressed, forming a cutting edge**; vomerine tooth patch short. **Dorsal-fin origin over middle of pectoral fin**; **dorsal and anal-fin rays unsegmented**. **Lateral-line pores before anus 34 to 40**; no pores behind the eye or in the supratemporal commissure. Vertebrae 132 to 138. **Colour:** yellowish brown, paler ventrally, vertical fins edged in black posteriorly.

Size: Maximum recorded: 62.7 cm.

Habitat, biology, and fisheries: Occurs on sandy bottoms at depths of 25 to 50 m, where it is said to be common. It burrows into the substratum tail-first, with only the head exposed. Food unknown, but probably small fishes and invertebrates. Taken incidentally throughout its range. Separate statistics are not reported for this species. Caught mainly in bottom trawls. Probably consumed occasionally but not common in markets.

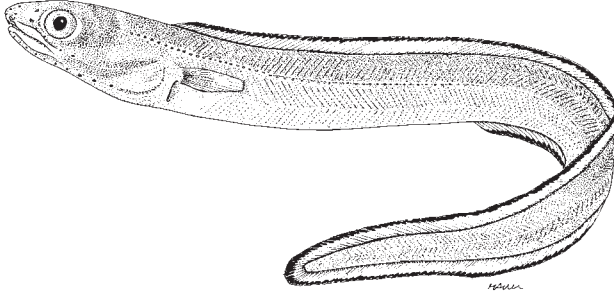
Distribution: Coast of West Africa from Senegal to Angola.



***Ariosoma anale* (Poey, 1860)**

En – Short-tail conger (AFS: Longtrunk conger).

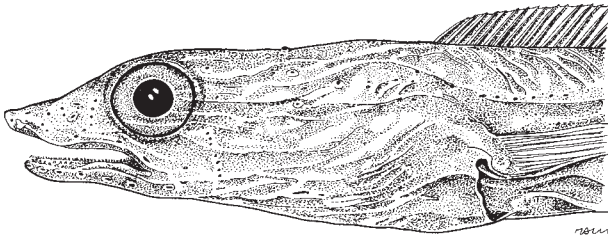
Maximum size to 37 cm. Uncommon in depths of 11 to 55 m, off Côte d'Ivoire and Ghana; also western Atlantic.



***Ariosoma mellissii* (Günther, 1870)**

En – Melliss's conger.

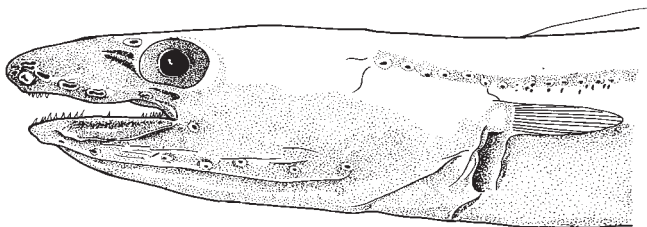
Maximum size to 43 cm. Found only at St Helena.

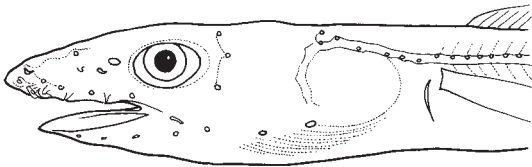
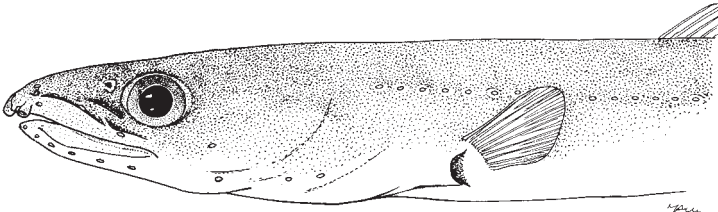
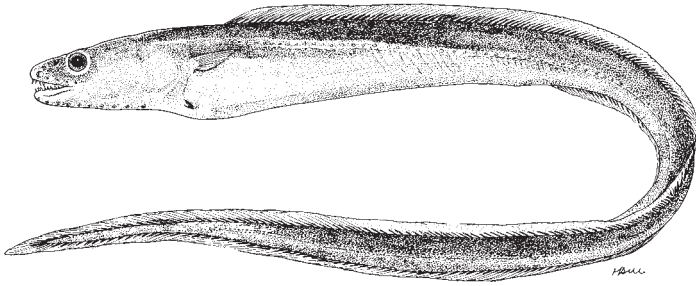


***Bathycongrus bertini* (Poll, 1953)**

En – Bertin's conger.

Maximum size to 35 cm. Occurs on mud or sand bottoms in depths of 200 to 400 m, from Guinea to Angola.

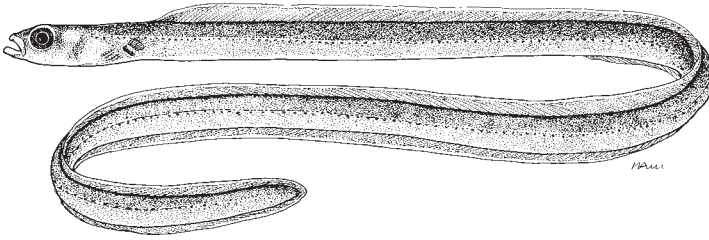




***Heteroconger longissimus* Günther, 1870**

En – Garden eel.

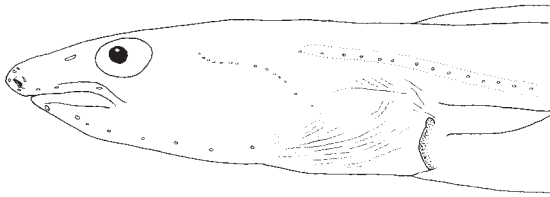
Maximum size to 49 cm. Found in certain specific sand-bottom habitats, at depths of 10 to 50 m; known from Madeira, the Canary Islands and coast of Senegal.



***Japonoconger africanus* (Poll, 1953)**

En – Long-fin conger.

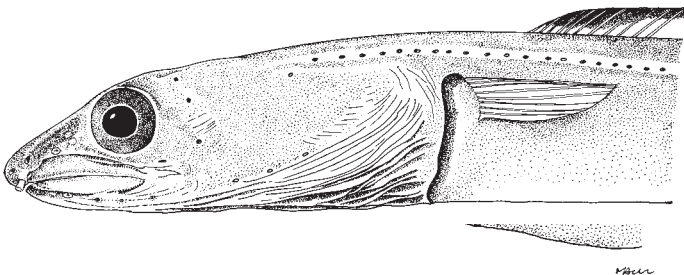
Maximum size to 50 cm. Found on mud or sand bottoms in 270 to 576 m, from Gabon to the Congo.



***Paraconger macrops* (Günther, 1870)**

En – Manypore conger.

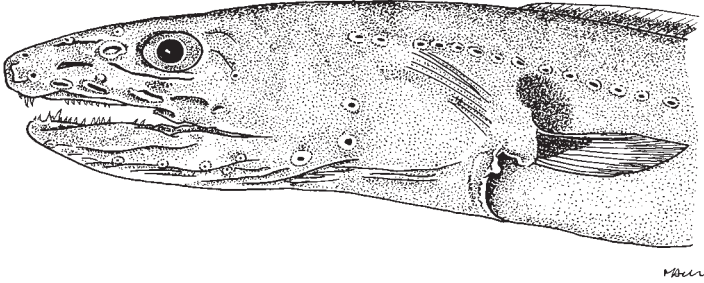
Maximum size 42 cm. Known only from Madeira.



***Paruroconger drachi* Blache and Bauchot, 1976**

En – Drach's conger.

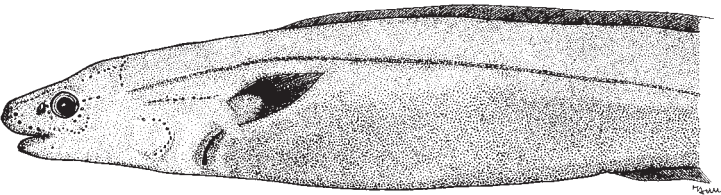
Maximum size at least 42 cm. Known from a single specimen, from 120 m off Congo.



***Promyllantor atlanticus* Karmovskaya, 2006**

En – Shortjaw conger.

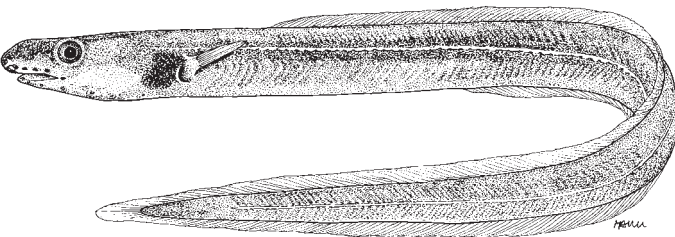
Maximum size at least 518 mm. Known only from the holotype and paratype, collected west of Congo at 6°14'S, 11°24'E, at 495 m.



***Pseudophichthys splendens* (Lea, 1913)**

En – Purplemouthed conger.

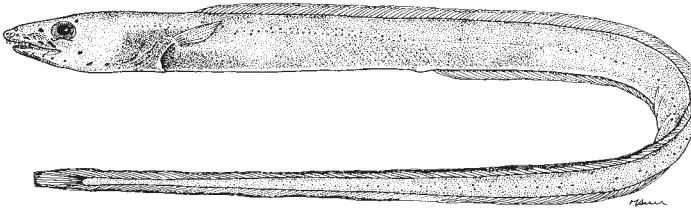
Maximum size to 38 cm. In the area, known from Morocco, the Canary Islands and Madeira, and the Gulf of Guinea, elsewhere the Azores and western Atlantic; mean depth 656 m, to 1 647 m.



***Uroconger syringinus* Ginsburg, 1954**

En – Slender-tail conger (AFS: Threadtail conger).

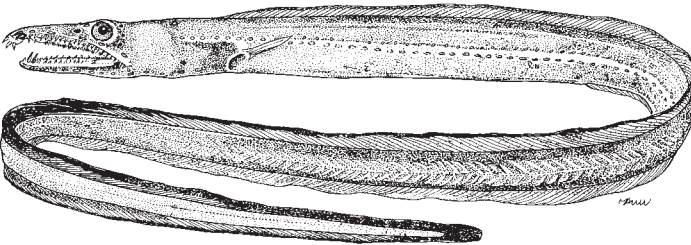
Maximum size to 51 cm. Occurs in continental waters at depths of 44 to 384 m. In the area, known from Ghana to the Congo; also in the western Atlantic.



***Xenomystax congroides* Smith and Kanazawa, 1989**

En – Snaggle-tooth conger.

Maximum size to 88 cm. In the area, occurs from Liberia to the Congo, in depths of 140 to 825 m; also western Atlantic.



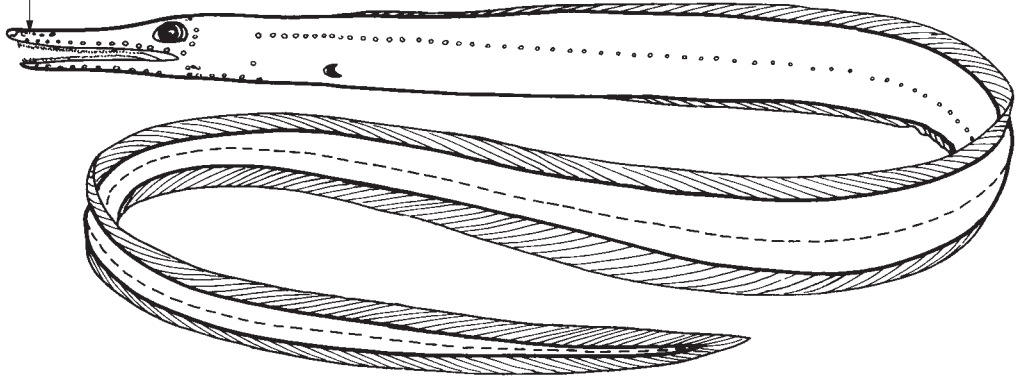
NETTASTOMATIDAE

Duckbill eels

by D.G. Smith, National Museum of Natural History, Washington, DC, USA

Diagnostic characters: Maximum size approximately 1 m, usually smaller. **Body elongate**, anus before midlength; **tail slender, attenuate**, often broken and regenerated. **Head slender, snout and jaws elongate, snout projecting a variable distance beyond tip of lower jaw.** Eye well developed. **Mouth large, gape extending to about rear margin of eye; no fleshy flange on upper or lower lip; some teeth exposed when mouth closed;** tip of lower jaw fits into depression behind intermaxillary tooth patch. Teeth on jaws and vomer generally small, conical, multiserial, except in *Hoplunnis*, which has enlarged vomerine fangs. Dorsal and anal fins present, confluent with caudal fin; dorsal fin begins over or slightly behind gill opening. Pectoral fin present or absent. Scales absent. Lateral line complete. **Colour:** brown, lighter ventrally, without markings; dorsal and anal fins often edged in black, especially posteriorly.

elongate snout and jaws



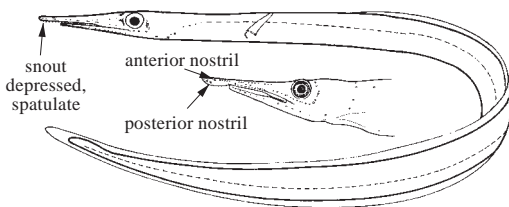
Habitat, biology, and fisheries: Nettastomatids live on or near the bottom in moderate to deep water. Although they are occasionally taken in trawls, they have no commercial value.

Similar families occurring in the area

The elongate body and head and the attenuate tail distinguish the Nettastomatidae from all but a few other eels.

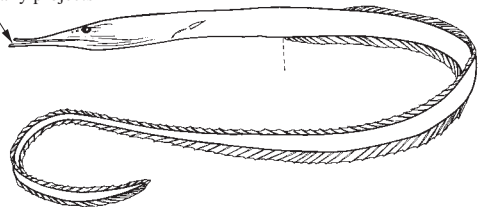
Derichthyidae (*Nessorhamphus*): the jaws are elongate, but the snout is depressed and spatulate, and the posterior nostril is near the tip of the snout.

Serrivomeridae: have elongate, slender jaws, but the lower jaw usually projects beyond the upper. Most species have enlarged teeth on the vomer, but these are arranged alternately in a double row, resulting in a saw-like appearance, quite different from the separated fangs present on some nettastomatids (*Hoplunnis*). In serrivomerids, the anterior and posterior nostrils are located close together, immediately in front of the eye. Serrivomerids are pelagic in habitat, unlike the benthic nettastomatids.



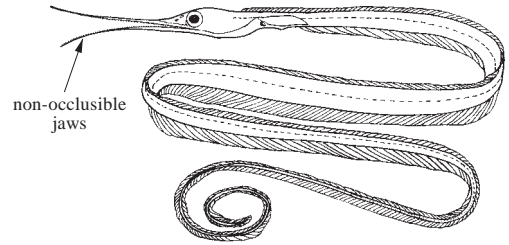
Nessorhamphus

lower jaw usually projects



Serrivomeridae

Nemichthyidae: have an elongate snout, but the upper and lower jaws diverge and are non-occlusible.



Nemichthyidae

Key to the species of Nettastomatidae occurring in the area

- 1a. Pectoral fin present; greatly enlarged, fang-like teeth on midline of vomer (Fig. 1) ***Hoplunnis punctata***
- 1b. Pectoral fin absent; vomerine teeth not greatly enlarged and fang-like → 2

- 2a. Posterior nostril at mideye level (Fig. 2); pterygoid teeth present (Fig. 3) ***Saurenehelys* sp.**
- 2b. Posterior nostril distinctly above or below mideye level; pterygoid teeth absent → 3

- 3a. Posterior nostril a slit in upper lip (Fig. 4a) ***Facciolella* spp.**
- 3b. Posterior nostril above mideye level, in front of anterior margin of eye or behind eye (Fig. 4b and c) → 4

- 4a. A fleshy proboscis at snout tip (Fig. 5); 8 to 13 pores in supraorbital canal ***Venefica proboscidea***
- 4b. No fleshy proboscis at tip of snout; 4 to 6 pores in supraorbital canal → 5

- 5a. Posterior nostril over anterior margin of eye (Fig. 4b) ***Nettastoma melanurum***
- 5b. Posterior nostril on top of head behind eye (Fig. 4c) ***Nettenchelys dionisi***



Fig. 1 lateral view of head (*Hoplunnis punctata*)

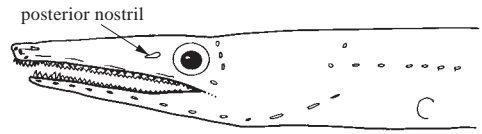


Fig. 2 lateral view of head (*Saurenehelys*)

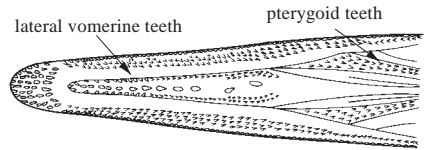
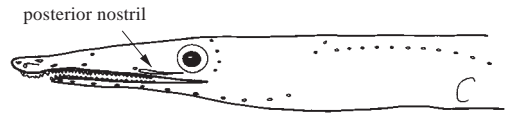
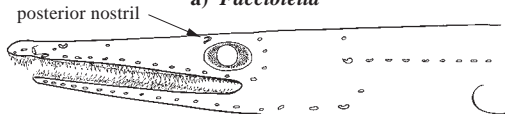


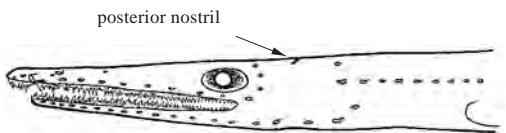
Fig. 3 upper jaw of *Saurenehelys*



a) *Facciolella*



b) *Nettastoma*



c) *Nettenchelys*

Fig. 4 lateral view of head



Fig. 5 lateral view of head (*Venefica proboscidea*)

List of species occurring in the area


The symbol  is given when species accounts are included.

Note: The species composition of *Facciolella* and *Saurenchelys* has not been satisfactorily established. Species of these 2 genera are largely indistinguishable as adults, except for minor proportional measurements and vertebral counts, which are of limited use due to the frequent occurrence of broken tails. Leptocephali are easier to distinguish, but most have not yet been linked to an adult. One species of *Saurenchelys* is known from the area, but it has not yet been formally described. *Facciolella* is probably represented by more than one species, based on myomere counts of larvae.

 *Facciolella* spp.

 *Hoplunnis punctata* Regan, 1915.

 *Nettastoma melanurum* Rafinesque, 1810.

 *Nettenchelys dionisi* Brito, 1989.

 *Saurenchelys* sp.

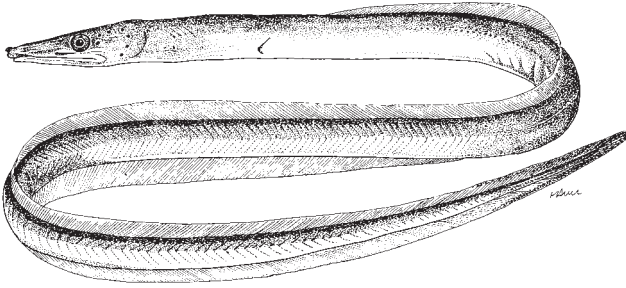
 *Venefica proboscidea* (Vaillant, 1888).

References

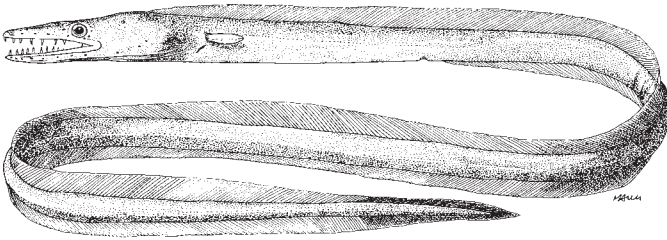
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- Brito, A.** 1989. *Nettenchelys dionisi*, a new species of nettastomatid eel (Pisces: Anguilliformes) from the Canary Islands. *Copeia*, 1989(4): 876–880.
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- Smith, D.G. & Castle, P.H.J.** 1982. Larvae of the nettastomatid eels: systematics and distribution. *Dana Report*, (90): 1–44.

Facciolella* spp.*En** – Facciola's duckbill eel.

Maximum size 65 cm. Benthic in depths of 330 to 730 m. In the area, reported from Morocco and from Cameroon to Gabon; occurrence in intervening area uncertain.

***Hoplunnis punctata* Regan, 1915****En** – Slender duckbill eel.

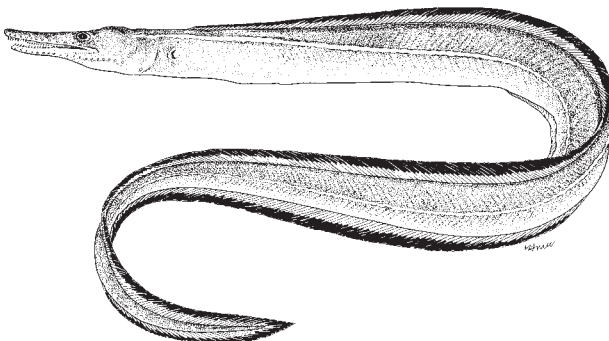
Maximum size 56 cm. Benthic on continental shelf and upper slope. Senegal to Angola.



(after Blache, 1968)

***Nettastoma melanurum* Rafinesque, 1810****En** – Blackfin sorcerer.

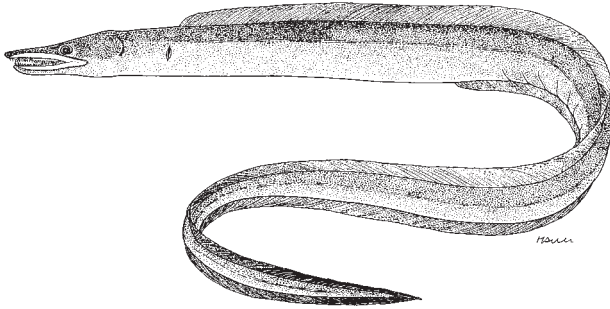
Maximum size 78 cm. Benthic in depths of 329 to 860 m. In the area, known from Morocco, the Canary Islands, and Madeira, and from Nigeria to Angola, presence in intermediate area uncertain. Elsewhere, Mediterranean, western Atlantic.



***Nettenchelys dionisi* Brito, 1989**

En – Rearnose duckbill eel.

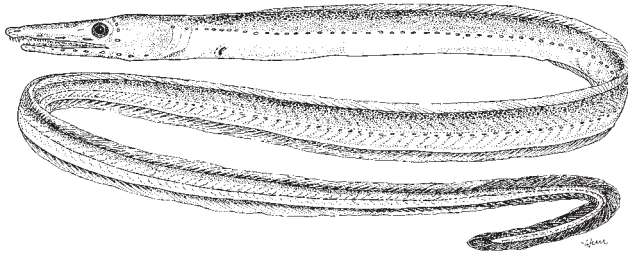
Maximum size 62 cm. Benthic at depths of 350 to 400 m. Known only from the Canary Islands.



***Saurenychelys* sp.**

En – Longface duckbill eel.

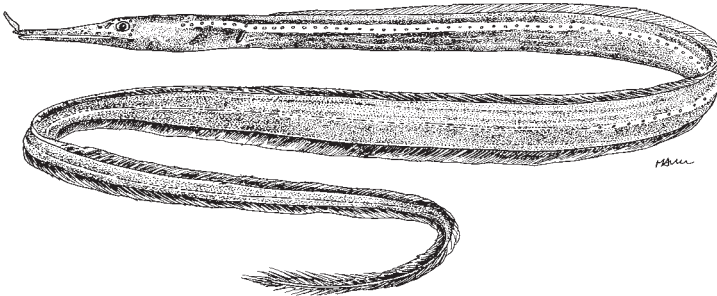
Maximum size 36 mm. Benthic on continental slope, Nigeria to Angola.



***Venefica proboscidea* Vaillant, 1888**

En – Whipsnout sorcerer.

Maximum size 96 cm. Benthic on continental slope, to depths of 2 000 m. Recorded from Morocco and South Africa, presence in intervening area uncertain.

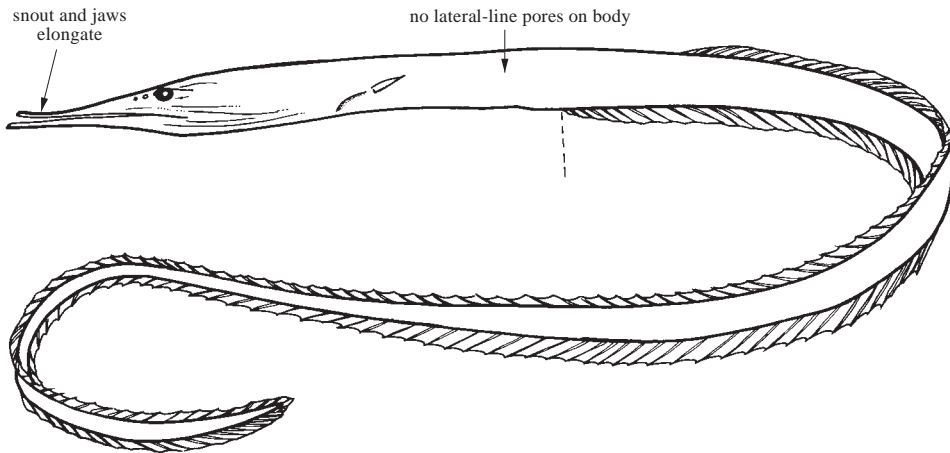


SERRIVOMERIDAE

Sawtooth eels

by D.G. Smith, National Museum of Natural History, Washington, DC, USA

Diagnostic characters: Body moderate to elongate, anus before midbody, at about first one-fourth to one-third of total length; tail slender but not greatly attenuated. Head slender. Eye fairly well developed. **Snout and jaws elongate and pointed; anterior and posterior nostrils close together, immediately in front of eye.** Mouth large, gape ending approximately under posterior margin of eye; upper and lower jaws approximately equal in length or lower slightly longer; no fleshy flange on upper or lower lip. Maxillary and mandibular teeth relatively small, conical, in 2 to several rows; **vomerine teeth either small and granular, or large and saw-like and arranged in 2 closely set rows.** Dorsal and anal fins present, confluent with caudal fin, anal fin somewhat higher than dorsal; **dorsal fin begins over or slightly behind anus.** Pectoral fin present though small. Scales absent. **Lateral line reduced, pores on body absent and on head limited to 3 small pores between anterior and posterior nostrils.** **Colour:** dark brown or black, with an iridescent silvery or bronze epidermal layer, the latter often lost during net capture. No markings.

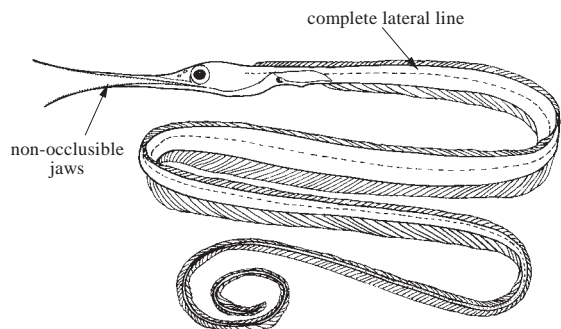


Habitat, biology, and fisheries: Serrivomerids are midwater eels, found mainly at depths of 500 to 1 000 m. At maturity, serrivomerids exhibit some sexual dimorphism; in males the upper jaw shortens, the dentition is modified or reduced, and the anterior nostril becomes tubular. They are of no importance to fisheries.

Similar families occurring in the area

Serrivomerids are distinctive eels and unlikely to be confused with anything else.

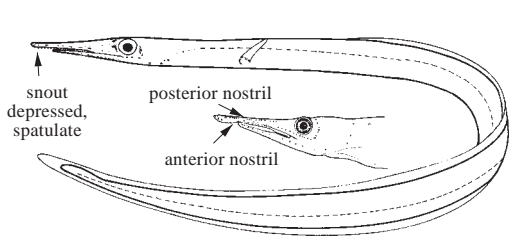
Nemichthyidae: except for seated, non-occlusible jaws. They also have a complexly mature males, nemichthyids have greatly elongate lateral line with well-developed pores.



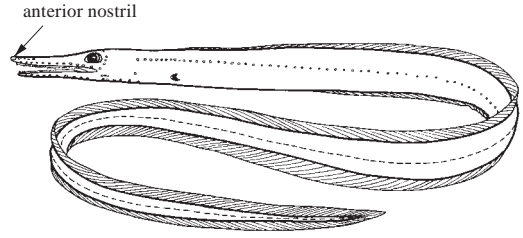
Nemichthyidae

Derichthyidae: *Nessorhamphus* has elongated jaws, but the snout is somewhat depressed and spatulate, and the nostrils are near the tip of the snout. The lateral line is complete.

Nettastomatidae: have elongated jaws, but the anterior nostril is near the tip of the snout, far from the posterior nostril. The lateral line is complete.



Nessorhamphus



Nettastomatidae

Key to the species of Serrivomeridae occurring in the area

- 1a. Dorsal fin begins over or slightly ahead of anus (Fig.1); vomerine teeth small and granular and in several rows (Fig. 2) ***Stemonidium hypomelas***
- 1b. Dorsal fin begins behind anus (Fig. 3); vomerine teeth enlarged and forming a saw-toothed row (Fig. 4) → 2

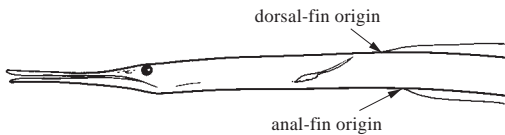


Fig. 1 *Stemonidium hypomelas*

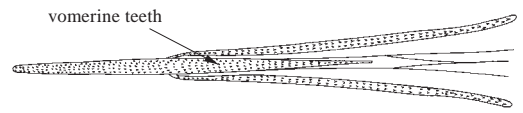


Fig. 2 roof of mouth (*Stemonidium hypomelas*)

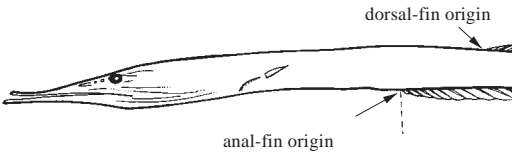


Fig. 3 *Serrivomer*

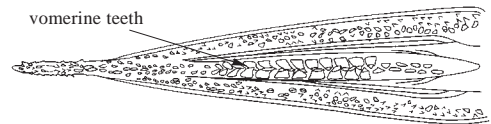


Fig. 4 roof of mouth (*Serrivomer*)

- 2a. Body with a silvery epidermal layer; each vomerine tooth about 3 or 4 times as long as wide; dorsal-fin rays 142 to 173; anal-fin rays 122 to 156; anterior tips of first 4 or 5 branchiostegal rays extend beyond their articulation with hyoid arch (Fig. 5) ***Serrivomer beanii***

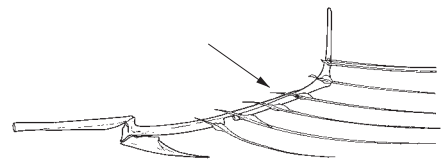



Fig. 5 branchiostegal rays

- 2b. Body with a bronze epidermal layer; each vomerine tooth about twice as long as wide; dorsal-fin rays 175 to 200; anal-fin rays 165 to 192; anterior tips of first 4 or 5 branchiostegal rays not extending beyond their articulation with hyoid arch. ***Serrivomer lanceolatoides***

List of species occurring in the area

The symbol  is given when species accounts are included.

Note: The nominal species *Platuronides danae*, *P. ophiocephalus*, *P. acutus*, and *Serrivomer brevidentatus* are synonyms of *Serrivomer lanceolatooides*.

 *Serrivomer beanii* Gill and Ryder, 1883.

 *Serrivomer lanceolatooides* (Schmidt, 1916).

 *Stemonidium hypomelas* Gilbert, 1905. To 38 cm.

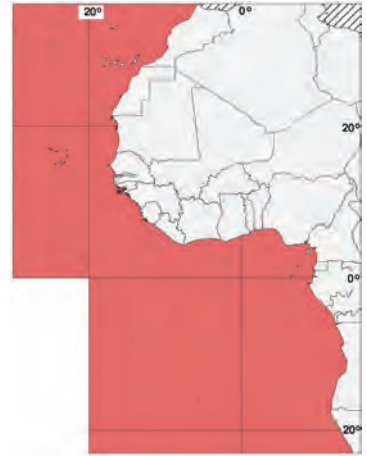
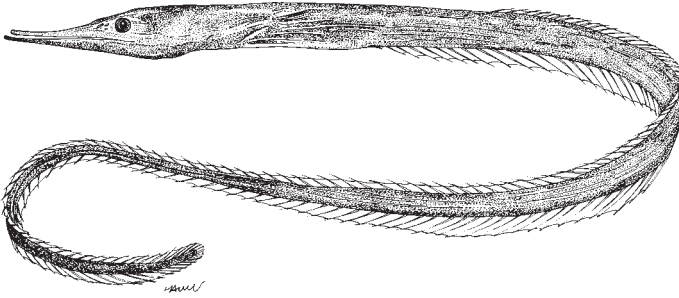
Reference

Tighe, K.A. 1989. Family Serrivomeridae. In E.B. Böhlke, ed. Fishes of the Western North Atlantic, Part 9. *Memoirs of the Sears Foundation for Marine Research*, 1(9): 613–627.

Serrivomer beanii Gill and Ryder, 1883

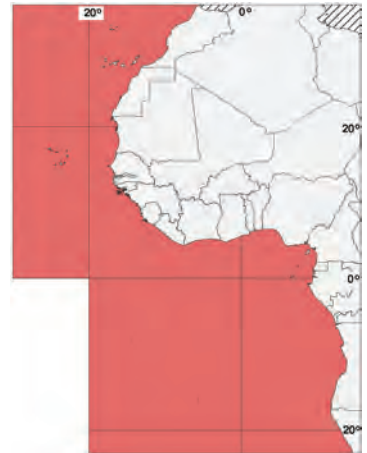
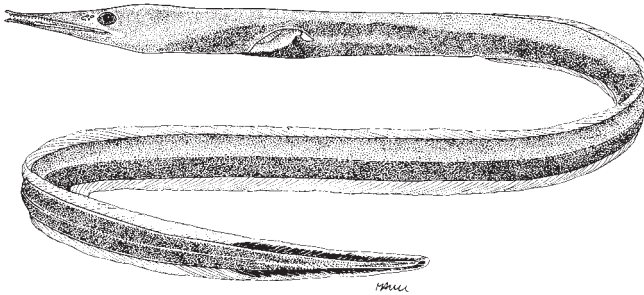
En – Bean's sawtooth eel.

Maximum size 75 cm. Eastern and western Atlantic, in depths of 500 to 1 000 m; found throughout the area.

***Serrivomer lanceolatoides*** (Schmidt, 1916)

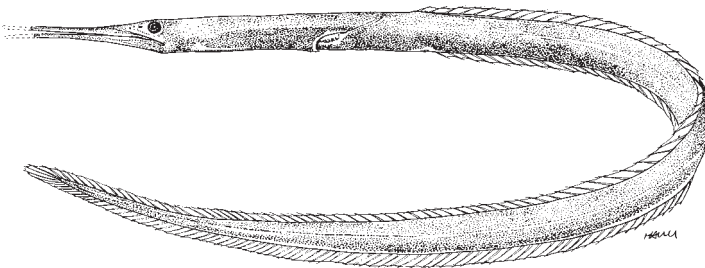
En – Bronze sawtooth eel.

Maximum size 64 cm. Eastern and western Atlantic, in depths of 500 to 1 000 m; found throughout the area.

***Stemonidium hypomelas*** Gilbert, 1905

En – Black serrivomerid eel.

Maximum size 38 cm. Equatorial region of all oceans, in depths of 200 to 1 200 m; one record from the area.



- A**
- ANGUILLIDAE** 1605
- ANGUILLIFORMES 1605
- American eel 1605
- Anarchias euryurus* 1637
- Anarchias grassi* 1637
- Anarchias longicauda* 1637
- Anarchias similis* 1637
- Angolan shortfaced eel 1609
- Anguilla europea* 1605
- Anguilla anguilla* 1605
- Anguille d'Europe 1605
- ANGUILLIDAE** 1646, 1681
- Anguillids 1646
- Ariosoma* 1680
- Ariosoma anale* 1690
- Ariosoma balearicum* 1686
- Ariosoma mellissii* 1690
- Avocet snipe eel 1678
- Avocettina acuticeps* 1678
- Avocettina infans* 1678
- B**
- Bandtooth conger 1686
- Basketwork eel 1650
- Bathycongrus bertini* 1690
- Bathuroconger vicinus* 1691
- Batnose eel 1650
- Bean's sawtooth eel 1703
- Bertin's conger 1690
- Bicoloured false moray 1613
- Blache's ooze eel 1651
- Black serrivomerid eel 1703
- Blackbelly spoonbill eel 1672
- Blackfin sorcerer 1698
- Broadbanded moray 1622
- Bronze sawtooth eel 1703
- Brown moray 1631
- C**
- CHLOPSIDAE** 1611
- COLOCONGRIDAE** 1667
- CONGRIDAE** 1680
- Canary moray 1639
- Catesbya* 1615
- Chain moray 1638
- Channomuraena vittata* 1622
- Chestnut moray 1638
- CHLOPSIDAE** 1615, 1644, 1646, 1681
- Chlopsids 1611-1612, 1646
- Chlopsis bicolor* 1613
- Chlopsis olokun* 1613
- Coloconger* 1680
- Coloconger cadenati* 1667-1668
- COLOCONGRIDAE** 1646, 1680
- Conger* 1680
- Conger conger* 1687
- Conger eels 1680
- Conger macrops* 1689
- Conger sp.* 1691
- Congers 1680
- Congre bec-fin 1688
- Congre d'Europe 1687
- Congre de Guinée 1689
- Congre des Baléares 1686
- CONGRIDAE** . 1611, 1644, 1646, 1655, 1670, 1674
- Congrids 1646, 1670
- Congrio común 1687
- Congrio de Guinea 1689
- Congrio dulce 1688
- Culegra de mar 1666
- Cutthroat eels 1645
- CYEMATIDAE** 1676
- Cynoponticus* 1674
- Cynoponticus ferox* 1673-1674
- D**
- DERICHTHYIDAE** 1669
- Dark moray 1626
- Deep-water arrowtooth eel 1651
- DERICHTHYIDAE** 1676, 1695, 1701
- Derichthyids 1669
- Derichthys* 1669-1670
- Derichthys serpentinus* 1672
- Diastobranchus capensis* 1650
- Drach's conger 1693
- Duckbill eels 1695
- Duckbill oceanic eel 1672
- Dysomma brevirostre* 1650
- Dysommia* 1612
- E**
- Echelus myrus* 1664
- Echelus pachyrhynchus* 1664
- Echidna catenata* 1638
- Echidna peli* 1623
- Echiophis punctifer* 1664

- Enchelycore anatina* 1624
Enchelycore carychroa 1638
Enchelycore nigricans 1625
European conger 1687
European eel 1605
- F**
- Facciola's duckbill eel 1698
Facciolella 1697
Facciolella spp. 1698
False morays 1611
Fangtooth moray 1624
Flagged moray 1641
Freshwater eels 1605
- G**
- Garden eel 1692
Gnathophis mystax 1688
Goldentail moray 1629
Grey cutthroat eel 1652
Guinean conger 1689
Guinean pike conger 1673
Gymnothorax afer 1626
Gymnothorax bacalladoi 1639
Gymnothorax maderensis 1627
Gymnothorax mareei 1628
Gymnothorax miliaris 1629
Gymnothorax moringa 1639
Gymnothorax polygnus 1630
Gymnothorax unicolor 1628,1631
Gymnothorax vicinus 1632
- H**
- HETERENCHELYIDAE** 1607
Haptenchelys texis 1650
Hemerorhinus 1662
Heteroconger longissimus 1692
HETEROCONGRINAE 1655,1680
Heterocongrines 1655
Histiobranchus bathybius 1651
Honeycomb moray 1635
Hoplunnis 1670,1695
Hoplunnis punctata 1674,1698
- I**
- ILYOPHINAE** 1612,1645,1674
Ilyophines 1612,1645-1646
Ilyophis blachei 1651
Ilyophis brunneus 1651
- J**
- Japonoconger africanus* 1692
Jigsaw moray 1642
- K**
- Kaup's arrowtooth eel 1652
- L**
- Labichthys carinatus* 1678
Leptocephali 1697
Long-fin conger 1692
Long-tooth conger 1691
Longface duckbill eel 1699
Longneck eels 1669
Longtailed shortfaced eel 1610
Longtrunk conger 1690
Lycodontis afer 1626
Lycodontis anatinus 1624
Lycodontis mareei 1628
Lycodontis miliaris 1629
Lycodontis unicolor 1631
Lycodontis vicinus 1632
- M**
- MURAENESOCIDAE** 1673
MURAENIDAE 1614
MYROCONGRIDAE 1643
Manypore conger 1692
Marbled moray 1641
Mauritanian shortfaced eel 1609
Mediterranean moray 1634
Melliss's conger 1690
Monopenchelys acuta 1640
Moray eels 1614
Morena boca manchada 1628
Morena cadena 1638
Morena cinturones 1622
Morena de boca púrpura 1632
Morena de lunares 1635
Morena de polígona 1630
Morena dorada 1629
Morena isleña 1624
Morena manchada 1639
Morena mediterránea 1634
Morena negra 1631,1633
Morena oscura 1626
Morena picopato negra 1625
Morena robusta 1636

Moreneta	1623
Morenita del confite	1637
Morenocio de Guinea	1673
MORINGUIDAE	1655
Moringuids	1655
Murène obscure	1626
Muddy arrowtooth eel	1651
<i>Muraena augusti</i>	1633
<i>Muraena bettencourti</i>	1633
<i>Muraena helena</i>	1633-1634
<i>Muraena melanotis</i>	1635
<i>Muraena miliaris</i>	1629
<i>Muraena pavonina</i>	1641
<i>Muraena robusta</i>	1635-1636
MURAENESOCIDAE	1646,1655,1680-1681
Muraenesocids	1646
<i>Muraenesox ferox</i>	1673
MURAENIDAE	1611,1644,1646,1674,1681
Muraenids	1646
MURAENINAE	1614
Murión	1639
Murión verde	1627
Murène aux yeux blancs	1633
Murène brune	1631
Murène canarienne	1639
Murène cobra	1628
Murène de Madère	1627
Murène de Méditerranée	1634
Murène des îles	1624
Murène dorée	1629
Murène jaune	1632
Murène noire	1625
Murène robuste	1636
Murène serpent	1623
Murène tachetée	1639
Murène à pois	1635
Murène anneau	1622
Murénésoce de Guinée	1673
MYROCONGER	1644
<i>Myroconger compressus</i>	1643
MYROCONGRIDAE	1615
MYROPHINAE	1612,1654-1655
<i>Mystriophis</i>	1662
<i>Mystriophis crosnieri</i>	1665
N	
NEMICHTHYIDAE	1675
NETTASTOMATIDAE	1695
Naked cut throat eel	1650

Narrownecked oceanic eel	1672
NEMICHTHYIDAE	1670,1696,1700
Nemichthyids	1675
<i>Nemichthys curvirostris</i>	1679
<i>Nemichthys scolopaceus</i>	1679
<i>Nessorhamphus</i>	1669-1670,1676,1695,1701
<i>Nessorhamphus danae</i>	1672
<i>Nessorhamphus ingolfianus</i>	1672
<i>Nettastoma melanurum</i>	1698
NETTASTOMATIDAE	1670,1674,1676,1701
Nettastomatids	1670,1695
<i>Nettenchelys dionisi</i>	1699
Northern cutthroat eel	1652

O

OPHICHTHIDAE	1654
OPHICHTHIDAE	1607,1612,1615,1647,1681
Ophichthids	1647,1654
OPHICHTHINAE	1607,1612,1654-1655
<i>Ophichthus</i>	1662
<i>Ophichthus ophis</i>	1665
<i>Ophisurus serpens</i>	1666

P

Painted eel	1664
Pale threadtail snipe eel	1679
<i>Panturichthys isognathus</i>	1609
<i>Panturichthys longus</i>	1609
<i>Panturichthys mauritanicus</i>	1609
<i>Paraconger macrops</i>	1692
<i>Paraconger notialis</i>	1689
<i>Paruroconger drachi</i>	1693
Pebbletooth moray	1623
<i>Phyllogramma regani</i>	1673
Pike congers	1673
<i>Pisodonophis semicinctus</i>	1662,1666
Plain false moray	1613
Polygon moray	1630
<i>Promyllantor atlanticus</i>	1693
<i>Pseudophichthys splendens</i>	1693
Purplemouth moray	1632
Purplemouthed conger	1693
Pygmy moray	1637
<i>Pythonichthys macrurus</i>	1610
<i>Pythonichthys microphthalmus</i>	1610

R

Rearnose duckbill eel	1699
Red eel	1643

- Redface eel 1640
 Roundscale cutthroat eel 1653
- S**
- SERRIVOMERIDAE** 1700
SYNAPHOBRANCHIDAE 1645
- Saddled snake eel 1666
 Safio de manchas negras 1665
 Safio dentado punteado 1664
 Sand eels 1654
Saurenhelys 1697
Saurenhelys sp. 1699
 Sawtooth eels 1700
 Serp tacada 1666
 Serpent eel 1666
 Serponton miro 1664
 Serponton pintillé 1664
 Serponton tacheté 1665
 Serponton à nez long 1666
 Serponton à selles 1666
Serrivomer beanii 1703
Serrivomer lanceolatoides 1703
SERRIVOMERIDAE 1670,1676,1695
 Serrivomerids 1695,1700
 Sharktooth moray 1627
 Short-tail conger 1690
 Short-tailed eels 1667
 Shortfaced eels 1607
 Shortgut fintail snipe eel 1678
 Shortjaw conger 1693
 Shorttailed shortfaced eel 1610
 Shrimp eels 1654
 SIMENCHELYINAE 1645
Simenchelys 1645-1646
Simenchelys parasitica 1645,1652,1667
 Slender duckbill eel 1698
 Slender shortfaced eel 1609
 Slender snipe eel 1679
 Slender-tail conger 1694
 Snaggle-tooth conger 1694
 Snake eels 1654
 Snapper eel 1664
 Snipe eels 1675
 Snubnosed eel 1652
 Southern fintail snipe eel 1678
 Spoon-nose eel 1665
 Spotjaw moray 1628
 Spotted moray 1639
 Spotted snake eel 1665
- St Helena conger 1691
Stemonidium hypomelas 1703
 Stippled spoon-nose eel 1664
 Stout moray 1636
SYNAPHOBRANCHIDAE 1612,1667,1674
 Synaphobranchids 1645-1646
 SYNAPHOBRANCHINAE 1645
 Synaphobranchines 1645
Synaphobranchus 1647
Synaphobranchus affinis 1652
Synaphobranchus kaupii 1652
Synaphobranchus oregoni 1653
- T**
- Thick-nosed eel 1664
 Thin morays 1643
 Thinlip conger 1688
 Threadtail conger 1694
 Tieso miro 1664
- U**
- Uroconger syringinus* 1694
 UROPTERYGIINAE 1614
Uropterygius macularius 1641
Uropterygius wheeleri 1642
- V**
- Varga 1686
Venefica proboscidea 1699
 Viper moray 1625
- W**
- Walvis moray 1640
 Whipsnout sorcerer 1699
 White-eyed moray 1633
 Worm eels 1654
- X**
- XENOCONGRIDAE** 1615
Xenomystax 1674,1680
Xenomystax congroides 1674,1694
- A**
- acuta, Monopenchelys* 1640
acuticeps, Avocettina 1678
afer, Gymnothorax 1626
afer, Lycodontis 1626
affinis, Synaphobranchus 1652
africanus, Japonconger 1692

<i>anale</i> , <i>Ariosoma</i>	1690
<i>anatina</i> , <i>Enchelycore</i>	1624
<i>anatinus</i> , <i>Lycodontis</i>	1624
<i>anguilla</i> , <i>Anguilla</i>	1605
<i>atlanticus</i> , <i>Promyllantor</i>	1693
<i>augusti</i> , <i>Muraena</i>	1633

B

<i>bacalladoi</i> , <i>Gymnothorax</i>	1639
<i>balearicum</i> , <i>Ariosoma</i>	1686
<i>bathybius</i> , <i>Histiobranchus</i>	1651
<i>beanii</i> , <i>Serrivomer</i>	1703
<i>bertini</i> , <i>Bathycongrus</i>	1690
<i>bettencourti</i> , <i>Muraena</i>	1633
<i>bicolor</i> , <i>Chlopsis</i>	1613
<i>blachei</i> , <i>Ilyophis</i>	1651
<i>brevirostre</i> , <i>Dysomma</i>	1650
<i>brunneus</i> , <i>Ilyophis</i>	1651

C

<i>cadenati</i> , <i>Coloconger</i>	1667-1668
<i>capensis</i> , <i>Diastobranchus</i>	1650
<i>carinatus</i> , <i>Labichthys</i>	1678
<i>carychroa</i> , <i>Enchelycore</i>	1638
<i>catenata</i> , <i>Echidna</i>	1638
<i>compressus</i> , <i>Myroconger</i>	1643
<i>conger</i> , <i>Conger</i>	1687
<i>congroides</i> , <i>Xenomystax</i>	1674, 1694
<i>crosnieri</i> , <i>Mystriophis</i>	1665
<i>curvirostris</i> , <i>Nemichthys</i>	1679

D

<i>danae</i> , <i>Nessorhamphus</i>	1672
<i>dionisi</i> , <i>Nettenchelys</i>	1699
<i>drachi</i> , <i>Paruroconger</i>	1693

E

<i>euryurus</i> , <i>Anarchias</i>	1637
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F

<i>ferox</i> , <i>Cynoponticus</i>	1673-1674
<i>ferox</i> , <i>Muraenesox</i>	1673

G

<i>grassi</i> , <i>Anarchias</i>	1637
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H

<i>helena</i> , <i>Muraena</i>	1633-1634
<i>hypomelas</i> , <i>Stemonidium</i>	1703

I

<i>infans</i> , <i>Avocettina</i>	1678
<i>ingolfianus</i> , <i>Nessorhamphus</i>	1672
<i>isognathus</i> , <i>Panturichthys</i>	1609

K

<i>kaupii</i> , <i>Symphobranchus</i>	1652
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L

<i>lanceolatooides</i> , <i>Serrivomer</i>	1703
<i>longicauda</i> , <i>Anarchias</i>	1637
<i>longissimus</i> , <i>Heteroconger</i>	1692
<i>longus</i> , <i>Panturichthys</i>	1609

M

<i>macrops</i> , <i>Conger</i>	1689
<i>macrops</i> , <i>Paraconger</i>	1692
<i>macrurus</i> , <i>Pythonichthys</i>	1610
<i>macularius</i> , <i>Uropterygius</i>	1641
<i>maderensis</i> , <i>Gymnothorax</i>	1627
<i>mareei</i> , <i>Gymnothorax</i>	1628
<i>mareei</i> , <i>Lycodontis</i>	1628
<i>mauritanicus</i> , <i>Panturichthys</i>	1609
<i>melanotis</i> , <i>Muraena</i>	1635
<i>melanurum</i> , <i>Nettastoma</i>	1698
<i>mellissii</i> , <i>Ariosoma</i>	1690
<i>microphthalmus</i> , <i>Pythonichthys</i>	1610
<i>miliaris</i> , <i>Gymnothorax</i>	1629
<i>miliaris</i> , <i>Muraena</i>	1629
<i>moringa</i> , <i>Gymnothorax</i>	1639
<i>myrus</i> , <i>Echelus</i>	1664
<i>mystax</i> , <i>Gnathophis</i>	1688

N

<i>nigricans</i> , <i>Enchelycore</i>	1625
<i>notialis</i> , <i>Paraconger</i>	1689

O

<i>olokun</i> , <i>Chlopsis</i>	1613
<i>ophis</i> , <i>Ophichthys</i>	1665
<i>oregoni</i> , <i>Synaphobranchus</i>	1653

P

<i>pachyrhynchus</i> , <i>Echelus</i>	1664
<i>parasitica</i> , <i>Simenchelys</i>	1645, 1652, 1667
<i>pavonina</i> , <i>Muraena</i>	1641
<i>pele</i> , <i>Echidna</i>	1623
<i>polygonius</i> , <i>Gymnothorax</i>	1630

<i>proboscidea, Venefica</i>	1699
<i>punctata, Hoplunnis</i>	1674,1698
<i>punctifer, Echiophis</i>	1664

R

<i>regani, Phyllogramma</i>	1673
<i>robusta, Muraena</i>	1635-1636

S

<i>scolopaceus, Nemichthys</i>	1679
<i>semicinctus, Pisodonophis</i>	1666
<i>semicinctus, Pixodonophis</i>	1662
<i>serpens, Ophisurus</i>	1666
<i>serpentinus, Derichthys</i>	1672
<i>similis, Anarchias</i>	1637
<i>splendens, Pseudophichthys</i>	1693
<i>syringinus, Uroconger</i>	1694

T

<i>taxis, Haptenchelys</i>	1650
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U

<i>unicolor, Gymnothorax</i>	1628,1631
<i>unicolor, Lycodontis</i>	1631

V

<i>vicinus, Bathyuroconger</i>	1691
<i>vicinus, Lycodontis</i>	1632
<i>vicinus, gymnothorax</i>	1632
<i>vittata, Channomuraena</i>	1622

W

<i>wheeleri, Uropterygius</i>	1642
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Order SACCOPHARYNGIFORMES

CYEMATIDAE

Bobtail eels

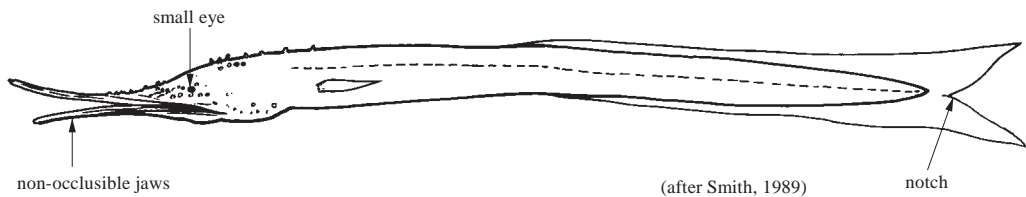
by D.G. Smith, National Museum of Natural History, Washington, DC, USA

A single species occurring in the area.

Cyema atrum Günther, 1878

Frequent synonyms / misidentifications: None / None.

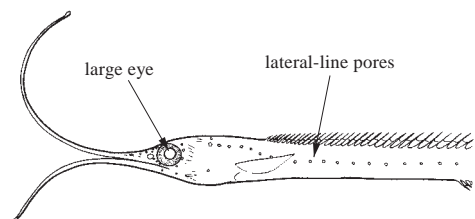
FAO names: En – Bobtail eel.



Diagnostic characters: Small eels, maximum size probably not more than 15 cm total length. Body short and stubby, anus at or slightly behind midlength. Eye small. **Jaws long and slender, diverging toward tips, forming a non-occlusible beak; gape of mouth extends well behind eye. Anterior and posterior nostrils close together, immediately in front of eye;** anterior nostril in a low tube. Teeth small and granular, in multiple rows. Dorsal and anal fins complete, continuous with caudal fin; **rays of both dorsal and anal fins lengthened just before tip of tail, giving posterior end of body a notched appearance.** Pectoral fin present. Scales absent. Lateral line reduced; **pores on body absent, replaced by small, dermal papillae;** additional papillae on head; some pores around eye and on snout. **Colour:** black or reddish, without markings.

Similar families occurring in the area

Cyema atrum is so distinctive in appearance that it cannot be confused with any other eels. Only the nemichthyids have a prolonged, non-occlusible beak, but nemichthyids are greatly elongate, with large eyes and well-developed lateral-line pores.



Nemichthyidae

Habitat, biology, and fisheries: *Cyema atrum* lives in midwater at depths of 1 500 to 3 000 m. Little is known of its biology; there is no indication of sexual dimorphism. It is of no importance to fisheries and is seldom seen except when brought up by deep-towed midwater trawls.

Distribution: Worldwide.

Reference

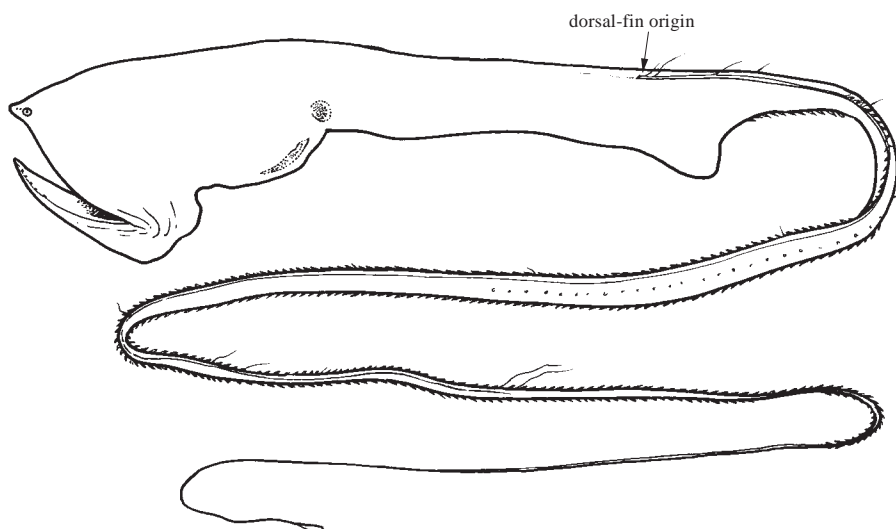
Smith, D.G. 1989. Family Cyematidae. In E.B. Böhlke, ed. Fishes of the Western North Atlantic, Part 9. *Memoirs of the Sears Foundation for Marine Research*, 1(9): 630–635.

SACCOPHARYNGIDAE

Swallower eels

by D.G. Smith, National Museum of Natural History, Washington, DC, USA

Diagnostic characters: Can reach nearly 2 m in total length, but most of this is the slender, attenuate caudal region. **Body very elongate; tail attenuate and ending in an expanded caudal organ of variable structure, often luminous;** anus near anterior one-third to one-fifth of total length; **abdomen distensible, usually distinctly deeper than tail.** Head large and deep, most of its length in postcranial part. Eye small. Snout short, beak-like; anterior and posterior nostrils small and close together, in front of eye. **Mouth greatly enlarged by a backward extension of jaws, gape extending far behind eye;** teeth slender, recurved, depressible, arranged in 3 or 4 overlapping rows. Dorsal and anal fins present, ending before tip of tail; dorsal fin begins well behind head, a short distance in front of anus; caudal fin absent; pectoral fin present. **A pair of white lines or grooves on each side of dorsal fin, of uncertain function.** Scales absent. Lateral line without pores, but with a series of papillae. **Colour:** black, without markings.



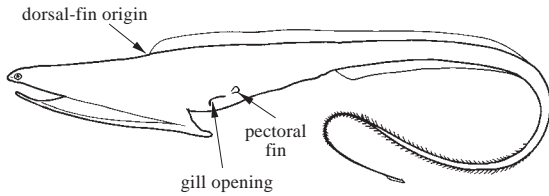
Habitat, biology, and fisheries: Saccopharyngids live pelagically at depths of 1 000 to 3 000 m. They feed mainly on fish, and their large mouth and distensible abdomen enable them to swallow large prey. It has been speculated that the luminous caudal organ serves as a lure to attract prey, but this has not been confirmed by observation. Saccopharyngids display some sexual dimorphism at maturity; males show a reduction of the feeding apparatus and an enlargement of the eye and olfactory organ. Saccopharyngids are rare and of no importance to fisheries.

Remarks: The Saccopharyngidae is one of 3 families of highly modified, midwater eels commonly known as gulpers; the others are the Eurypharyngidae and Monognathidae. Gulpers are characterized by the reduction and loss of many skeletal elements. Their precise relationship to the other eels is still uncertain, but they are usually placed in a separate order, the Saccopharyngiformes. The Saccopharyngidae contains a single genus, *Saccopharynx*, with approximately 9 species worldwide.

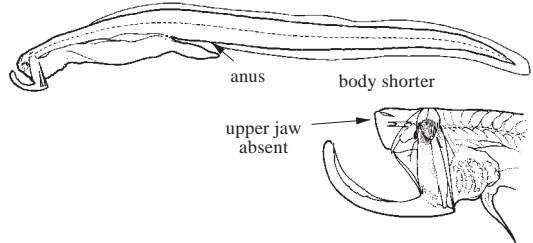
Similar families occurring in the area

Eurypharyngidae: the monotypic family Eurypharyngidae is the only fish likely to be confused with *Saccopharynx*. In *Eurypharynx* the mouth is even larger than in *Saccopharynx*, greater than half the preanal length as opposed to less than 40%. In *Eurypharynx* the dorsal fin begins in front of the pectoral fin instead of far behind it. *Eurypharynx* also has smaller teeth.

Monognathidae: the monognathids lack an upper jaw, and their bodies are much less elongate.



Eurypharyngidae



Monognathidae

Key to the species of Saccopharyngidae occurring in the area

- 1a. Origin of "white lines" closer to pectoral fins than to snout; caudal organ short, length less than 3 times depth (Fig. 1); pectoral fin rays 40 to 52. *Saccopharynx ramosus*
- 1b. Origin of "white lines" closer to snout than to pectoral fin; caudal organ slender, length several times depth (Figs 2 & 3); pectoral fin rays 28 to 41 → 2

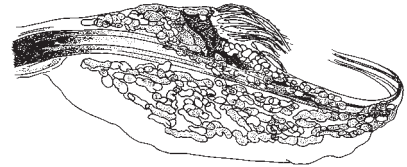


Fig. 1 caudal organ

- 2a. Body filaments only on tail; caudal organ with well developed filaments (Fig. 2) *Saccopharynx thalassa*
- 2b. Body filaments on trunk and tail; caudal organ without well developed filaments *Saccopharynx ampullaceus*

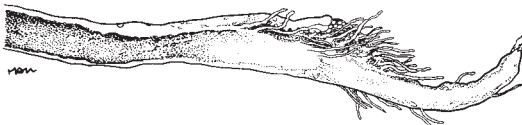





Fig. 2 caudal organ



Fig. 3 caudal organ

List of species occurring in the area

The symbol  is given when species accounts are included.

-  *Saccopharynx ampullaceus* (Harwood, 1827).
-  *Saccopharynx ramosus* Nielsen and Bertelsen, 1985.
-  *Saccopharynx thalassa* Nielsen and Bertelsen, 1985.

Reference

Nielsen, J.G. & Bertelsen, E. 1985. The gulper-eel family Saccopharyngidae (Pisces, Anguilliformes). *Steenstrupia*, 1(6): 157–206.

***Saccopharynx ampullaceus* (Harwood, 1827)**

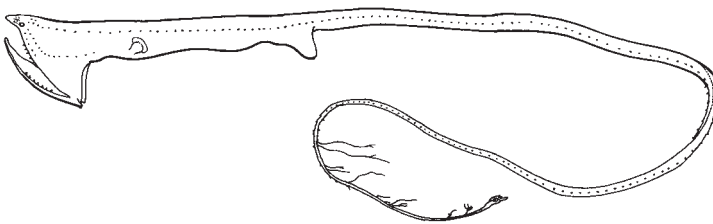
En – Northern swallower eel.

Maximum size 160 cm. Eastern and western North Atlantic, from Iceland to Africa, in depths of 2 000 m or more; occurs in the northern part of the area, to about 10°N.

***Saccopharynx ramosus* Nielsen and Bertelsen, 1985**

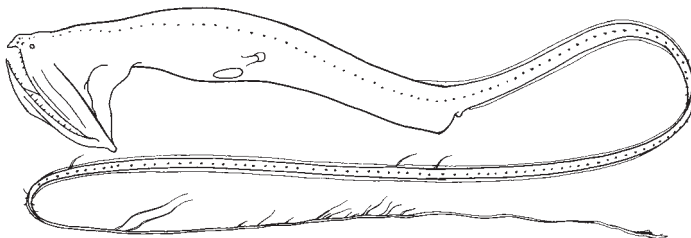
En – Shortline swallower eel.

Maximum size at least 62 cm. Known from off North Africa and off Capetown, South Africa; in the area, known from southwest of Madeira; in depths to 1 500 m.

***Saccopharynx thalassa* Nielsen and Bertelsen, 1985**

En – Hairytail swallower eel.

Maximum size 110 cm. Eastern and western North Atlantic, in depths to 1 700 m; in the area, known from near the Canary Islands and Madeira.



EURYPHARYNGIDAE

Pelican eels

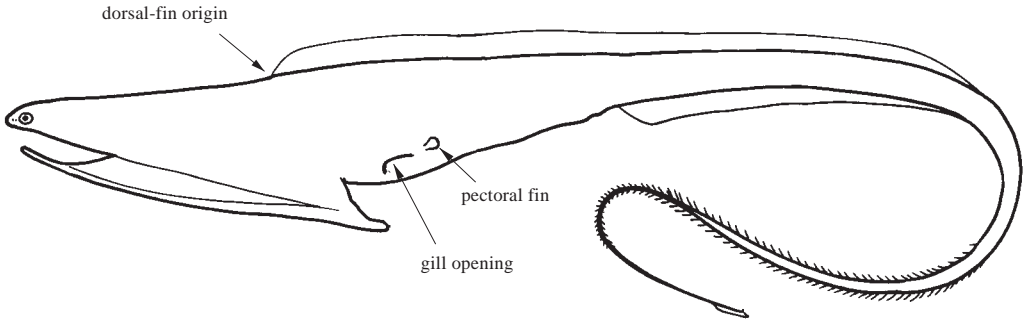
by D.G. Smith, National Museum of Natural History, Washington, DC, USA

A single species in this family.

Eurypharynx pelecyanoides Vaillant, 1882

Frequent synonyms / misidentifications: *Gastrostomus bairdii* Gill and Ryder, 1883 / None.

FAO names: En – Pelican eel.



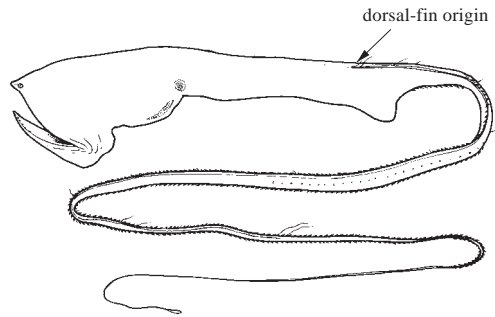
Diagnostic characters: Maximum size about 75 cm, but much of this consists of the slender caudal region. **Body elongate, tail attenuated and ending in an expanded, luminous caudal organ;** anus near anterior third of total length. Head large and deep, most of its length in postcranial part. Eye small. Snout short; anterior and posterior nostrils close together, in front of eye. **Mouth greatly enlarged by a backward extension of jaws, gape comprising half or more of preanal length; buccal cavity greatly distensible;** teeth small, close-set, with recurved tips, in several rows on jaws. Dorsal and anal fins present, but ending before tip of tail; **dorsal fin begins about midway between tip of snout and anus;** caudal fin absent; pectoral fin rudimentary. **A pair of white lines or grooves, 1 on each side of dorsal fin, of uncertain function.** Scales absent. Lateral line with groups of elevated tubules instead of pores. Vertebrae: 101 to 103. **Colour:** black, without markings.

Similar families occurring in the area

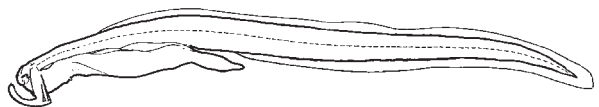
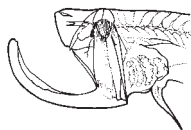
Note: The Eurypharyngidae, Saccopharyngidae, and Monognathidae are placed together in the order Saccopharyngiformes and are characnly genus in the Saccopharyngidae, has a smaller moterized by the reduction and loss of many skeletal elements. They are unlikely to be confused with any other fishes.

Saccopharyngidae: *Saccopharynx*, the outh, however, some 40% or less of the preanal length. The teeth are larger, and the dorsal fin begins over or slightly in front of the anus.

Monognathidae: has a much shorter body, a smaller mouth, and lack an upper jaw.



Saccopharyngidae



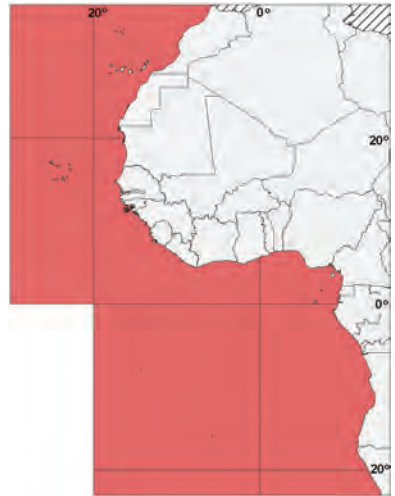
Monognathidae

Habitat, biology, and fisheries: *Eurypharynx pelecanoioides* is a midwater fish, occurring to about 3 000 m. Its principal food seems to be crustaceans, but it also takes fishes, cephalopods, and other invertebrates. Although the mouth is large, the stomach is not greatly distensible, as it is in the related saccopharyngids. This, along with the weak dentition and generally feeble structure of the mouth, indicates that *Eurypharynx* does not take large individual prey organisms. Instead, it seems adapted for engulfing smaller animals along with a quantity of surrounding water. After the prey has been captured, the water can be expelled through the gill openings and the prey swallowed. Males undergo pronounced morphological changes at maturity: the olfactory organs enlarge, the jaws degenerate, and the teeth are reduced or lost. Females remain relatively unchanged. *Eurypharynx pelecanoioides* is fairly common in its depth range, but most specimens are badly damaged during net capture, and it is rare to see an intact specimen. It is of no importance to fisheries.

Distribution: *Eurypharynx pelecanoioides* is currently considered to be a single cosmopolitan species. In the Atlantic, it occurs over a wide range of latitude, from Iceland in the north to 48°S.

Reference

Nielsen, J.G., Bertelsen, E. & Jespersen, C. 1989. The biology of *Eurypharynx pelecanoioides* (Pisces, Eurypharyngidae). *Acta Zoologica (Stockholm)*, 70(3):187–197.

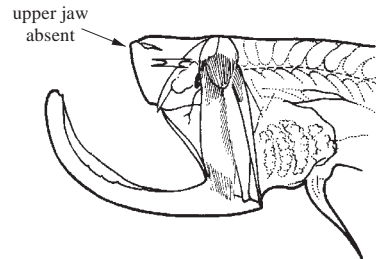
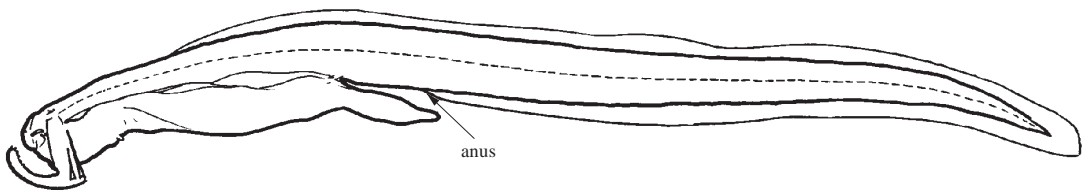


MONOGNATHIDAE

One-jawed eels

by D.G. Smith, National Museum of Natural History, Washington, DC, USA

Diagnostic characters: Small, fragile fishes, maximum size 16 cm. Body short to moderate; tail moderate, not attenuate; anus near anterior one-fourth to one-third of total length; abdomen distensible, posterior part often protruding ventrally into a pouch that may extend behind anus. Head moderate; eye greatly reduced. Snout variable, from short to moderately elongate; olfactory organ reduced to a short tube between anterior and posterior nostrils. **Upper jaw (maxilla and palatopterygoid arcade) absent, lower jaw closes against bottom of neurocranium; lower jaw and suspensorium greatly prolonged;** lower jaw with a single series of small, conical teeth; **front of skull with a median, unpaired fang provided with a venom gland.** Dorsal and anal fins present, reaching tip of tail, may or may not be confluent around tip of tail; true caudal fin absent; dorsal fin begins at or before middle of trunk; pectoral fin absent or present as a dermal flap without rays. Scales absent. Lateral line absent. **Colour:** variable, from unpigmented to light or dark brown.



(after Bertelsen and Nielsen, 1987)

detail of head

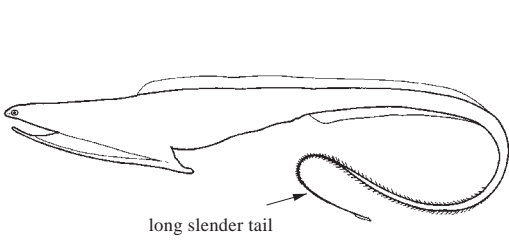
Habitat, biology, and fisheries: Monognathids are pelagic and live at great depths; most of the known specimens have been collected at 2 000 to 5 400 m, making them the deepest-living of all the pelagic eels and eel-like fishes. They appear to feed mainly on shrimp and can take relatively large prey; the venomous fang apparently is used to immobilize the prey and allow it to be swallowed. The single known mature male differs markedly from the females and immatures; the lower jaw is reduced to a rudiment, the rostral fang is short and blunt, the olfactory organs are greatly enlarged, the head is covered with a layer of spongy tissue, and the posterior dorsal- and anal-fin rays are lengthened just before the tip of the tail to form a notched tail fin. The reduction of the feeding apparatus indicates that the male stops feeding at maturity, and hence that spawning is the terminal event in its life. The enlarged olfactory organ and the broadened tail suggests that it locates its mate by following pheromone trails. Beyond this we know nothing about the biology of monognathids; indeed, their odd morphology and their near total lack of sense organs make it difficult to imagine how they function and survive in their environment. Monognathids are rare and of no importance to fisheries.

Remarks: Monognathids belong to an order characterized by the reduction and loss of many skeletal features, but they have carried these trends to bizarre lengths. The absence of an upper jaw is unique among fishes. They are small fishes; the largest specimen known is only 15.9 cm in total length, and most are less than 10 cm. Fourteen species are currently recognized. Although they can be divided into 2 groups based on the length of the snout and the shape of the skull, they are all considered to belong to a single genus, *Monognathus*.

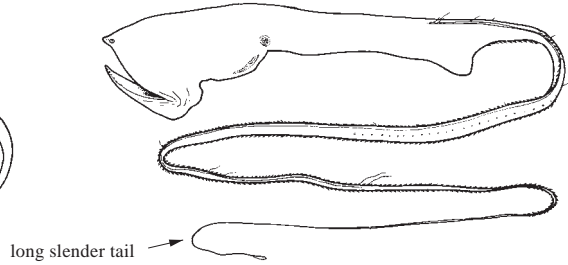
Similar families occurring in the area

Eurypharyngidae: upper jaw present; tail long and slender, ending in a caudal organ.

Saccopharyngidae: upper jaw present; tail long and slender, ending in a caudal organ.



Eurypharyngidae



Saccopharyngidae

Key to the species of Monognathidae occurring in the area

- 1a. Snout in front of rostral fang relatively long and pointed, rostral fang forming right angle with dorsal profile of skull (Fig. 1) → 2
- 1b. Snout in front of rostral fang relatively short and blunt, dorsal profile of rostral fang forming almost a straight line with skull (Fig. 2) → 3

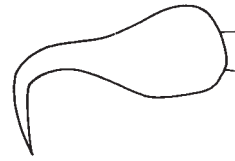


Fig. 1

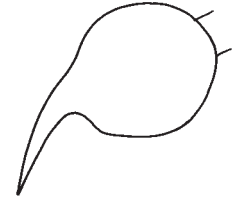


Fig. 2

- 2a. Skin transparent, no lateral subdermal spots of pigment ***Monognathus herringi***
- 2b. Skin densely pigmented and/or lateral subdermal pigmented ***Monognathus nigeli***
- 3a. Dorsal fin with a glandular structure at middle of fin (Fig. 3) ***Monognathus jespersenii***
- 3b. Dorsal fin without a glandular structure → 4
- 4a. Dorsal fin-rays 116 or fewer. . . ***Monognathus bertini***
- 4b. Dorsal fin-rays 125 or more. → 5
- 5a. Anal fin-rays 59 to 64; dorsal-fin origin above myomere no. 3 . . ***Monognathus taningi***
- 5b. Anal fin-rays 110 to 130; dorsal-fin origin above myomere numbers 13 to 16 ***Monognathus boehlkei***

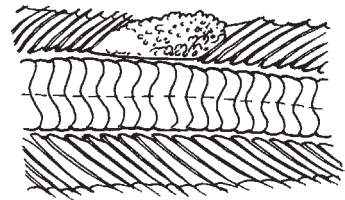









Fig. 3 glandular structure ***Monognathus jespersenii***

List of species occurring in the area

The symbol  is given when species accounts are included.

This is a poorly known family, and the following species are known from very few individuals. All of them could have wider distributions than now recognized. Additional, undescribed species may be found in the future.

-  *Monognathus bertini* Bertelsen and Nielsen, 1987.
-  *Monognathus boehlkei* Bertelsen and Nielsen, 1987.
-  *Monognathus herringi* Bertelsen and Nielsen, 1987.
-  *Monognathus jespersenii* Bertin, 1936.
-  *Monognathus nigeli* Bertelsen and Nielsen, 1987.
-  *Monognathus tanningi* Bertin, 1936.

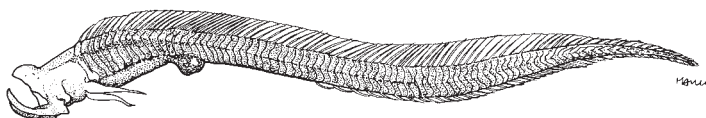
Reference

- Bertelsen, E. & Nielsen, J.G.** 1987. The deep-sea eel family Monognathidae. *Steenstrupia*, 13(4): 141–198.

***Monognathus bertini* Bertelsen and Nielsen, 1987**

En – Bertin's one-jawed eel.

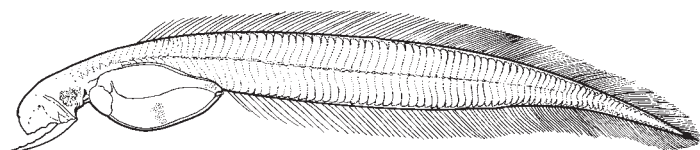
Maximum size to at least 10 cm. Known from 3 widely scattered localities, northeast Atlantic, southeast Atlantic, and southwest Indian Ocean.



***Monognathus boehlkei* Bertelsen and Nielsen, 1987**

En – Böhlke's one-jawed eel.

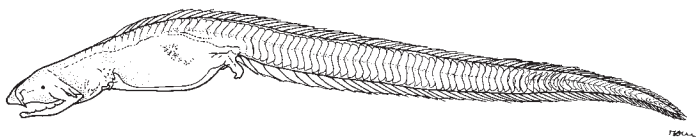
Maximum size 7 cm. Eastern and western North Atlantic.



***Monognathus herringi* Bertelsen and Nielsen, 1987**

En – Herring's one-jawed eel.

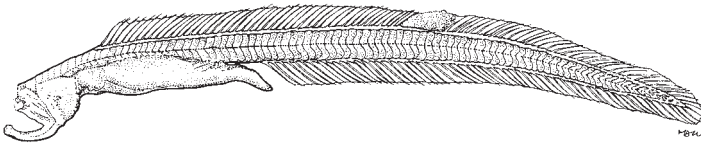
Maximum size 6 cm. Eastern North Atlantic.



***Monognathus jespersenii* Bertin, 1936**

En – Jespersen's one-jawed eel.

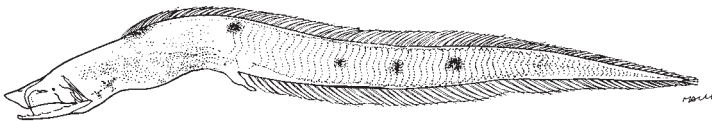
Maximum size 11 cm. Eastern North Atlantic.



***Monognathus nigeli* Bertelsen and Nielsen, 1987**

En – Nigel's one-jawed eel.

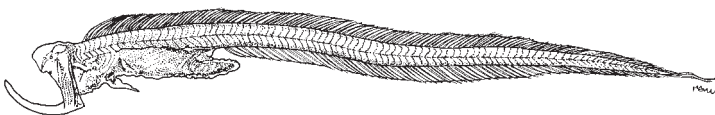
Maximum size 6 cm. Eastern North Atlantic.



***Monognathus taningi* Bertin, 1936**

En – Taning's one-jawed eel.

Maximum size 6 cm. Eastern North Atlantic.



New Index

- B**
 Bertin's one-jawed eel 1713
 Bobtail eel 1704
 Bobtail eels 1704
 Böhlke's one-jawed eel 1713
- C**
CYEMATIDAE 1704
Cyema atrum 1704
- E**
EURYPHARYNGIDAE 1708
EURYPHARYNGIDAE 1705-1706,1711
Eurypharynx 1706,1709
Eurypharynx pelecyanoides 1708-1709
- G**
Gastrostomus bairdii 1708
 Gulpers 1705
- H**
 Hairytail swallower eel 1707
 Herring's one-jawed eel 1713
- J**
 Jespersen's one-jawed eel 1714
- M**
MONOGNATHIDAE 1710
MONOGNATHIDAE 1705-1706,1708
 Monognathids 1710
Monognathus 1710
Monognathus bertini 1713
Monognathus boehlkei 1713
Monognathus herringi 1713
Monognathus jespersenii 1714
Monognathus nigeli 1714
Monognathus taningi 1714
- N**
 Nemichthyids 1704
 Nigel's one-jawed eel 1714
 Northern swallower eel 1707
- O**
 One-jawed eels 1710
- P**
 Pelican eel 1708
 Pelican eels 1708
- S**
SACCOPHARYNGIDAE 1705
SACCOPHARYNGIFORMES 1704
SACCOPHARYNGIDAE 1705,1707-1708,1711
 Saccopharyngids 1705
SACCOPHARYNGIFORMES 1705,1708
Saccopharynx 1705-1706,1708
Saccopharynx ampullaceus 1707
Saccopharynx ramosus 1707
Saccopharynx thalassa 1707
 Shortline swallower eel 1707
 Swallower eels 1705
- T**
 Taning's one-jawed eel 1714
- A**
ampullaceus, Saccopharynx 1707
atrum, Cyema 1704
- B**
bairdii, Gastrostomus 1708
bertini, Monognathus 1713
boehlkei, Monognathus 1713
- H**
herringi, Monognathus 1713
- J**
jespersenii, Monognathus 1714
- N**
nigeli, Monognathus 1714
- P**
pelecyanoides, Eurypharynx 1708-1709
- R**
ramosus, Saccopharynx 1707
- T**
taningi, Monognathus 1714
thalassa, Saccopharynx 1707

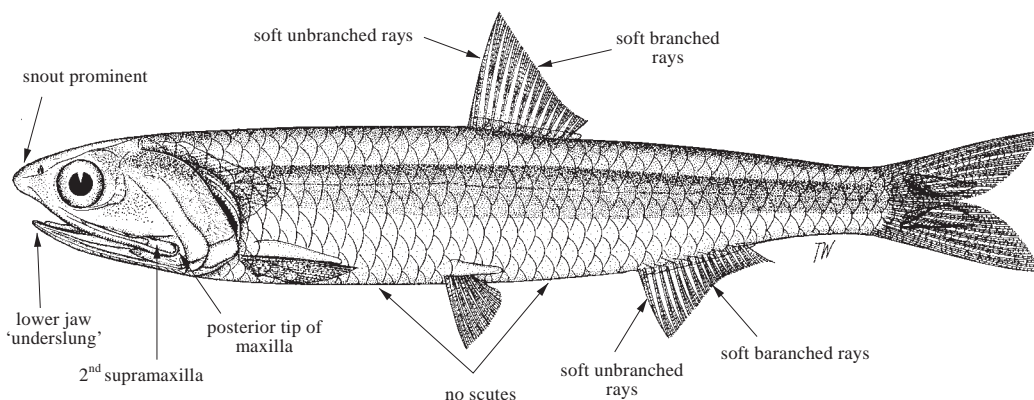
Order CLUPEIFORMES

ENGRAULIDAE

Anchovies

by M.S. Nizinski and T.A. Munroe, National Marine Fisheries Service, National Museum of Natural History, Washington DC, USA

Diagnostic characters: Small to moderate-sized silvery fishes (to 20 cm standard length, commonly 12 to 15 cm standard length), usually with fusiform, subcylindrical bodies but sometimes quite strongly compressed; **no scutes present along abdomen** (except for plate-like scute at pelvic-fin bases). Characterized by an usually **prominent pig-like snout projecting beyond tip of lower jaw**. **Lower jaw almost always long and slender and characteristically 'underslung'; its articulation extending posterior to vertical through posterior margin of eye, and usually extending to point well beyond vertical through posterior margin of eye.** Typically with 2 supramaxillae. Maxilla (posterior tip of upper jaw) long and rounded posteriorly; jaw teeth usually small or minute. Eyes large, with adipose eyelid completely covering eyes. **Pseudobranch (gill-like structure on inner face of gill cover) present.** Branchiostegals usually 11 or 12. **Gill rakers slender and numerous.** **No spiny rays in fins; dorsal fin single, short, and usually near midpoint of body;** anal fin short or moderate; caudal fin forked; pectoral fins set low on body; pelvic fins usually inserted about midway between pectoral-fin base and anal-fin origin. **Scales always cycloid (smooth to touch), moderate, with posterior striae or striations, very often shed upon capture; no lateral line.** **Colour:** typically dorsum blue-green or translucent grey, sides wholly silver or with a bright silver midlateral stripe; darker markings may include stripe along side and duskiness of fins, especially distal margin of caudal fin.



Habitat, biology, and fisheries: Most anchovies are marine, but some can tolerate low salinities. Most are plankton filter-feeders and are major forage species in the natural food chain. Although usually small (mostly 8 to 15 cm), many species school in such numbers that they form the basis of sizeable fisheries. Some species are valued as foodfishes, while others are used as bait or as fishmeal. Although all species are edible, transportation and large-scale marketing of these fishes is difficult because of the soft consistency of their flesh. Presence of anchovies in markets has been steadily increasing in the past few years. Anchovies are usually caught with fine-meshed beach seines or purse seines.

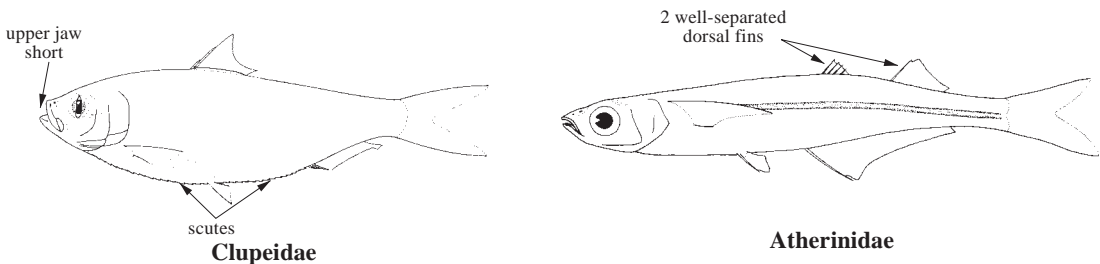
Remarks: Historically, the taxonomy of anchovy species occurring in most of the world's regions with temperate boundary currents has been very confused; disjunct populations of morphologically similar forms have been named, although in some cases, morphological characters alone were inadequate for diagnosing individuals from these disjunct populations. Recent molecular data on the genus *Engraulis* have reinforced the argument for the need of taxonomic revisions at the generic and species level for these fishes (Grant and Bowen, 1998). Preliminary results indicate that some named regional populations of anchovies (*E. japonicus*, *E. australis*, *E. capensis* and *E. encrasicolus*), long considered distinct species, may represent disjunct populations of a single wide-ranging species. Furthermore, *E. encrasicolus* populations are highly structured genetically. This structuring is likely caused by interactions between biological and physical processes, making it extremely difficult to understand present day population structure (Magoulas *et al.*, 2006). Until a thorough systematic revision is completed for this and related genera, traditional species

names applied to disjunct regional populations of anchovies will continue to be used. In the eastern tropical Atlantic, *E. encrasicolus* occurs widely throughout the region of interest. Another putative species, *E. capensis*, occurs from the Angola/Namibia border south to Cape Town and into the southeastern Indian Ocean to about Lourenço Marques, Mozambique. Identifications of members of these taxa have been based primarily on the known geographic distributions for the named populations. No diagnostic morphological characters have been identified to accurately distinguish individual specimens of *E. encrasicolus* and *E. capensis*. Possibly, members from both populations may occur in the southernmost parts of the area of interest, but there is presently no clear way to distinguish these fishes morphologically. Since *E. encrasicolus* has the more widespread distribution throughout the region, it is likely the species that is most frequently captured in the area, especially in the tropical portions of this region.

Similar families occurring in the area

Clupeidae: mouth terminal, upper jaw short, lower jaw deep, and in most cases, scutes forming distinct keel along abdomen.

Atherinidae: mouth terminal, upper jaw short, and 2 dorsal fins, no scutes along abdomen.



List of species occurring in the area

The symbol  is given when species account is included.

Note: *Engraulis capensis* Gilchrist, 1913 possible in southern portions of the area. See remarks.

 *Engraulis encrasicolus* (Linnaeus, 1758).

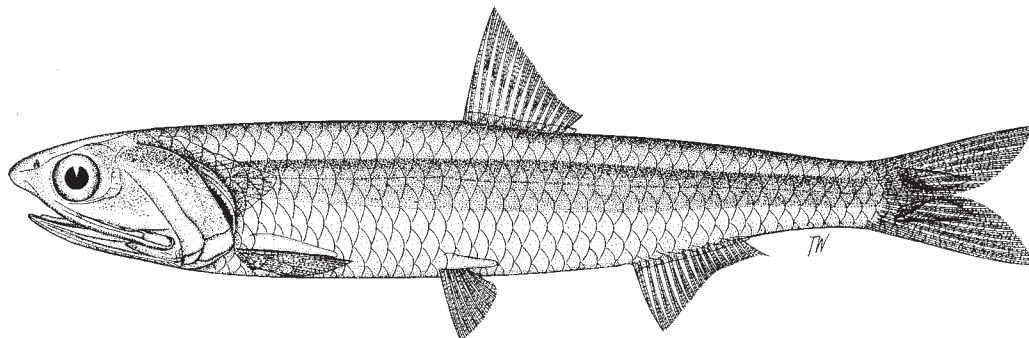
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***Engraulis encrasicolus* (Linnaeus, 1758)**

Frequent synonyms /misidentifications: *Anchoa guineensis* Rossignol and Blache, 1961 / None.

FAO names: En – European anchovy; Fr – Anchois; Sp – Boquerón.



Diagnostic characters: Body slender, fusiform, oval in cross section, its depth about 6 times in standard length; **abdomen not sharply keeled**, without a series of scutes. **Snout prominent**, pointed, projecting in front of lower jaw, **mouth inferior**; **maxilla elongate, tip rounded, reaching almost to anterior border of preoperculum**, not projecting beyond tip of second supramaxilla; upper jaw long, reaching well behind posterior margin of eye; tip of lower jaw reaching to below nostril. Lower gill rakers, short, 27 to 43; **gill rakers present on hind face of third epibranchial. Pseudobranch longer than eye, reaching onto inner face of operculum**. Dorsal fin short, with 12 or 13 rays, its origin at about midpoint of body; anal fin short, with 13 to 15 rays, its origin well behind vertical through posterior dorsal-fin base. Scales deciduous (easily shed). **Colour:** dorsum blue/green, quickly fading to fleshy grey, sides with a silver stripe edged with a dark grey line above, disappearing with age, abdomen pale; caudal fin with dark margin.

Size: Maximum to 20 cm standard length; common to 12 to 15 cm.

Habitat, biology, and fisheries: Coastal, pelagic species found mainly in shallow water (to 50 m) and to depths of about 400 m, often forming large shoals, migratory. Euryhaline, tolerating salinities of 5 to 41‰ and in some areas entering lagoons, estuaries or lakes, especially in the warmer months during spawning season. Spawning occurs multiple times over an extended period from April to November with peaks usually in the warmest months, the limits of the spawning season dependent on temperature and thus more restricted in northern areas. Eggs ellipsoidal to oval, floating in the upper 50 m, hatching in 24 to 65 hours. After hatching, larvae are colourless and transparent. Growth is rapid with fish reaching a length of 9 to 10 cm after 1 year. First spawning occurs at sizes greater than 12 to 13 cm. Maximum age of individuals from southwestern Africa was 3 years. Two hyaline rings are formed annually on otoliths; one being clearly visible, well formed and laid down in June-July, the other diffuse, faint, and laid down in November-December. Feeds on planktonic organisms, chiefly copepods, cirripede, and mollusc larvae, and fish eggs and larvae. Caught throughout the area, but particularly off Morocco, Senegal, Ghana, Togo, and the Congo. Status of the stocks is reported separately by subregions within the area of interest. Off Morocco and Mauritania, a single stock is recognized. Moroccan and Spanish fleets target this species off Morocco; whereas it is usually taken as bycatch in Mauritania. In 2011, the annual catch for this stock was reported as 39 075 tonnes in Morocco, while the total catch for the stock was 150 000 tonnes. Mauritania reported the majority of landings, of which 51% was exploited by Russian and Ukrainian fleets; however, much of this catch could be horse mackerel or other small species. In 2011, the agreement between Morocco and Spain allowing 20 Spanish purse seiners to fish in the northern zone ended. Lifespan of individuals is short, 2 years at most. Abundance is dependent on recruitment, which can show large inter-annual variations. Average length of fish harvested was between 7 and 17 cm. Stock may be at or close to full exploitation in this subregion. In the southern subregion, exploitation is by non-selective gears such as beach and purse seines. Consumed in some countries; or appearing with other small species in mixed landings, or considered as non-valuable bycatch and discarded in other countries. Three stocks are recognized, of which the western is largest with annual catches varying

from 82 220 to 48 415 tonnes (1990–2008). Overall, biomass for this stock shows a general decreasing trend and this stock appears to be fully exploited. The southern stock is relatively stable and averages around 499 tonnes annually. Catch data for the northern stock varied widely between 2002 and 2008, with catches peaking at 151 tonnes in 2006. Catches in the northern and equatorial parts of the area are reported as *E. encrasicolus*; those for Namibia as *E. capensis*. Caught with purse seines, lamparas (light fishing), trawls, and beach seines. Marketed fresh, frozen, processed, salted and dried, smoked, and canned, used as bait. Important in the Namibian pelagic fisheries for the production of fishmeal and fish oil.

Distribution: Eastern Atlantic, throughout entire area of interest, including Canary Islands and possibly Madeira; elsewhere, Azores, northward to Norway, Mediterranean and Black Sea; possibly mixing with *E. capensis* southward from Angolan/ Namibian border.



PRISTIGASTERIDAE

Pristigasterids

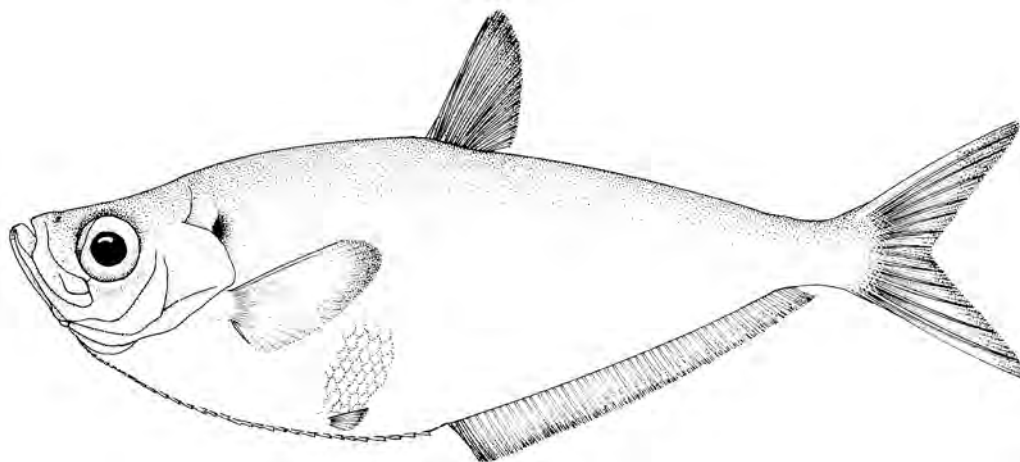
by T.A. Munroe, National Marine Fisheries Service, National Museum of Natural History, Washington DC, USA

A single species occurring in the area.

Ilisha africana (Bloch, 1795)

Frequent synonyms / misidentifications: *Clupea africana* Bloch, 1795 / None.

FAO names: En – West African ilisha; Fr – Alose rasoir; Sp – Sardineta africana.

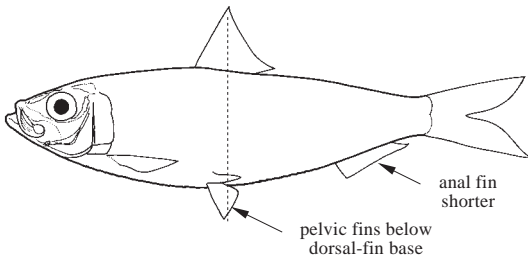


Diagnostic characters: A moderate-sized pristigasterid (to about 22 cm standard length) with **deep and compressed body** (body depth 33-39% standard length); **with complete series (25 to 27 + 7 or 8) of sharp and serrate scutes along abdomen from gill opening to anus**. Head length 26 to 31% of standard length. Eyes large (26 to 37% head length). **Mouth directed obliquely upward, with lower jaw projecting beyond upper; with 2 supramaxillae, and small or minute jaw teeth, a gap at center of upper jaw. No toothed hypomaxillary bone between posterior tip of premaxilla and blade of maxilla; articulation of lower jaw anterior to vertical through middle of eye.** Gill rakers fairly short and thick, 10–12 + 22–28 on first gill arch (31 to 37 total). **No spiny rays in dorsal fin; single, short dorsal fin with 14 to 18 fin rays positioned at or anterior to vertical through body midpoint. Anal fin long, with 41 to 50 fin rays; anal-fin origin at vertical through middle or posteriormost dorsal-fin rays.** Pectoral fins moderate, with 13 to 16 fin rays; **pelvic fins small, with 6 to 8 fin rays, pelvic-fin insertion anterior to vertical at anterior dorsal-fin base.** Caudal fin forked; caudal lobes slender, pointed. **Scales small, cycloid, without posterior striations, adherent or easily lost, of moderate size (about 40 to 43 in lateral series). No lateral line. Swimbladder with 2 short tubes passing posteriorly in the muscles on either side of haemal spines.** Vertebrae 42 or 43. **Colour:** dorsum grey, flanks pale grey or silver, with faint dark spot on body posterior to gill cover (green/gold when alive); dorsal fin yellow, with dusky tip; pectoral fins with upper fin rays yellow, the rest colourless, as also pelvic fins; anal fin with yellow border; caudal fin yellow with upper lobe and posterior margin dusky.

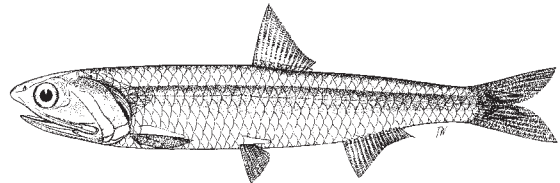
Similar families occurring in the area

Clupeidae: articulation of lower jaw always anterior to vertical through middle of eye; usually with complete series of scutes along abdomen; anal fin with fewer than 28 fin rays; pelvic fins inserting below dorsal-fin base.

Engraulidae: articulation of lower jaw well posterior to vertical through posterior margin of eye, lower jaw usually slender; snout pig-like and projecting, lower jaw underslung; adipose eyelid completely covering eyes; scales with posterior striae or striations.



Clupeidae



Engraulidae

Size: Maximum to 22 cm total length; common to 18 cm total length.

Habitat, biology, and fisheries: Occurs in inshore waters, along sandy beaches, in estuaries to nearly freshwater; caught near bottom down to 25 m or at surface. Feeds on small planktonic animals, including a variety of small fishes, crustacean zooplankton, and shrimps. In Qua Iboe estuary, Nigeria, diets consisted primarily of macrocrustaceans (mysids, penaeid, and palaemonid shrimps), while fishes, molluscs, polychaetes, algae, free-living nematodes, insect remains, fish eggs, and detritus also constituted minor percentages of the diet. Similar diets were observed for this species off the Lagos coast. This is a fast growing and short-lived species (to about 4 years). Mean total lengths at age for fish taken off Nigeria are about 18 cm, 24, 26, and 28 cm total length for ages 1 to 4, respectively. Females attain sexual maturity at a median size of about 15 cm total length. Spawning occurs year-round, with maximum and minimum intensities in December and March, respectively. Off the Lagos coast, spawning occurred throughout the year with peak spawning between May and December. Off Ghana, the major breeding season was preceded by a period of high feeding activity. Batch fecundity estimates vary between 2 098 and 11 687 eggs/female (mean batch fecundity about 6 700 eggs/female); fecundity generally increased with total length and total weight, but decreased with increases in egg weight and condition factor. Represents a minor part of clupeoid catch from southern Mauritania to the Congo, but no special fishery exists for this species, so difficult to determine population trends for most of the region. Has some local importance in artisanal fisheries and is overexploited in some regional areas. Separate statistics not always reported for this species, so difficult to determine population trends for most of the region. Caught in industrial and artisanal fisheries with beach seines, purse seines, gillnets, and trawls. Juveniles are a major species taken in shrimp nets used in artisanal estuarine fisheries. Also taken as bycatch (often discarded) in demersal shrimp fisheries. Heavily fished locally (both adults and juveniles), and subjected to oil pollution in some estuaries. Marketed fresh or frozen, also dried, salted, smoked, and used in fishmeal. Local importance has increased as other, more desirable, species have been reduced in abundance.

Distribution: Eastern Atlantic; southern Mauritania, Senegal (not abundant), Sierra Leone to the Congo (common), probably also to Angola.

Remarks: Until recently, the pristigasterid fishes were considered a subfamily of the Clupeidae.



References

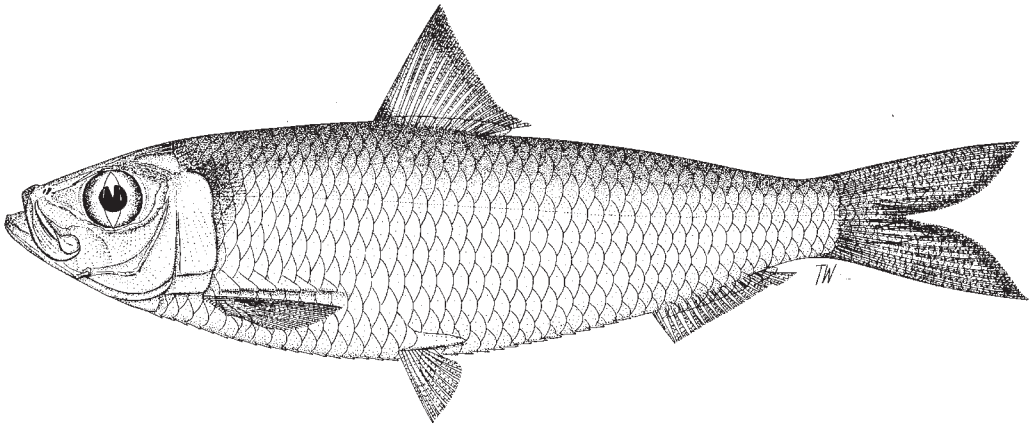
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CLUPEIDAE

Herrings (shads, pilchards, sprats, sardinellas)

by T.A. Munroe, National Marine Fisheries Service, National Museum of Natural History, Washington DC, USA

Diagnostic characters: Small, mostly silvery fishes, usually with fusiform, subcylindrical bodies, but sometimes quite strongly compressed; **a keel of scutes present along abdomen. Lower jaw short but deep, giving typical clupeid mouth shape. Fins lacking spiny rays; a single dorsal fin, usually short and at midpoint of body; no adipose fin;** pectoral fins set low on body; pelvic-fin bases about equidistant between pectoral-fin bases and anal-fin origin; **anal fin usually short, its origin behind dorsal-fin base;** caudal fin deeply forked. **Scales always cycloid** (smooth to touch), but often shed easily, their posterior border sometimes fimbriate; **no lateral line.** **Colour:** usually dark blue or blue-green on back, silvery on flanks; darker markings include a spot on or behind the gill opening (*Sardinella*, *Alosa alosa*), sometimes followed by a series of spots along flanks (*Sardinops*, *Sardina*, *Alosa fallax*), a spot at base of anterior dorsal-fin rays (some *Sardinella*) or a dusky margin to caudal fin.

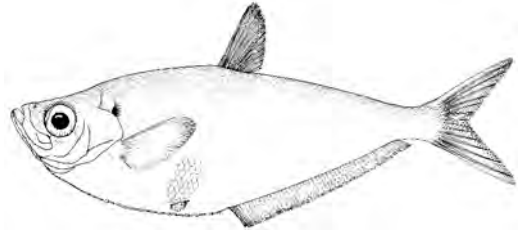


Habitat, biology, and fisheries: Most species are marine, coastal and pelagic, but some are anadromous (shads), and in this area *Ethmalosa fimbriata* tolerates very low salinities in lagoons and estuaries during the dry season; a freshwater clupeid fauna (13 genera) exists in West African rivers, of which species of *Pellona* occur in estuaries and lagoons and species of *Cynothrissa* and *Odaxothrissa* may move downriver into oligohaline portions of the upper estuary. Although clupeids are mostly small species (about 15 to 25 cm), certain species form large schools and are the basis of sizable fisheries. The total catch of Clupeidae from the area is around 45 to 49% of the total catches in the whole area. Catches of clupeoids are mostly reported for *Sardina pilchardus*, *Sardinella aurita*, *S. maderensis*, and *Ethmalosa fimbriata*.

Remarks: According to Whitehead (1985), the status of populations of *Sardinella* (*S. aurita* and *S. maderensis*) occurring off the West African coast are in need of evaluation regarding their homogeneity and their relationships with Mediterranean and western Atlantic counterparts. Further research is also needed to determine the taxonomic status of geographically isolated populations of *Sardinops* (Whitehead, 1985; Parrish *et al.*, 1989).

Similar families occurring in the area

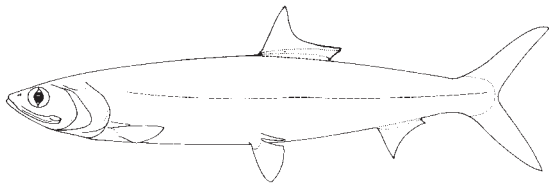
Pristigasteridae: anal fin long, with more than 40 fin rays, anal-fin origin located at vertical through middle of dorsal-fin base; lower jaw strongly projecting.



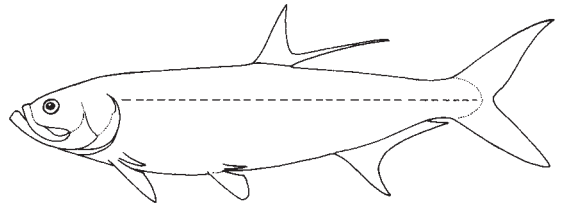
Pristigasteridae

Elopidae: lateral line present, no keel of scutes along abdomen.

Megalopidae: last dorsal-fin ray a filament, lateral line present.



Elopidae

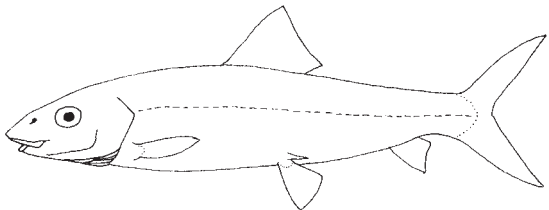


Megalopidae

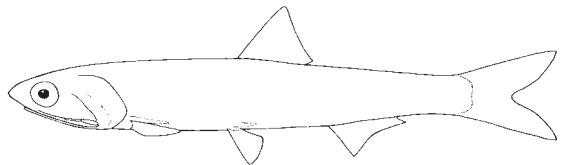
Albulidae: snout conical, projecting beyond lower jaw, mouth inferior, lateral line present.

Engraulidae: articulation of lower jaw well posterior to vertical through posterior margin of eye, lower jaw usually slender; snout pig-like and projecting, lower jaw underslung; adipose eyelid completely covering eyes; scales with posterior striae or striations.

Similar silvery fishes of other families: no keel of scutes along abdomen.



Albulidae



Engraulidae

Key to species of Clupeidae occurring in the area

Note: This key excludes purely freshwater species.

1a. Upper jaw rounded in front, without median notch for reception of tip of lower jaw (Fig. 1a) → **2**

1b. Upper jaw with distinct median notch for reception of tip of lower jaw (Fig. 1b) → **10**

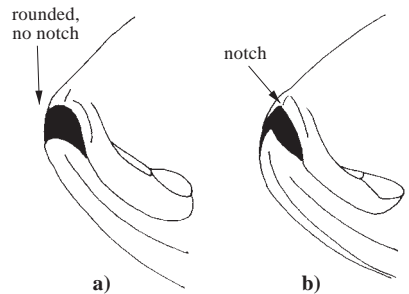


Fig. 1

- 2a. Two supramaxillae (Fig. 2a) → 3
- 2b. A single supramaxilla (anterior missing) (Fig. 2b) → 7
- 3a. Gill cover smooth; a single black spot on posterior margin of gill cover or on body posterior to gill cover (Fig. 3) (*Sardinella*) → 4
- 3b. Gill cover with bony radiating striae (Figs 4 and 5); also, multiple black spots along flanks → 6

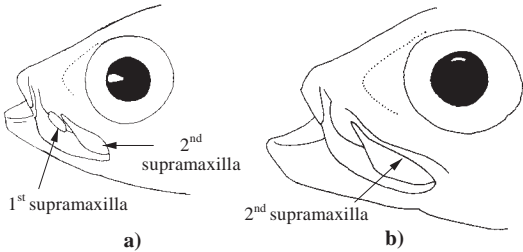


Fig. 2

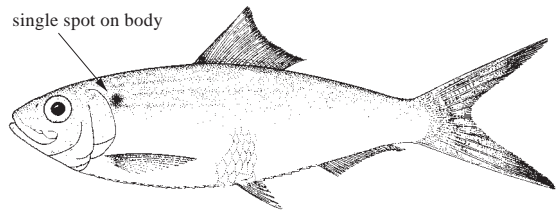


Fig. 3 *Sardinella maderensis*

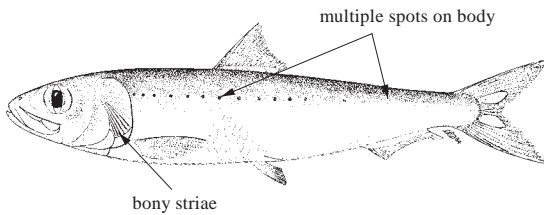


Fig. 4 *Sardinops*

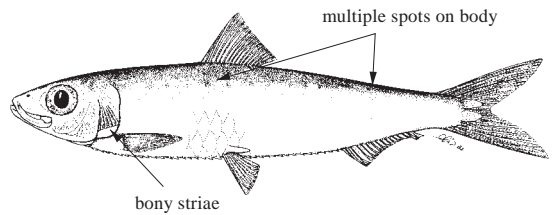


Fig. 5 *Sardina*

- 4a. A distinct black spot on posterior margin of gill cover; no black spot at dorsal-fin origin (Fig. 5); pelvic-fin rays 9 *Sardinella aurita*
- 4b. No distinct black spot on posterior margin of gill cover (black spot sometimes present on body but posterior to gill cover); a distinct black spot at dorsal-fin origin (Fig. 6); pelvic-fin rays 8 → 5

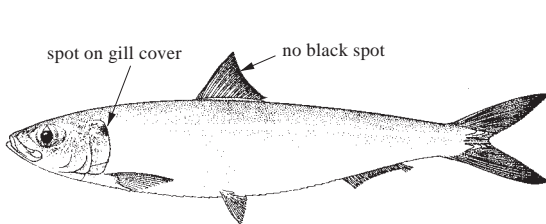


Fig. 5 *Sardinella aurita*

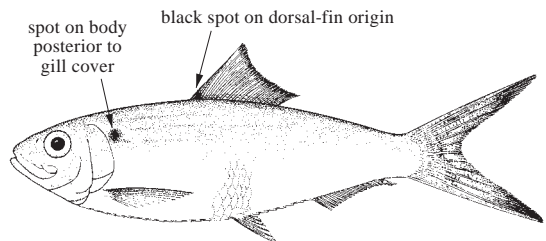


Fig. 6 *Sardinella maderensis*

- 5a. Gill rakers fine and numerous, more than 70 on lower limb of first gill arch; pectoral fin black between white fin rays in upper part, colourless below; caudal fin dark grey, caudal-fin tips nearly black *Sardinella maderensis*
- 5b. Gill rakers 34 to 40 on lower limb of first gill arch; upper part of pectoral fins dusky; caudal fin pale yellow with a dusky posterior margin *Sardinella rouxi*

- 6a. Lower gill rakers not decreasing in size at angle of first arch (Fig. 7a); restricted to northern part of area ***Sardina pilchardus***
- 6b. Lower gill rakers decreasing in size at angle of first arch (Fig. 7b); restricted to southern part of area ***Sardinops ocellatus*** (Angola)

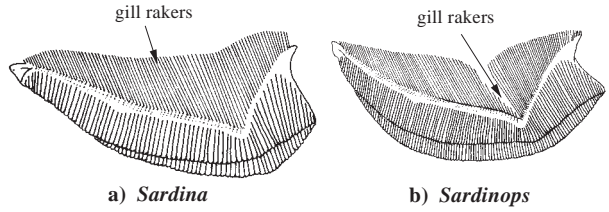


Fig. 7 first gill arch

- 7a. Premaxillae without canine teeth (teeth sometimes enlarged, but not fang-like); lower jaw teeth small, of even lengths (Fig. 8) . . . (***Pellonula***) → 8
- 7b. Premaxillae with 2 to 4 large, backward pointing, strong, canine-like teeth behind normal outer series of smaller teeth (Fig. 9); lower jaw teeth enlarged or canine-like . . . (***Odaxothrissa***) → 9

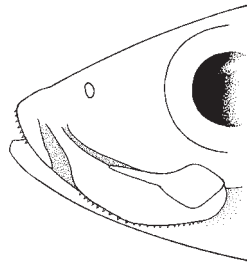


Fig. 8 *Pellonula*

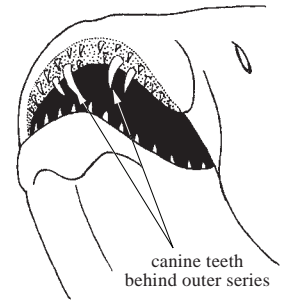
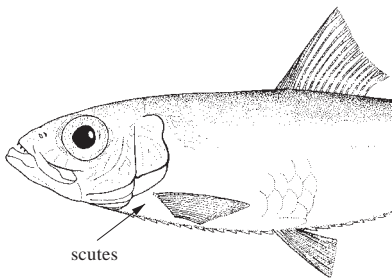
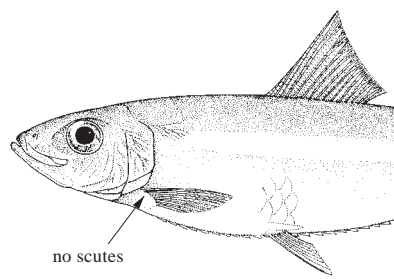


Fig. 9 *Odaxothrissa*

- 8a. Scutes present on abdomen anterior to pectoral-fin base (beginning at isthmus) (Fig. 10a); first ventral scute longer and more developed than next succeeding scute; premaxillary teeth strong, fairly straight, pointing forward in some fish; an indented toothless gap present at centre of lower jaw ***Pellonula vorax***
- 8b. No scutes present on abdomen anterior to pectoral-fin base, scutes begin on abdomen posterior to base of first (or more usually the last) pectoral-fin ray (Fig. 10b); first ventral scute about as long as next succeeding scute; premaxillary teeth small, curved inward, only their tips usually apparent; no strongly marked indentation at centre of lower jaw ***Pellonula leonensis***



a) *Pellonula vorax*



b) *Pellonula leonensis*

Fig. 10

- 9a. First ventral scute longer and more developed than next successive scute; gill rakers on lower limb of first gill arch 22 to 33 ***Odaxothrissa ansorgii***
- 9b. First ventral scute about equal in length or slightly shorter than next successive scute; gill rakers on lower limb of first gill arch 16 to 19 ***Odaxothrissa mento***

10a. Body fairly slender, gill cover with bony radiating striae (Fig. 11); posterior borders of scales not fringed; found only in northern part of area (*Alosa*) → **11** (to Cape Blanc)

10b. Body deep, gill cover smooth (Fig. 12); posterior borders of scales fringed; not found in northern part of area *Ethmalosa fimbriata* (from southern Mauritania)

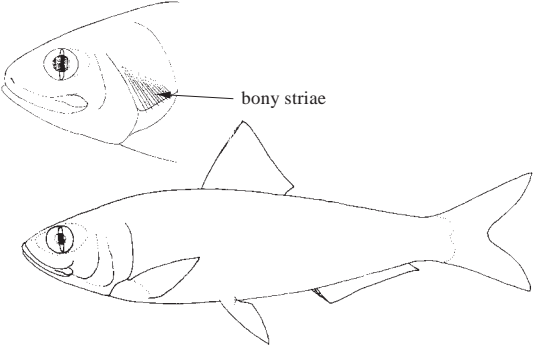


Fig. 11 *Alosa*

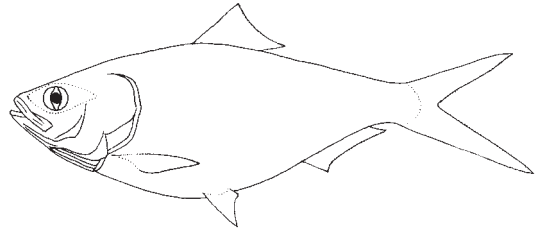
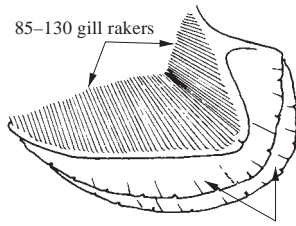
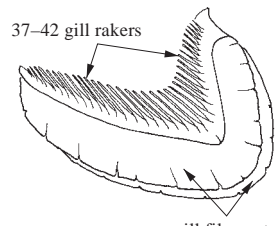


Fig. 12 *Ethmalosa*

11a. Gill rakers on first gill arch long, thin and numerous, longer than gill filaments (Fig. 13a), total 85 to 130; usually a dark spot on body posterior to gill cover occasionally followed by 1 or 2 others along flanks (Fig. 14). *Alosa alosa*



a) *Alosa alosa*



b) *Alosa fallax*

Fig. 13

11b. Gill rakers on first gill arch short, stout, shorter than gill filaments (Fig. 13b); total gill rakers 37 to 42; usually a dark spot on body posterior to gill cover followed by 6 or 7 dark spots along flanks (Fig. 15) *Alosa fallax*

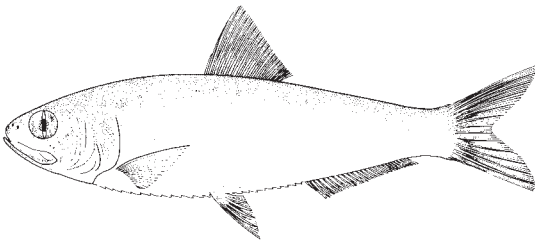


Fig. 14 *Alosa alosa*

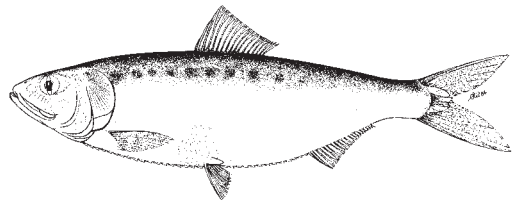





Fig. 15 *Alosa fallax*

List of species occurring in the area






Note: Purely freshwater species are excluded.

The symbol  is given when species accounts are included.





Subfamily ALOSINAE

-  *Alosa alosa* (Linnaeus, 1758).
-  *Alosa fallax* (Lacépède, 1803).
-  *Ethmalosa fimbriata* (Bowdich, 1825).

Subfamily CLUPEINAE

-  *Sardina pilchardus* (Walbaum, 1792).
-  *Sardinella aurita* Valenciennes, 1847.
-  *Sardinella maderensis* (Lowe, 1838).
-  *Sardinella rouxi* (Poll, 1953).
-  *Sardinops ocellatus* (Pappe, 1853).

Subfamily PELLONULINAE

-  *Odaxothrissa ansorgii* Boulenger, 1910.
-  *Odaxothrissa mento* (Regan, 1917).
-  *Pellonula leonensis* Boulenger, 1916.
-  *Pellonula vorax* Günther, 1868.

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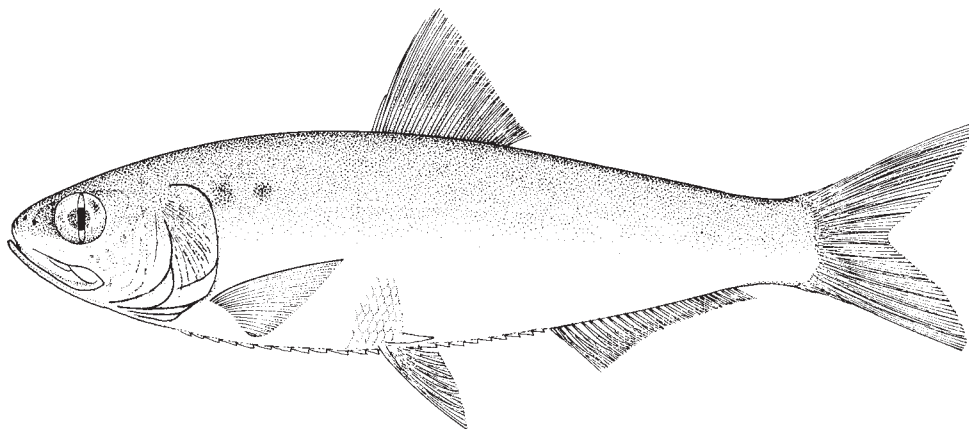
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Alosa alosa (Linnaeus, 1758)

Frequent synonyms / misidentifications: None / None.

FAO names: **En** – Allis shad; **Fr** – Alose vraie; **Sp** – Sábalo común.



Diagnostic characters: Body fusiform, slightly compressed; moderately deep (depth at pectoral fin more than head length); head wedge-shaped in cross-section; **abdomen with distinct keel of scutes. Upper jaw with distinct notch to receive tip of lower jaw.** No teeth on vomer. **Lower gill rakers 55 to 85; gill rakers slender, long and thin, appearing to be more numerous and longer than gill filaments. Gill cover with radiating bony striae.** Dorsal-fin origin slightly anterior to vertical through midpoint of body; anal-fin origin well behind dorsal-fin base. **Colour:** dorsum deep blue, flanks silvery, both with metallic gleam; usually with **dark spot on body posterior to gill cover, which is occasionally followed by one or even two additional spots (but not more) along flanks.**

Size: Maximum to 70 cm; common to 40 cm.

Habitat, biology, and fisheries: Anadromous, pelagic, migratory species entering rivers to breed. Adults occur in large schools in marine waters; juveniles remain close to shore and within estuaries. Off West Africa, caught at depths of 10 to 400 m. Feeds principally on zooplanktonic organisms such as copepods (*Calanus*) and euphausiids (*Meganyciophanes*), also on decapods (*Pandalus*) and occasionally small fishes, at least in more northern waters. Adults (ages 4 to 6 years) enter rivers (thought to be natal rivers) in spring to spawn (usually at night at the surface and in areas of strong currents). Migration periods are longer and begin earlier (December) in the Sebou River, Morocco, than in areas further north. After spawning, spent adults die or return to the sea. Juveniles emigrate from estuaries during the autumn of their first year of life. Growth rates of shad off Morocco were notably higher than those from other regions, thought to be related to favourable factors related to proximate upwelling. Caught in very small numbers in this area and populations are much reduced compared to historical levels. Separate statistics not reported for this species. Taken in trawls, perhaps also in purse seines. The Allis shad has largely disappeared from Moroccan waters since about 1992 due to alterations resulting from pollution, dams associated with hydro-electric impoundments, and industrial installations along river ways. Marketed fresh (this species is palatable, but bony).

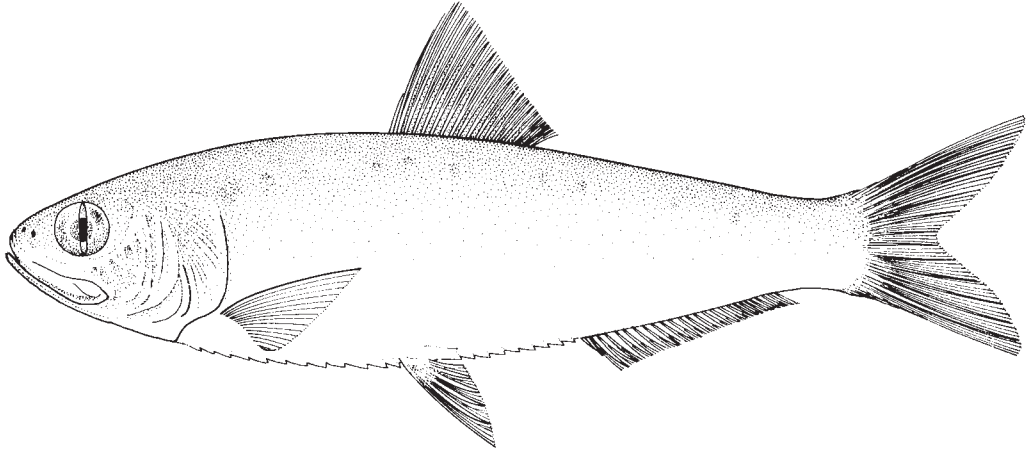
Distribution: Eastern Atlantic; along West Africa from Morocco southward to Mauritania (about 21°N); also Canary Islands. Elsewhere, coasts of Europe from Iberian peninsula to Norway, Sweden, and Russian Federation, and United Kingdom, Ireland and Iceland, also western region of Mediterranean.



Alosa fallax (Lacépède, 1803)

Frequent synonyms / misidentifications: *Alosa finta* (Cuvier, 1829) / None.

FAO names: En – Twaite shad; Fr – Alose feinte; Sp – Saboga.



Diagnostic characters: Body fusiform, slightly compressed, moderately deep (depth at pectoral fin less than head length); head wedge-shaped in cross-section; **abdomen with a keel of scutes. Upper jaw with distinct notch to receive tip of lower jaw. Total gill rakers 37 to 42 (West African populations); gill rakers short and stout, shorter and fewer than gill filaments.** No teeth on vomer. Gill cover with radiating bony striae. Dorsal-fin origin slightly anterior to vertical through midpoint of body; anal-fin origin well behind vertical through posterior dorsal-fin base. **Colour:** dorsum blue, flanks silvery, both with metallic gleam; **usually with dark spot on body posterior to gill cover and with 6 or 7 additional dark spots along flanks**, occasionally with another series of spots ventral to first series.

Size: Maximum to 60 cm; common to 40 cm.

Habitat, biology, and fisheries: Anadromous, pelagic, migratory species entering rivers to breed (but apparently not penetrating far up rivers). Adults occur in schools in marine waters. Enters tidal parts of rivers in spring to spawn or spawns slightly upriver from tidal regions. Adults return to the sea following spawning. Eggs demersal, scattered over unconsolidated gravel or sand in moving water. Juveniles emigrate from estuaries in the autumn of their first year of life and move to sea at end of their second year. Off West Africa, caught in area at depths of 10 to 400 m. Feeds primarily on small fishes (anchovies, especially) with crustaceans (mysids, shrimps, isopods, euphausiids) and insects of secondary importance; young fish feed on early life stages of herrings, sprats, and gobies. Caught in small numbers in the area. Separate statistics not always reported for this species, but included with catches of *A. alosa*. Probably makes up the major part of *Alosa* catches reported by Morocco. Taken in trawls, perhaps also in purse seines. Marketed fresh (this species is palatable, but bony).

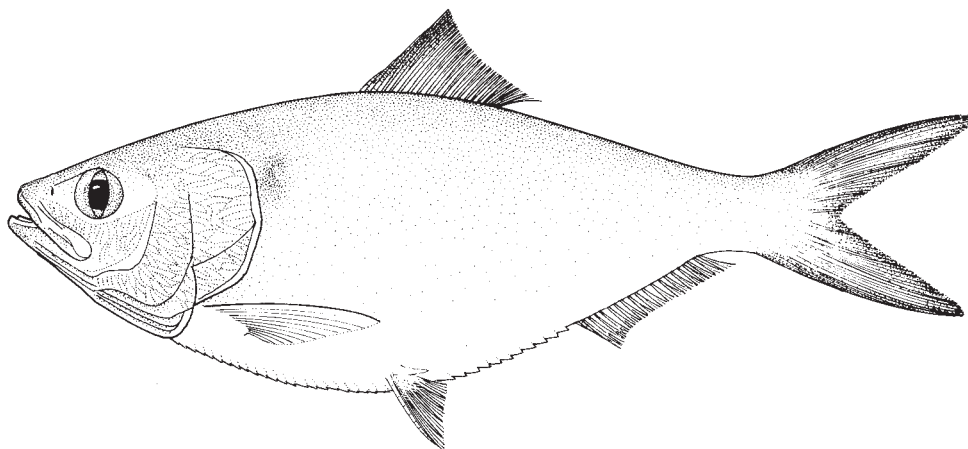
Distribution: Eastern Atlantic; along West Africa from Morocco southward to Western Sahara. Elsewhere, coasts of Europe from southern coast of Iceland and coastal waters around Bergen, Norway, British Islands, Baltic, and whole of Mediterranean.



Ethmalosa fimbriata (Bowdich, 1825)

Frequent synonyms / misidentifications: *Ethmalosa dorsalis* (Valenciennes, 1847) / None.

FAO names: **En** – Bonga shad; **Fr** – Ethmalose d'Afrique; **Sp** – Sábalo africano.



Diagnostic characters: **Body fairly deep and compressed; head large; abdomen with a keel of scutes** (partly concealed in a groove of scales). Mouth terminal, **lower jaw fitting into median notch of upper jaw**. Lower gill rakers long, fine and numerous; about three times as long as gill filaments; upper gill rakers bent sharply upward, V-shaped. Dorsal fin short, about at vertical through midpoint of body; anal-fin short, placed well behind vertical through posterior dorsal-fin base; caudal-fin tips long and pointed. Pelvic-fin rays with 1 unbranched and 7 branched rays. **Scales with fringed posterior borders.** **Colour:** dorsum blue-green, flanks silvery, with faint oval spot on body a short distance posterior to gill opening (occasionally followed by other faint spots); golden areas on upper part of head; anterior dorsal-fin rays dark, rest of fin yellow, except at base; anal fin yellow at base; **caudal fin deep chrome yellow**, but upper and posterior margins grey.

Size: Maximum to 46 cm; common to 25 cm.

Habitat, biology, and fisheries: Euryhaline; occurs in coastal waters at fairly shallow depths, lagoons and estuaries, and sometimes in freshwater more than 300 km upriver; major concentrations occur in lagoons and estuaries. Fishes larger than about 12 cm prefer salinities usually greater than 5‰. Undertakes seasonal movements with a spring migration towards the coast for spawning, and a fall migration toward the open sea. Spawns in the sea, lagoons and estuaries over a salinity range of 3.5 to 38‰. Reproduction in some areas related to seasonal periods of high salinities. Feeds principally on phytoplankton filtered by the very fine gill raker sieve. An important commercial species with annual landings of over 100 000 tonnes. Caught by canoe fishermen using purse seines and encircling gillnets, also castnets, beach seines, and trawlers. Marketed fresh (especially in the Senegambian region), smoked and dried (preferred in Nigeria and elsewhere), and salted and dried (the latter greatly preferred in Cameroon). Fresh bonga is consumed in urban areas, while the salted and dried and smoked products have a large market in the rural areas. Processed products are also exported to neighboring countries.

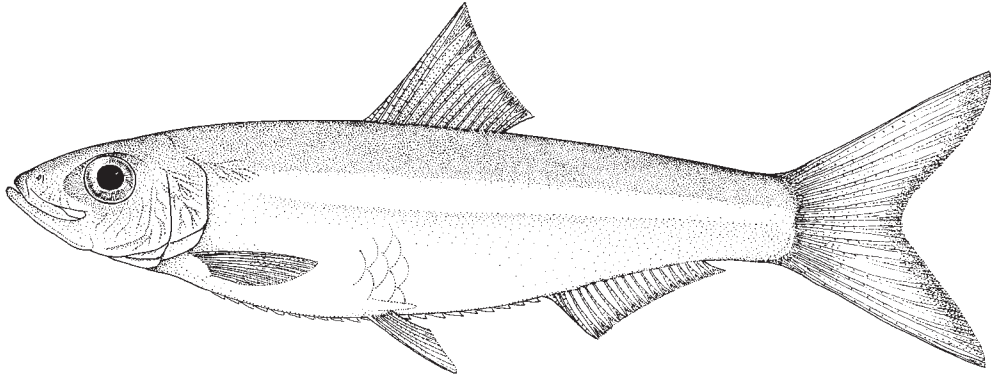
Distribution: Eastern Central Atlantic; from Dakhla, Western Sahara, southward to at least Lobito, Angola, (from 24°N to 12°S). Records from Cape Verde Islands based on erroneous information concerning type locality.



Pellonula leonensis Boulenger, 1916

Frequent synonyms / misidentifications: *Pellonula afzeliusi* Johnels, 1954; *Microthrissa miri* Daget, 1954; *Pellonula afzeliusi miri* (Daget, 1954); *P. miri* (Daget, 1954); *Microthrissa normanae* Whitehead, 1986 / None.

FAO names: En – Smalltoothed pellonula; Fr – Spratelle de Guinée; Sp – Sardinita guineana.



Diagnostic characters: Body slender to moderately deep (body depth 17 to 30% of standard length) and compressed; **abdomen sharply keeled, with scutes beginning posterior to base of first (usually last) pectoral-fin ray and continuing to anus, but without scutes anterior to pectoral-fin base; first ventral scute about as long, or slightly shorter than next successive scute.** Mouth terminal, or lower jaw only very slightly projecting; small teeth on premaxillae and dentaries, teeth at symphysis only slightly enlarged; **no canine-like teeth present;** premaxillary teeth small, curved inward, only the tips usually apparent, **no strongly marked indentation at centre of jaw.** Lower gill rakers 20 to 30 on first arch; gill rakers long (equal to or longer than corresponding gill filaments). Dorsal fin at about vertical through midpoint of body; anal-fin origin slightly posterior to vertical through posterior dorsal-fin base. Pelvic fin with 1 unbranched and 7 branched rays. **Colour:** dorsum pale green, **flanks with silver stripe,** grey below and becoming very pale on abdomen; a faint gold line above silver stripe when viewed from above; fins hyaline, but with faint yellow on dorsal fin and stronger yellow on caudal fin (except outermost rays); posterior margin of caudal fin dusky, distal tip of lower caudal lobe darker.

Size: Maximum to 9 cm; common to 8 cm.

Habitat, biology, and fisheries: Pelagic, anadromous species found chiefly in freshwater streams and rivers, but also in estuaries and lagoons of moderate to high salinities. Often occurring with juvenile *Sardinella maderensis* and *Ethmalosa fimbriata*. Forms schools and is mainly nocturnal. Breeds in rivers, lakes and perhaps estuaries and lagoons (July to September in Volta Lake). Reported from beaches on the Congo coast at Pointe Noire. Feeds on algae, terrestrial and aquatic insects and small crustaceans. Caught in artisanal fisheries throughout area of distribution; a special fishery in the Wouri River estuary near Douala (Cameroon), but others also probably exist. Separate statistics not reported for this species. Caught by seine nets (beach seines and purse seines) in shallow water (fresh or brackish), by scoop nets and in basket traps; also on line using as bait the eye of a *Pellonula* (Cameroon). Marketed fresh.

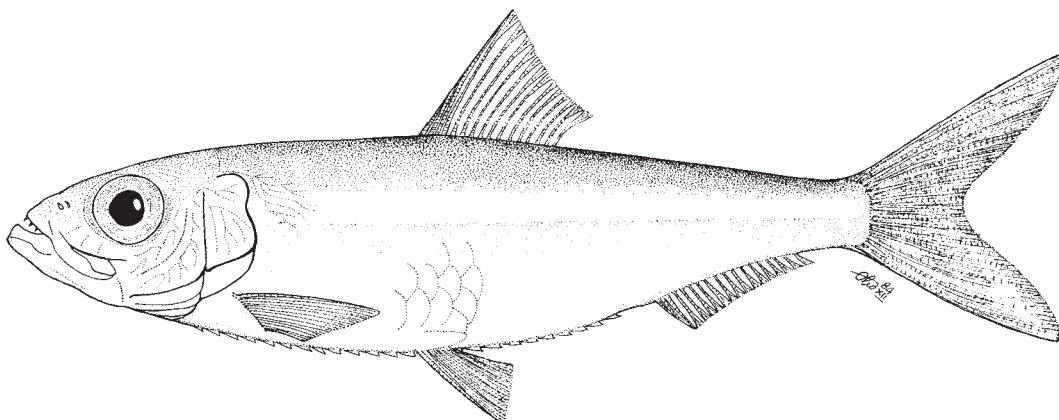
Distribution: Eastern Central Atlantic; in fresh and estuarine waters from northern Senegal to Democratic Republic of the Congo, upper reaches of Niger and lower parts of Benue, but apparently not in upper parts of the Congo system.



***Pellonula vorax* Günther, 1868**

Frequent synonyms / misidentifications: *Pellonula stanleyana* Regan, 1917 / None.

FAO names: En – Bigtoothed pellonula.



Diagnostic characters: Body moderate to fairly deep (depth 23 to 30% of standard length). **Adomen sharply keeled, with scutes beginning at isthmus** and continuing to anus; **first ventral scute longer and more developed than next successive scute**. Mouth terminal with lower jaw slightly projecting; premaxillary teeth strong, fairly straight, pointing forward in some fishes and with an indented, toothless gap at centre of jaw; **teeth at symphysis large in larger fishes; no canine-like teeth present**. Lower gill rakers 25 to 36 on first arch; gill rakers long (equal to or longer than corresponding gill filaments). Dorsal fin at about vertical through midpoint of body; anal-fin origin slightly posterior to vertical through posterior dorsal-fin base. Pelvic fin with 1 unbranched and 7 branched rays. **Colour:** dorsum pale green, **flanks with silver stripe**, grey below and becoming very pale on abdomen; fins pale to hyaline.

Size: Maximum to 12 cm standard length; common to 10 cm.

Habitat, biology, and fisheries: Pelagic, anadromous species found in lower reaches of rivers and streams, estuaries, coastal lagoons. Feeds on crustaceans and small fishes. Larvae are found in Sierra Leone estuaries from July to November. More data needed on biology of this species. Enters artisanal fisheries, but catches are small.

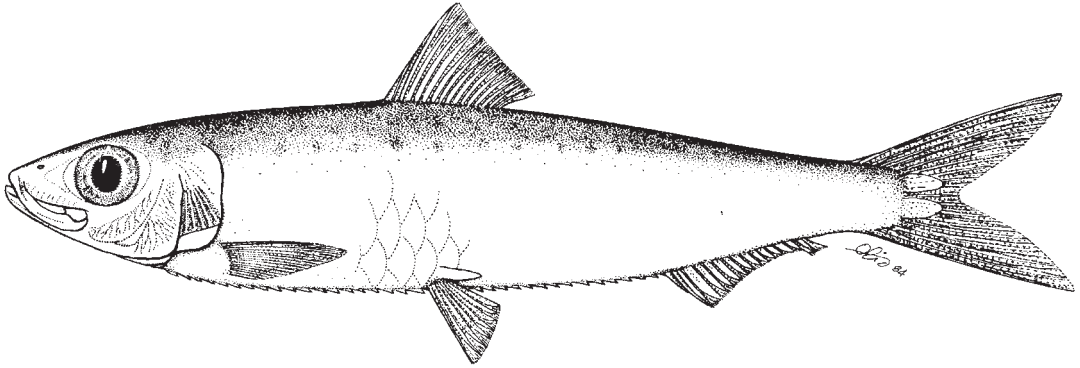
Distribution: Eastern Central Atlantic; lower parts of rivers from Sierra Leone to Angola (but apparently absent in region from Ghana to the Niger Delta, Nigeria).



Sardina pilchardus (Walbaum, 1792)

Frequent synonyms / misidentifications: None / None.

FAO names: En – European pilchard; Fr – Sardine commune; Sp – Sardina europea.



Diagnostic characters: Body fairly slender, subcylindrical, abdomen more rounded in adults; **abdomen with scutes but not sharply keeled.** Mouth terminal; jaws about equal; **lower gill rakers 44 to 68 (Mediterranean) or 59 to 106 (Sahara, Senegal), not decreasing in length at angle of first gill arch;** lower gill rakers not overlapped by those on upper limb at this point. Posterior margin of gill opening smoothly rounded (without fleshy outgrowths). **Three to 5 distinct bony striae radiating downwards on lower part of operculum.** Dorsal fin at about midpoint of body. Anal-fin origin well behind vertical through posterior dorsal-fin base, last two anal-fin rays enlarged. Pelvic-fin insertion well posterior to vertical through dorsal-fin origin; 8 pelvic-fin rays. **Colour:** dorsum green or olive, flanks golden, shading to silvery-white on belly; **single series of dark spots along upper flanks,** sometimes with a second or even third series below.

Size: Maximum to 25 cm; common from 15 to 20 cm.

Habitat, biology, and fisheries: A pelagic, migratory fish, forming large schools at shallow depths in coastal waters; normally a 'cold water' species. Maximum age is about 14 years. Sexual maturity occurs at ages 2 and 3 (18 to 20 cm). Feeds mainly on planktonic crustaceans and other, sometimes larger, zooplankton. Of considerable economic importance to fishery landings of Morocco and Mauritania, principally off southern Morocco and northern Sahara; of limited importance southwards. Most of the catch is made within coastal seas, only small amounts are taken in deeper areas at 50 to 70 m. Schools of young pilchards (13 to 16 cm) are targeted by purse seiners. Morocco regularly catches over 0.5 million tonnes of the 0.6 to 0.8 million tonnes caught annually. Caught with purse seines, lamparas (light fishing), gillnets, beach seines, trap nets, and high-opening bottom trawls. Marketed fresh, frozen or canned or for processing into fishmeal.

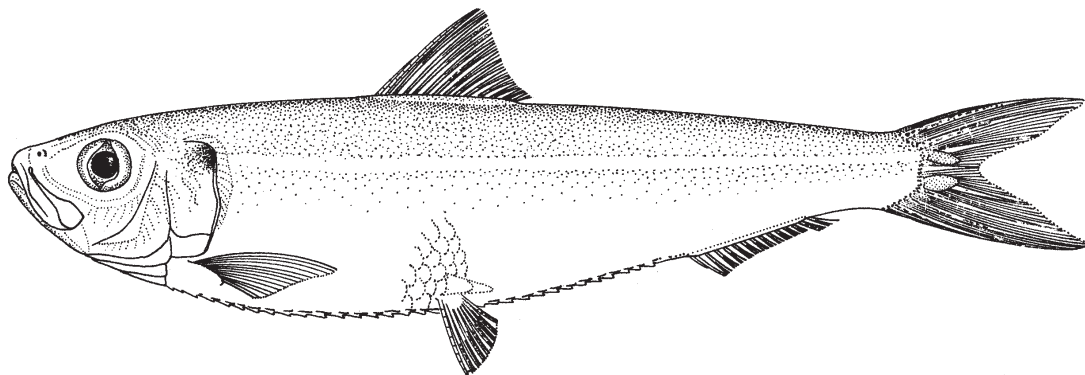
Distribution: Eastern Atlantic; off Morocco, Madeira, Canary Islands, and southward to 26°N, but since 1970 has occurred further southward to northern coasts of Mauritania (Cape Timiris), with individuals caught as far south as Bay de Gorée, Senegal (14°43'N). Elsewhere, northeastern Atlantic from southern Iceland coast, southern coasts of Scandinavia; North Sea and British Isles; coastal Europe to Gibraltar; also Mediterranean (except southeast) and Black Sea.



Sardinella aurita Valenciennes, 1847

Frequent synonyms / misidentifications: *Alosa senegalensis* Bennett, 1831 / None.

FAO names: **En** – Round sardinella (AFS: Spanish sardine); **Fr** – Allache (= Sardinelle ronde, Area 37); **Sp** – Alacha (= Sardinela atlántica, Area 31).



Diagnostic characters: Body elongate, **subcylindrical in cross-section**, and sometimes slightly compressed; **abdomen rounded, but with distinct keel of scutes**. Eye moderate, more than 3 times in head length; mouth terminal; **lower gill rakers fine and numerous, more than 80 (162 to 248 in West African specimens of 23 to 28 cm standard length) on lower limb of first arch. Two fleshy outgrowths along outer margin of gill opening.** Dorsal-fin origin slightly anterior to vertical through midpoint of body; **1 unbranched and 9 branched pelvic-fin rays**; anal-fin origin well behind vertical through posterior dorsal-fin base; posteriormost anal-fin rays longer than those immediately anterior. **Colour:** dorsum blue-green, lower flanks silvery, with faint golden midlateral line preceded by gold spot on body posterior to gill cover; **distinct black spot on posterior margin of gill cover** (absence of underlying silver pigment); dorsal fin pale to deep yellow, upper margin dusky, anterior fin rays black, but **no black spot at dorsal-fin origin**; pectoral fins pale yellow with dark speckling; caudal fin faint yellow near base, remainder dusky, tips very dark or black.

Size: Maximum to 42 cm; commonly to 25 cm.

Habitat, biology, and fisheries: Occurs in nearshore waters to near surface at outer continental shelf margin. Forms large and dense schools; approaching the coast and shoaling near the surface during periods of upwelling, but retreating below the thermocline in the hot season, to depths of 200 to 350 m off West Africa. Growth is rapid with fish reaching about 15 cm during their first year. Maturity occurs during year 2. Lives to about 6 years. Spawns at all times of the year off West Africa, with distinct seasonal peaks, which in some areas are linked with upwelling events. Feeds mainly on zooplankton, especially copepods. Sometimes contributing up to 90% of clupeid catches although usually catch records are mixed for *Sardinella* species. Caught by canoe fishermen using ring nets, gillnets, and beach seines; by local purse seiners; and by industrial trawlers. Marketed fresh, frozen, also smoked, canned, salted and dried, and used in production of fish meal.

Distribution: Eastern and western Atlantic; African coast throughout the area from Gibraltar southward to Saldana Bay, South Africa, also Canary Islands; elsewhere, Mediterranean, but rare in Black Sea; Western Atlantic (Cape Cod to Argentina).

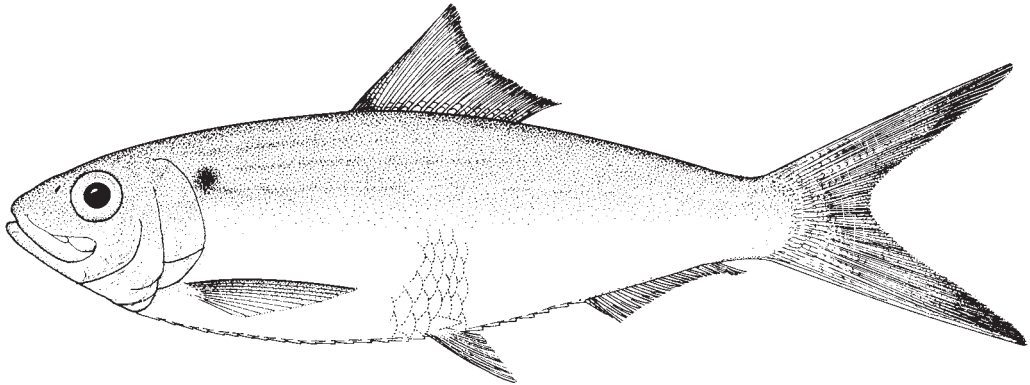
Remarks: Disjunct populations of *S. aurita* need further study to determine their taxonomic status.



***Sardinella maderensis* (Lowe, 1838)**

Frequent synonyms / misidentifications: *Pellonula modesta* Fischer, 1885; *Sardinella granigera* Valenciennes, 1847; *S. eba* Valenciennes, 1847; *S. cameronensis* Regan, 1917 / None.

FAO names: En – Madeiran sardinella (= Short body sardine, Area 37); Fr – Grande allache; Sp – Machuelo.



Diagnostic characters: Body elongate, moderately compressed, variable in depth; **abdomen sharply keeled**, with scutes from gill opening to anus. Eye moderate, more than 3 times in head length; mouth terminal; **gill rakers fine and numerous, more than 70 on lower limb of first arch (70 to 166 in fishes 6 cm standard length or larger)**. Dorsal-fin origin slightly anterior to vertical through midpoint of body; **1 unbranched and 8 branched pelvic-fin rays**; anal-fin origin well behind vertical through posterior dorsal-fin base; posteriormost anal-fin rays longer than those immediately preceding. **Colour:** dorsum blue-green, lower flanks silvery, with faint gold midlateral line, preceded by a **gold, green or faint black spot on body posterior to gill cover**; one or two very faint gold lines above main one. Dorsal fin yellow with dusky margin and **black spot at base of anterior fin rays**; **pectoral fin black between white fin rays in upper part**, colourless below; **caudal fin dark grey, tips almost black**, lowermost fin ray colourless.

Size: Maximum to 32 cm; commonly 20 to 25 cm.

Habitat, biology, and fisheries: A coastal, pelagic, warm-water species, shoaling at the surface or at the bottom down to at least 50 m; tolerant of fairly low salinity; juveniles sometimes entering estuaries (e.g. Gabon). A schooling species that is highly migratory. Seasonal movements are correlated with seasonal upwelling. Inshore/offshore movements correlate also with rainy and dry seasons. Feeds on a variety of small planktonic organisms, including phytoplankton and zooplankton, also fish larvae. Growth is rapid with fish reaching about 12 cm during their first year. Sexual maturity occurs during its third year of life. Of considerable commercial importance off West African coasts, but catches for this species often combined with that of *S. aurita*. Caught by canoe fishermen using ring nets, gillnets, very large cast nets, and beach seines; by local purse seiners; and by industrial trawlers. Catch in some areas are reported to be declining corresponding to more intensive and extensive exploitation. Marketed fresh, frozen, smoked, also salted, and dried and canned; increasingly utilized in production of fish meal.

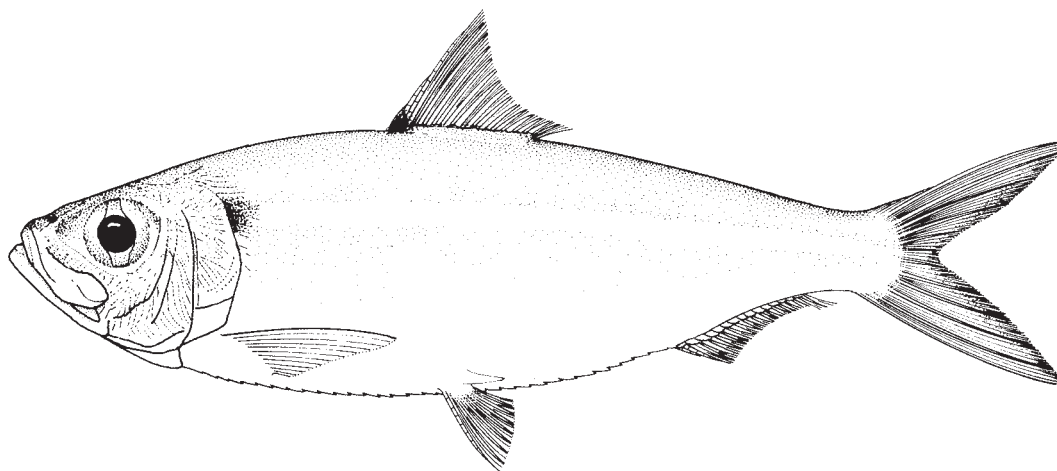
Distribution: Eastern Atlantic; southeastern Spain and Gibraltar southward along coastal West Africa from Morocco to at least Luanda, Angola, and perhaps further south (single record from Walvis Bay, Namibia); Madeira and Canary Islands (common); elsewhere, southern Mediterranean and penetrating Suez Canal.



Sardinella rouxi (Poll, 1953)

Frequent synonyms / misidentifications: *Harengula rouxi* Poll, 1953 / *Sardinella maderensis* (Lowe, 1838).

FAO names: En – Yellowtail sardinella; Fr – Sardinelle à queue jaune; Sp – Alacha rabo amarillo.



Diagnostic characters: Body fusiform, but **moderately compressed and deep**; **abdomen sharply keeled with scutes from gill opening to anus**. **Eye large**, 3.0 to 3.3 times in head; mouth terminal; **lower gill rakers 34 to 40**. Dorsal-fin origin slightly anterior to vertical through midpoint of body; **1 unbranched and 7 branched pelvic-fin rays**; anal-fin origin well behind vertical through posterior dorsal-fin base; posteriormost anal-fin rays longer than those immediately preceding. **Colour:** dorsum blue-green, flanks silvery, with faint golden midlateral line preceded by **black spot on body posterior to gill cover**; dorsal fin pale yellow with dusky upper margin; **black spot at bases of anterior dorsal-fin rays**; **caudal fin pale yellow with dusky posterior margin**; other fins hyaline, but upper part of pectoral fins dusky.

Size: Maximum to 16 cm; common to 13 cm.

Habitat, biology, and fisheries: Coastal, pelagic species occurring in inshore waters and along beaches. Caught in small numbers throughout its distribution; often taken with juvenile *S. maderensis*. More data needed for this species. Separate statistics not reported for this species. Catches of this species undoubtedly included with the combined catches of unsorted *Sardinella* species. Caught in artisanal, semi-industrial and industrial fisheries with beach seines, purse seines, and gillnets. Marketed fresh, perhaps also dried.

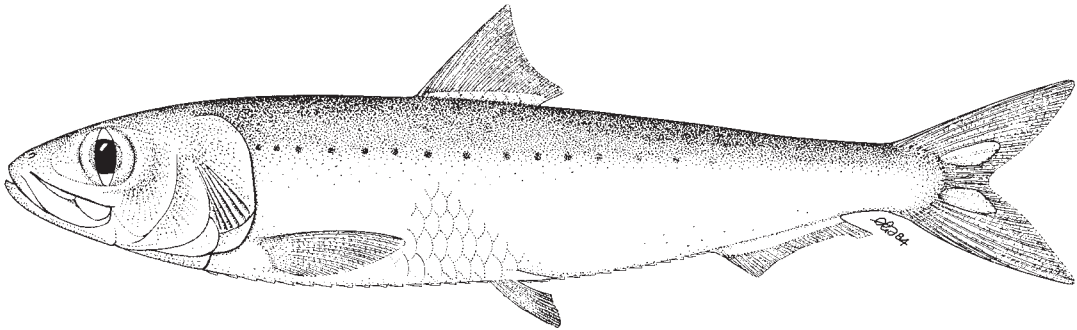
Distribution: Eastern Atlantic; Senegal to Congo, perhaps southward to northern Angola.



***Sardinops ocellatus* (Pappe, 1853)**

Frequent synonyms / misidentifications: *Sardinops sagax* (Jenyns, 1842) / None.

FAO names: **En** – Southern African pilchard; **Fr** – Pilchard de l'Afrique australe; **Sp** – Sardina de Africa austral.



Diagnostic characters: Body fairly slender, oval in cross-section; **abdomen not sharply keeled**, but with small ridge of scutes from gill opening to anus. **Lower gill rakers to about 120, decreasing in length at angle of gill arch, lower gill rakers overlapped by upper gill rakers at this point; strong radiating bony striae on lower part of operculum. No fleshy outgrowths at posterior border of gill opening.** Dorsal-fin origin about equal with vertical through midpoint of body; 1 unbranched and 8 branched pelvic-fin rays; anal-fin origin well behind vertical through posterior dorsal-fin base, posteriormost two fin rays enlarged. **Colour:** dorsum green or olive, flanks golden, shading to silvery-white on belly; single series of dark spots along upper flanks, sometimes with second or third series below.

Size: Maximum to 30 cm standard length; common to 25 cm.

Habitat, biology, and fisheries: A coastal, pelagic and migratory species, forming large shoals that may be spread over several kilometres; occurs especially in March-July in southern parts of the area of interest; highly migratory. Local pilchard concentrations and migrations depend upon prevailing winds and currents. Abundance in given area closely matched with plankton concentrations, which in turn are affected by upwelling events. Prefers cooler waters of the southwestern African shelf. Occurs in coastal waters and on the shelf to a depth of about 200 m. Breeds September-April off Namibia, either offshore (January to March), or inshore (September to December). A non-selective planktivore that feeds on zooplankton (mainly calanoid copepods and other small crustaceans) when young, but on phytoplankton (mainly diatoms) at sizes from about 10 cm standard length. An important commercial species, with bulk of catches taken south of the region. Historical catches in the Namibian pelagic fishery were over 1 000 000 tonnes per year in the 1960's. Within the area, major fishing grounds include Baia dos Tigres (Angola) and Walvis Bay (Namibia). Smallest catches are in summer (January, February), when the strong south winds predominate. Peak catches are made in winter (July) when low northerly winds predominate and when schools of pilchards are found closer to shore. Caught with purse seines, bottom and pelagic trawls, gillnets, and beach seines. Appreciated for its delicate meat, pilchards are marketed fresh, frozen or canned; used also for fishmeal and fish oil.

Distribution: Eastern Atlantic and southwestern Indian Ocean; in the area from southern Angola (Baia dos Tigres) south to Cape Town; elsewhere northeast to Durban.

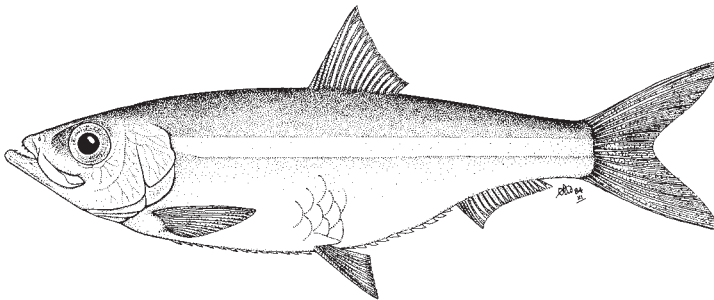


Remarks: See comments above concerning systematics in this species.

***Odaxothrissa ansorgii* Boulenger, 1910**

En – Ansorge's fangtooth pellonuline.

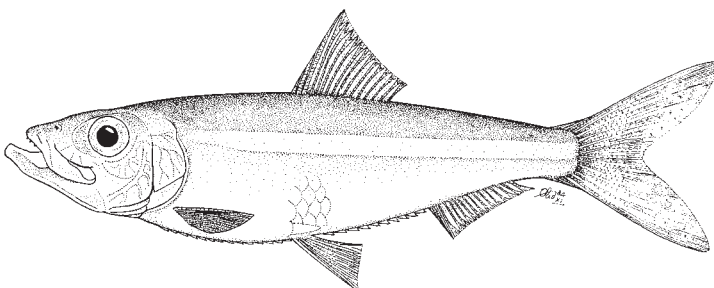
Maximum size to 13 cm standard length. Occurs in rivers and streams; may be found in lower reaches of rivers. Enters artisanal fisheries, but catches are small. West African freshwaters from Senegal to Angola (lagoons in Côte d'Ivoire; lower reaches of rivers in Senegal; in rivers from Kouilou River, Congo, to Angola).



***Odaxothrissa mento* (Regan, 1917)**

En – Nigerian fangtooth pellonuline.

Maximum size to 13 cm standard length. Occurs in rivers and streams; may be found in lower reaches of rivers. Feeds on small fishes and aquatic insects. Possibly migrates upstream to spawn. Enters artisanal fisheries, but catches are small. West African freshwaters from Ghana to Nigeria (lower parts of Volta and Niger basins, also lower Benue).



- A**
 Alacha 1735
 Alacha rabo amarillo 1737
ALBULIDAE 1723
 Allache 1735
 Allis shad 1729
Alosa alosa 1722,1729-1730
Alosa fallax 1722,1730
Alosa finta 1730
Alosa senegalensis 1735
 Alose feinte 1730
 Alose rasoir 1719
 Alose vraie 1729
Anchoa guineensis 1717
 Anchois 1717
 Anchovies 1715
 Ansorge's fangtooth pellonuline 1739
ATHERINIDAE 1716
- B**
 Bigtoothed pellonula 1733
 Bonga shad 1731
 Boquerón 1717
- C**
CLUPEIDAE 1722
 CLUPEIFORMES 1715
Clupea africana 1719
CLUPEIDAE 1716,1720
Cynothrissa 1722
- E**
ENGRAULIDAE 1715
ELOPIDAE 1723
ENGRAULIDAE 1720,1723
Engraulis 1715
Engraulis australis 1715
Engraulis capensis 1715-1716,1718
Engraulis encrasicolus 1715-1717
Engraulis japonicus 1715
Ethmalosa dorsalis 1731
Ethmalosa fimbriata 1722,1731-1732
 Ethmalose d'Afrique 1731
 European anchovy 1717
 European pilchard 1734
- G**
 Grande allache 1736
- H**
Harengula rouxi 1737
 Herrings 1722
- I**
Ilisha africana 1719
- M**
 Machuelo 1736
 Madeiran sardinella 1736
MEGALOPIDAE 1723
Microthrissa miri 1732
Microthrissa normanae 1732
- N**
 Nigerian fangtooth pellonuline 1739
- O**
Odaxothrissa 1722
Odaxothrissa ansorgii 1739
Odaxothrissa mento 1739
- P**
PRISTIGASTERIDAE 1719
Pellona 1722
Pellonula 1732
Pellonula afzeliusi 1732
Pellonula afzeliusi miri 1732
Pellonula leonensis 1732
Pellonula miri 1732
Pellonula modesta 1736
Pellonula stanleyana 1733
Pellonula vorax 1733
 Pilchard de l'Afrique australe 1738
 Pilchards 1722
PRISTIGASTERIDAE 1723
 Pristigasterids 1719
- R**
 Round sardinella 1735
- S**
 Saboga 1730
Sardina 1722
 Sardina de Africa austral 1738
 Sardina europea 1734
Sardina pilchardus 1722,1734
 Sardine commune 1734
 Sardinela atlántica 1735
Sardinella 1722,1737
Sardinella aurita 1722,1735-1736
Sardinella cameronensis 1736

- Sardinella eba* 1736
Sardinella granigera 1736
Sardinella maderensis 1722,1732,1736-1737
Sardinella rouxi 1737
Sardinellas 1722
Sardinelle ronde 1735
Sardinelle à queue jaune 1737
Sardineta africana 1719
Sardinita guineana 1732
Sardinops 1722
Sardinops ocellatus **1738**
Sardinops sagax 1738
Shads 1722
Short body sardine 1736
Smalltoothed pelionula 1732
Southern African pilchard 1738
Spanish sardine 1735
Spratelle de Guinée 1732
Sprats 1722
Sábalo africano 1731
Sábalo común 1729
- T**
Twaite shad 1730
- W**
West African ilisha 1719
- Y**
Yellowtail sardinella 1737
- A**
africana, Clupea 1719
africana, Ilisha 1719
afzeliusi miri, Pellonula 1732
afzeliusi, Pellonula 1732
alosa, Alosa 1722,1729-1730
ansorgii, Odaxothrissa 1739
aurita, Sardinella 1722,1735-1736
australis, Engraulis 1715
- C**
cameronensis, Sardinella 1736
capensis, Engraulis 1715-1716,1718
- D**
dorsalis, Ethmalosa 1731
- E**
eba, Sardinella 1736
encrasicolus, Engraulis 1715-1717
- F**
fallax, Alosa 1722,1730
fimbriata, Ethmalosa 1722,1731-1732
finta, Alosa 1730
- G**
granigera, Sardinella 1736
guineensis, Anchoa 1717
- J**
japonicus, Engraulis 1715
- L**
leonensis, Pellonula 1732
- M**
maderensis, Sardinella 1722,1732,1736-1737
mento, Odaxothrissa 1739
miri, Microthrissa 1732
miri, Pellonula 1732
miri, Pellonula afzeliusi 1732
modesta, Pellonula 1736
- N**
normanae, Microthrissa 1732
- O**
ocellatus, Sardinops 1738
- P**
pilchardus, Sardina 1722,1734
- R**
rouxi, Harengula 1737
rouxi, Sardinella 1737
- S**
sagax, Sardinops 1738
senegalensis, Alosa 1735
stanleyana, Pellonula 1733
- V**
vorax, Pellonula 1733

Order GONORYNCHIFORMES

GONORYNCHIDAE

Beaked salmon

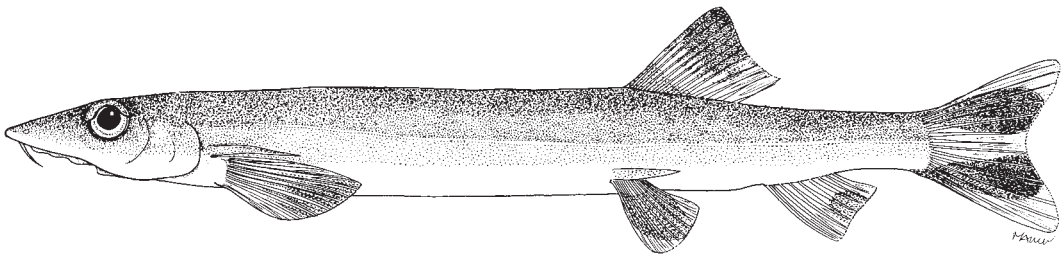
by C.J. Ferraris, Jr., Portland, Oregon, USA

A single species occurring in the area.

Gonorynchus gonorynchus (Linnaeus, 1766)

Frequent synonyms / misidentifications: *Gonorhynchus gonorhynchus* (Linnaeus, 1766) / None.

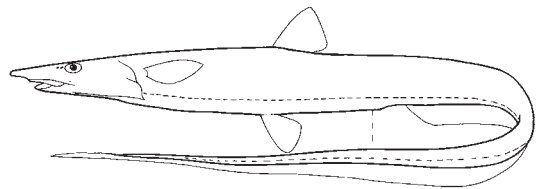
FAO names: En – Beaked salmon.



Diagnostic characters: A moderate-sized fish (to 60 cm total length) with a **slender, cylindrical body of nearly-uniform depth** from posterior extent of head to posterior end of anal-fin base. Head elongate, conical. Snout acutely pointed anteriorly; **snout with single, medial fleshy barbel**, attached near ventral tip of snout. Gill membranes joined across isthmus, branchial opening restricted. Eye large, lateral, orbit ovoid and completely covered with thick skin, leaving no free orbital margin. Mouth inferior, overhung by snout. **Jaws without teeth. Dorsal-fin base small, located well posterior to middle of body.** No adipose dorsal fin. Caudal fin shallowly forked, lobes symmetrical, with rounded tips. Anal-fin base short, far posterior on body, **anal-fin origin posterior of posterior extent of dorsal-fin base**; fin margin concave. Pelvic fin small, abdominal; fin insertion ventral to dorsal-fin base; fin margin convex. **Pectoral and pelvic fins with slender axillary scale** dorsal of fin. Pectoral fin well developed, low on body; fin margin slightly convex. **Body and head nearly completely covered with small, ctenoid scales**, typically 170 to 185 scales along lateral line; only tip of snout, folds in branchiostegal membranes, and orbit scaleless. Lateral line complete, midlateral; lateral-line canal pores extend to body surface between scales and do not penetrate scales. Some scales near lateral-line pores smaller than typical body scales. **Colour:** dorsal and lateral surface of head and body brown; ventral surface of head and abdomen somewhat lighter; no bars or stripes along body. Dorsal and caudal fins with dark subterminal stripe.

Similar families occurring in the area

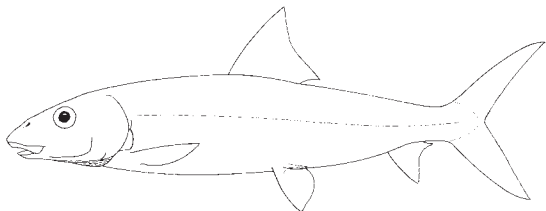
Halosauridae: anal-fin base long, extending for more than one-half length of body; no barbel on snout.



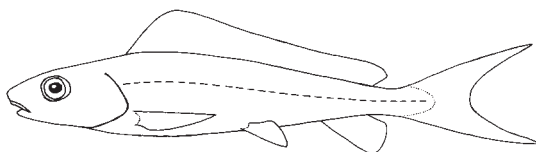
Halosauridae

Abulidae: dorsal fin above middle of body; caudal fin deeply forked; no barbel on snout.

Pterothrissidae: dorsal-fin base long, extending over more than one-half of body; no barbel on snout.



Abulidae



Pterothrissidae

Size: To 60 cm.

Habitat, biology, and fisheries: Beaked salmon live just above soft substratum, apparently feeding on invertebrates that live on, or just below, substratum surface. Little is known about the biology of this species, as it is only rarely collected, usually as a bycatch of trawl fisheries. Beaked salmon have no commercial importance.

Distribution: Along coast of southern Africa; within eastern central Atlantic known only from St Helena Island.

Remarks: Presence of *Gonorynchus gonorynchus* in eastern central Atlantic based on a specimen taken at St Helena, which was first reported by Clark (1913) as *Gonorhynchus greyi*, and later by Edwards and Glass (1987) and Edwards (1990).



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New Index

A**ALBULIDAE** 1741**B**

Beaked salmon 1740

Beaked sandfish 1740

G**GONORYNCHIDAE** 1740

GONORYNCHIFORMES 1740

Gonorhynchus gonorhynchus 1740*Gonorhynchus greyi* 1741*Gonorynchus gonorynchus* 1740**H****HALOSAURIDAE** 1740**P****PTEROTHRISSIDAE** 1741**G***gonorhynchus, Gonorhynchus* 1740*gonorynchus, Gonorynchus* 1740*greyi, Gonorynchus* 1741

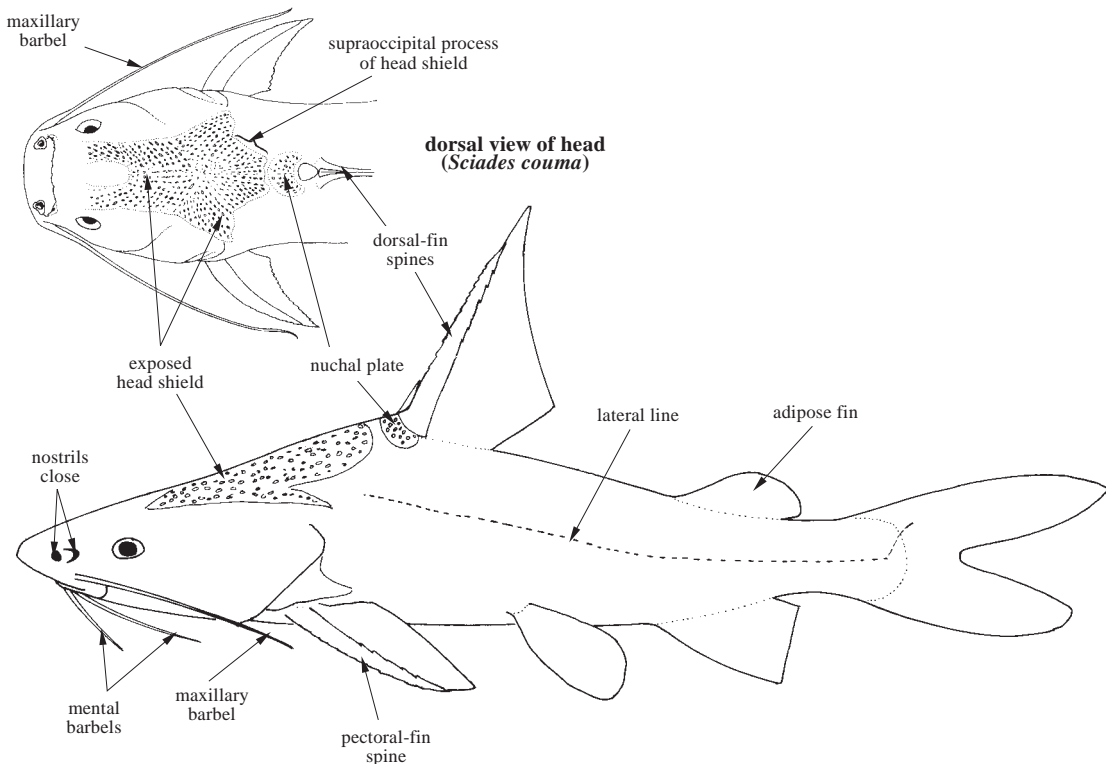
Order SILURIFORMES

ARIIDAE

Sea catfishes

by A. Acero P., Universidad Nacional de Colombia sede Caribe, Santa Marta, Colombia and
R. Betancur-R., University of Puerto Rico – Río Piedras, San Juan, Puerto Rico

Diagnostic characters: Medium- to large-sized fishes. The larger species attain over 1 m. Snout and head rounded to depressed. **Head covered by an often-rugose bony shield, part of which is clearly visible beneath the thin skin in most species (nearly obscured by thick skin and muscles in some); the supraoccipital process or posterior portion of this shield extends posteromedially to meet the nuchal plate (a separate bone at base of dorsal-fin spines) and its shape is characteristic in some species.** Eye medium-sized to small. **Two pairs of nostrils closely approximated on each side, the posterior pair partly covered by a flap of skin.** Mouth terminal to inferior. Teeth in jaws fine; those on palate fine, arranged in one or more patches or absent. **Three pairs of barbels on head, 1 maxillary and 2 mental (mandibular).** Gill membranes fused with each other and attached to isthmus, with at most a narrow free posterior flap. **Gill rakers present on anterior faces of all arches, total number 10 to 22 on first arch; rakers present or absent on posterior faces of first and second arches.** Dorsal fin short, with long, more or less serrated spine preceded by very short one and followed by 7 soft rays. **A fleshy adipose fin always present opposite the anal fin; anal fin with 16 to 24 soft rays.** Caudal fin forked, with 13 branched rays (6 in upper and 7 in lower lobe). Pectoral fins low-set, with more or less serrated spine and 9 to 13 soft rays. Pelvic fins with 6 soft rays. **Scales absent.** Lateral line complete. **Lapillus otolith enlarged.** Swimbladder physostomous, oval, and sac-like, lacking a posterior chamber. **Colour:** usually greyish, dark grey-brown, some species with a silvery lateral stripe; paler to white below.

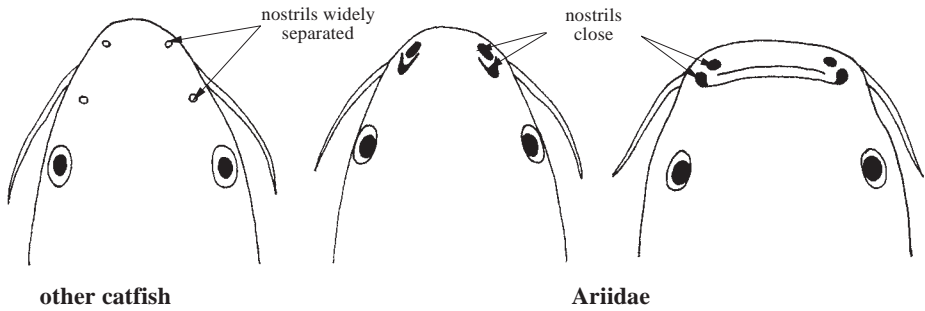


Habitat, biology, and fisheries: Sea catfishes occur in fully marine waters, close to shore marine environments, brackish lagoons and estuaries, and completely freshwaters of warm-temperate and tropical regions. The representatives known from Fishing Area 34 include some large species attaining over 160 cm in total length and they are mostly confined to the coastline of the continent, with 1 species mainly confined to freshwater (*Carlarius gigas*). They are locally abundant in the turbid waters of certain habitats, particularly large river estuaries and mangrove-lined lagoons. Sea catfishes' diets range from omnivorous, including detritus, to strongly carnivorous, including large bony fishes and crustaceans. Reproduction is highly specialized; the males incubate the eggs and vitelline young in their mouths. The sea catfishes include several species of high economic value. The reported catch has increased over the last 10 years. They are captured with a variety of gear, including bottom trawls, longlines, seines, castnets, traps, and hook-and-line. The flesh is usually of good quality. The sharp dorsal- and pectoral-fin spines can inflict painful wounds.

Remarks: The family is often listed as Tachysuridae and sometimes Bagridae in the literature. The generic nomenclature follows Marceniuk and Menezes (2007).

Similar families occurring in the area

All other catfish families in the area are confined to freshwater and have the anterior and posterior nostrils widely separated, the posterior nostrils not covered by a flap of skin; branched caudal-fin rays fewer or more than 13. The most important commercial freshwater families are Bagridae (bagrid catfishes), Clariidae (airbreathing or labyrinth catfishes) and Mochokidae (= Synodontidae or upside-down catfishes or squeakers).



Key to species of Ariidae occurring in the area

- 1a. Gill rakers on posterior surfaces of first and second arches numerous; humeral process fan-shaped (Fig. 1); top of head nearly smooth, covered by thick skin and muscle . . . → 2
- 1b. No gill rakers or at most 1 or 2 rakers on posterior surfaces of first and second arches; humeral process pointed, triangular to elongated, but never fan-shaped (Fig. 2); rear part of skull (head shield) broadly visible beneath the thin skin, rugose. → 3

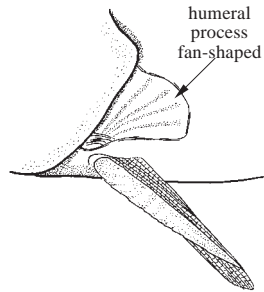


Fig. 1 *Galeichthys*

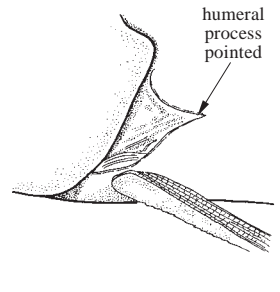


Fig. 2 *Carlarius*

- 2a. Caudal fin slightly forked, its lobes rounded and short; caudal peduncle short and deep, its depth more than half its length; dark brown to blackish above, belly and underside of head slightly lighter and densely covered with fine brown specks *Galeichthys ater*
- 2b. Caudal fin deeply forked, its lobes pointed and long; caudal peduncle relatively slender, its depth less than half its length; greyish to greenish brown above, sides and ventral surfaces much lighter, dark specks sometimes present laterally on belly but never midventrally *Galeichthys feliceps*

- 3a. Anterior gill rakers on first arch 17 to 22 → 4
 3b. Anterior gill rakers on first arch 11 to 15 → 5
- 4a. Teeth on palate in 2 single subtriangular blocks (Fig. 3) *Carlarius gigas*
 4b. Teeth in palate in 2 paired patches, anterior pair trapezoidal and posterior pair elongate (Fig. 4) *Carlarius latiscutatus*
- 5a. Palatal teeth absent or in 1 or 2 small patches (patch on one or both sides frequently missing); if present, distance between patches much greater than diameter of patch (Fig. 5) *Carlarius heudelotii*
 5b. Palatal teeth in 2 large patches separated by their own diameter or less (Fig. 6) . *Carlarius parkii*

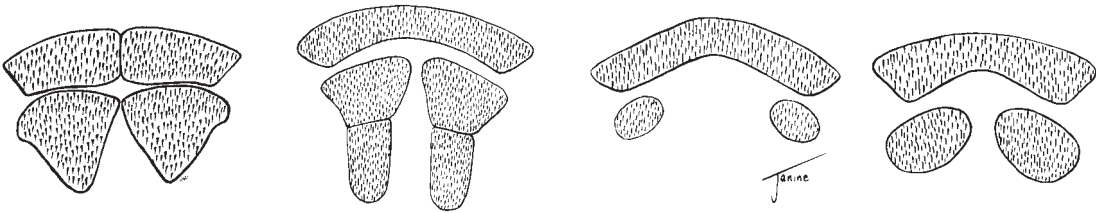









Fig. 3 *Carlarius gigas* Fig. 4 *Carlarius latiscutatus* Fig. 5 *Carlarius heudelotii* Fig. 6 *Carlarius parkii*

List of species occurring in the area

The symbol  is given when species accounts are included.

-  *Carlarius gigas* (Boulenger, 1911).
-  *Carlarius heudelotii* (Valenciennes, 1840).
-  *Carlarius latiscutatus* (Günther, 1864).
-  *Carlarius parkii* (Günther, 1864).
-  *Galeichthys ater* Castelnau, 1861.
-  *Galeichthys feliceps* Valenciennes, 1840.

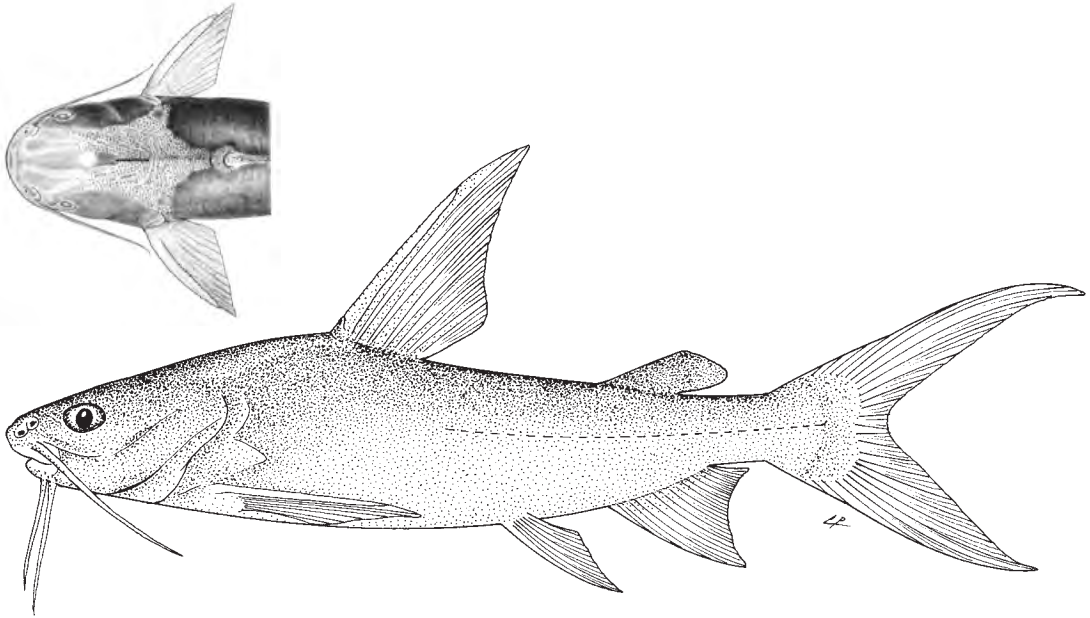
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***Carlarius gigas* (Boulenger, 1911)**

Frequent synonyms / misidentifications: *Arius gigas* Boulenger, 1911 / None

FAO names: En – Giant sea catfish; Fr – Mâchoiron géant; Sp – Bagre gigante.



Diagnostic characters: Head rounded and only slightly flattened above; snout rounded transversely (slightly pointed in small specimens); mouth inferior; 3 pairs of barbels (1 maxillary and 2 mental), maxillary barbel just reaching to pectoral-fin bases. **Exposed head shield clearly visible**, very rugose, extending anteriorly to opposite eyes; **supraoccipital process moderately broad at base**, narrower and truncated posteriorly, with a very low median keel; nuchal plate short, rugose, and crescent-shaped; **a very short, narrow fleshy groove in median depression of head falling well short of eyes**. **Teeth on palate villiform in 2 large subtriangular patches, which are only slightly separated at midline**. **No gill rakers on posterior surfaces of first and second arches; total number of anterior gill rakers on first arch 18 to 21, on second arch 18 to 20**. Dorsal and pectoral fins with a strong, serrated, erectile spine; soft rays of pectoral fins usually 12; adipose fin well developed; dorsal lobe of caudal fin slightly elongated. **Colour:** light yellowish brown above, grading to slightly lighter below.

Size: Maximum at least to 165 cm and 50 kg; young to 30 cm most commonly captured.

Habitat, biology, and fisheries: The limited information suggests its presence in shallow near-shore marine habitat close to river mouths, in estuaries, and in rivers. Data on the extent of exploitation are not available. Separate statistics are not reported for this species.

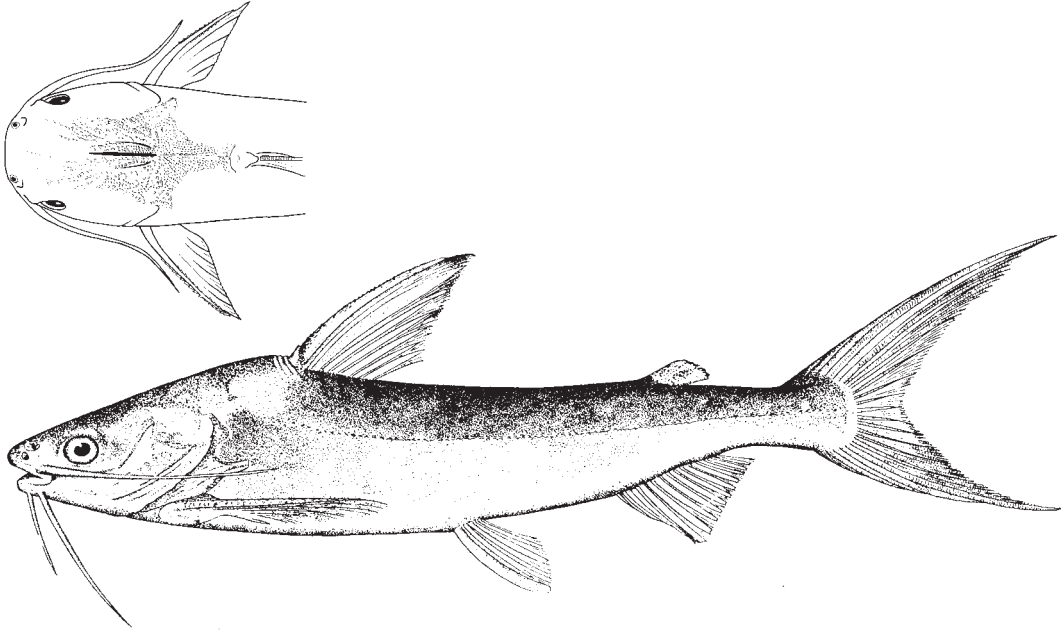
Distribution: Known only from vicinity of rivers flowing from the north into the Gulf of Guinea, such as Volta and Niger rivers. Unverified reports indicate a presence in the lower Congo River estuary.



Carlarius heudelotii (Valenciennes, 1840)

Frequent synonyms / misidentifications: *Arius heudelotii* Valenciennes, 1840; *A. mercatoris* Poll, 1949 / None.

FAO names: **En** – Smoothmouth sea catfish; **Fr** – Mâchoiron banderille; **Sp** – Bagre bocalisa.



Diagnostic characters: Head rounded, rather arched, only slightly flattened above; snout rounded transversely, mouth inferior; 3 pairs of barbels (1 maxillary and 2 mental) around mouth, blackish in colour, the maxillary barbels extend well beyond pectoral-fin bases. **Exposed head shield well visible**, extending anteriorly to opposite eyes; **supraoccipital process rather narrow at base**, tapering posteriorly, with a relatively well-developed median keel; nuchal plate short, rugose and crescent-shaped; long narrow fleshy groove in median depression of head, approaching posterior edge of eyes. **Teeth on palate, if present, villiform, in 2 small and widely separated patches; separation much greater than diameter of patches; sometimes one or both patches absent. Usually no (infrequently 1 or 2 tiny) gill rakers on posterior surfaces of first and second arches; total number of anterior gill rakers on first arch 13 to 15, on second arch 10 to 14.** Dorsal and pectoral fins with strong, serrated, erectile spine; soft rays in pectoral fins usually 11, sometimes 10 or 12; adipose fin well developed; anal fin with 18 or 19 rays. **Colour:** median brown to dark blue above, lighter brown to blue below and on sides, abdomen plain whitish.

Size: Maximum reaches 83 cm and 8.5 kg; common to 35 cm.

Habitat, biology, and fisheries: Inhabits shallow coastal waters and river estuaries. Separate statistics are not reported for this species, but it surely makes up for a significant share of the sea catfish catches in the area. Caught with bottom trawls, purse seines, fixed bottom nets, gillnets, and longlines. Marketed fresh, dried, salted, smoked, and converted to fishmeal.

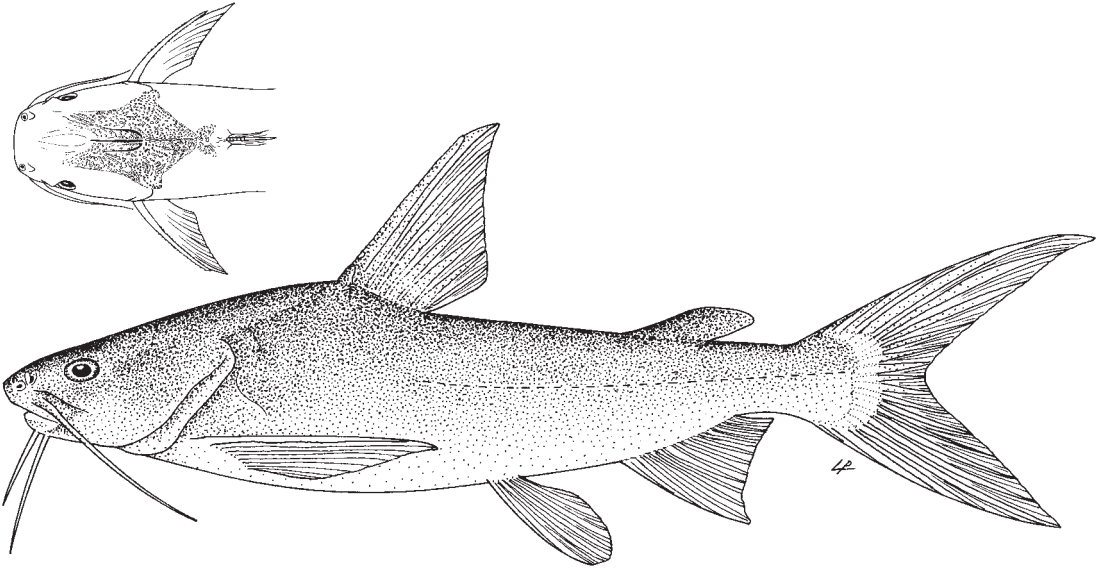
Distribution: From Cape Blanc to Gabon and possibly Angola.



***Carlarius latiscutatus* (Günther, 1864)**

Frequent synonyms / misidentifications: *Arius latiscutatus* Günther, 1864; *A. gambensis* (Bowdich, 1825); *Tachysurus gambensis* (Bowdich, 1825); *T. lagoensis* (Pfaff, 1933) / None.

FAO names: **En** – Rough-head sea catfish; **Fr** – Mâchoiron de tête rugueuse; **Sp** – Bagre cabecirugoso.



Diagnostic characters: Head rounded, only slightly flattened above; snout rounded transversely; mouth inferior; 3 pairs of barbels (1 maxillary and 2 mental) around mouth, maxillary barbels reaching or passing pectoral-fin bases. **Exposed head shield clearly visible**, coarsely rugose, extending anteriorly to opposite eyes; **supraoccipital process prominently broad at base**, tapering posteriorly, with median keel; nuchal plate short, crescent-shaped and very rugose; fleshy groove in median depression of head extends anteriorly almost to opposite eyes. **Teeth on palate villiform, in 2 pairs of patches, anterior patch wide and trapezoidal; posterior patch elongated and continuous with anterior patch. No gill rakers on posterior surfaces of first and second arches; total number of anterior gill rakers on first arch 17 to 22, on second arch 18 to 23.** Dorsal and pectoral fins each with serrated, erectile spine; soft rays in pectoral fin 11 or 12; adipose fin well developed; anal fin with 19 rays (2 specimens). **Colour:** dark brown to greenish above, lighter on lower sides and whitish below.

Size: Maximum to about 85 cm; common to 40 cm.

Habitat, biology, and fisheries: Found chiefly in shallow marine waters. Feeds on fish, benthic invertebrates, zooplankton, and detritus. Reported to be common in winter. Separate statistics are not reported for this species, but it doubtless makes up for a part of the total catches of sea catfishes from the area. Caught with bottom trawls, purse seines, fixed bottom nets, gillnets, and longlines. Marketed fresh, dried-salted, smoked, and converted to fishmeal.

Distribution: Senegal River Basin and along coast from northern Senegal to Namibia, around Kunene River.

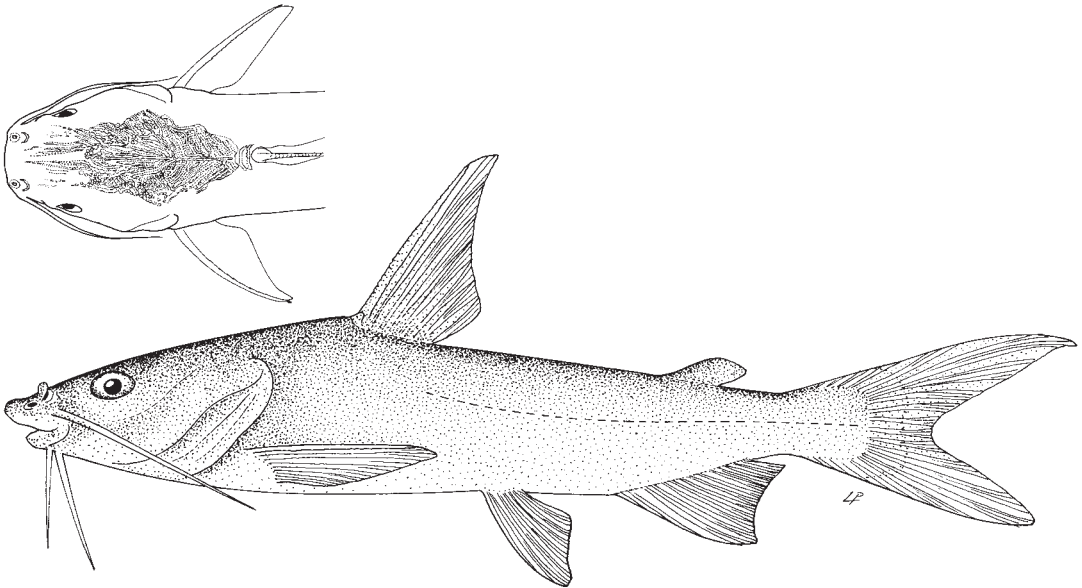
Remarks: As of the time of writing, Eschmeyer's Catalogue of Fishes places this species in the genus *Arius*. This publication, however, maintains the name *Carlarius latiscutatus* and recognizes the restriction of the genus *Arius* to the Indian subcontinent, as supported by Marceniuk and Menezes, 2007.



Carlarius parkii (Günther, 1864)

Frequent synonyms / misidentifications: *Arius parkii* Günther, 1864; *Arius capellonis* Steindachner, 1867; *Tachysurus capellonis* (Steindachner, 1867); *Arius granulatus* Peters, 1868 / *Arius heudeloti* (not Valenciennes, 1840) Boulenger, 1911; *Tachysurus heudelotii* (not Valenciennes, 1840) Fowler, 1936.

FAO names: **En** – Guinean sea catfish; **Fr** – Mâchoiron de Guinée; **Sp** – Bagre de Guinea.



Diagnostic characters: Head not broadened, but slightly rounded and flattened above; snout rounded transversely; mouth inferior; 3 pairs of barbels (1 maxillary and 2 mental) around mouth, maxillary barbels reaching or barely passing pectoral-fin bases. **Exposed head shield clearly visible**, moderately rugose, extending anteriorly to opposite eyes or slightly beyond; **supraoccipital process moderately broad at base**, tapering posteriorly, with median keel; long narrow fleshy groove in median depression of head, reaching opposite posterior edge of eyes. **Teeth on palate villiform in 2 rounded and relatively well-developed patches, separated by their own diameter or less. No gill rakers on posterior surfaces of first and second arches; anterior gill rakers on first arch 11 to 14, on second arch 10 to 13.** Dorsal and pectoral fins each with a strong, serrated, erectile spine; soft rays in pectoral fins 11 to 13, usually 11 or 12; adipose fin well developed; anal fin with 19 to 21 rays. **Colour:** dark brown to green above and light brown to silvery below; fin tips darker.

Size: Maximum to about 75 cm; common to 40 cm.

Habitat, biology, and fisheries: An abundant species that inhabits shallow coastal waters and river estuaries; prefers brackish and marine waters along the coast. Feeds on fish and shrimp. Separate statistics are not reported for this species, but it doubtless makes up for part of the total sea catfish catches from the area. Caught with bottom trawls, purse seines, fixed-bottom nets, gillnets, and longlines. Marketed fresh, dried, salted, smoked, and converted to fishmeal.

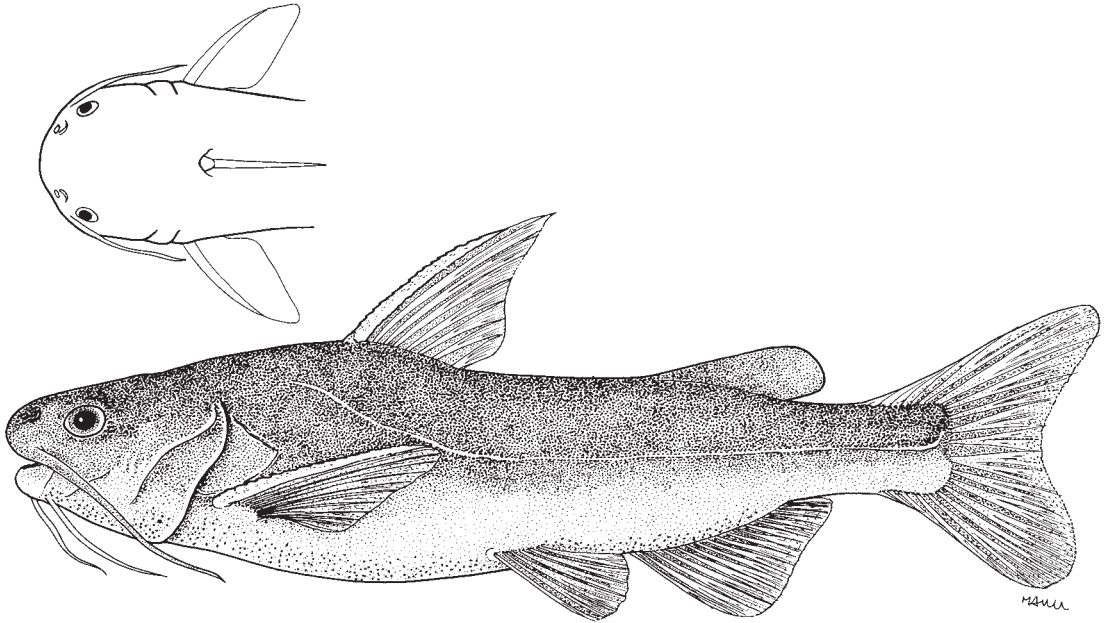
Distribution: From Cape Blanc to Angola, sporadically to Morocco; one record from Mediterranean Israel.



***Gleichthys ater* Castelnaud, 1861**

Frequent synonyms / misidentifications: *Arius ater* (Castelnaud, 1861) / None.

FAO names: En – Black sea catfish; Fr – Mâchoiron noir; Sp – Bagre negro.



Diagnostic characters: Head flattened above and relatively wide; snout rounded transversely; mouth inferior; 3 pairs of barbels (1 maxillary and 2 mental) around mouth, maxillary barbels reaching at most to pectoral-fin bases. Head relatively smooth above, shield not prominent; no fleshy groove in median depression of head or groove very shallow. Teeth on palate villiform, in 2 transverse patches joining medially and tapering at edges. Numerous gill rakers present on posterior surfaces of all arches; anterior gill rakers on first arch 10 to 13; posterior gill rakers on first arch 12 to 16; anterior gill rakers on second arch 11 to 14; posterior gill rakers on second arch 11 to 15. Humeral process fan-shaped. Dorsal and pectoral fins each with strong, serrated, erectile spine; soft rays in pectoral fins 10 to 12; adipose fin well developed; anal fin with 19 to 22 rays. Caudal fin slightly forked, its lobes rounded and short; caudal peduncle short and deep, its depth more than half its length. **Colour:** dark brown to blackish above, belly and underside of head slightly lighter and densely covered with fine brown specks.

Size: Maximum to about 45 cm; common to 32 cm.

Habitat, biology, and fisheries: Inhabits coastal marine waters, mostly over reefs and rocky bottoms to at least 60 m; not found in estuaries or freshwaters. Separate statistics are not reported for this species. Caught chiefly with gillnets and on hook-and-line. It is a bycatch of the line fishery of kob (*Sciaenidae*). Taken in small numbers by recreational boat and skiboat fisheries. Utilized mostly fresh.

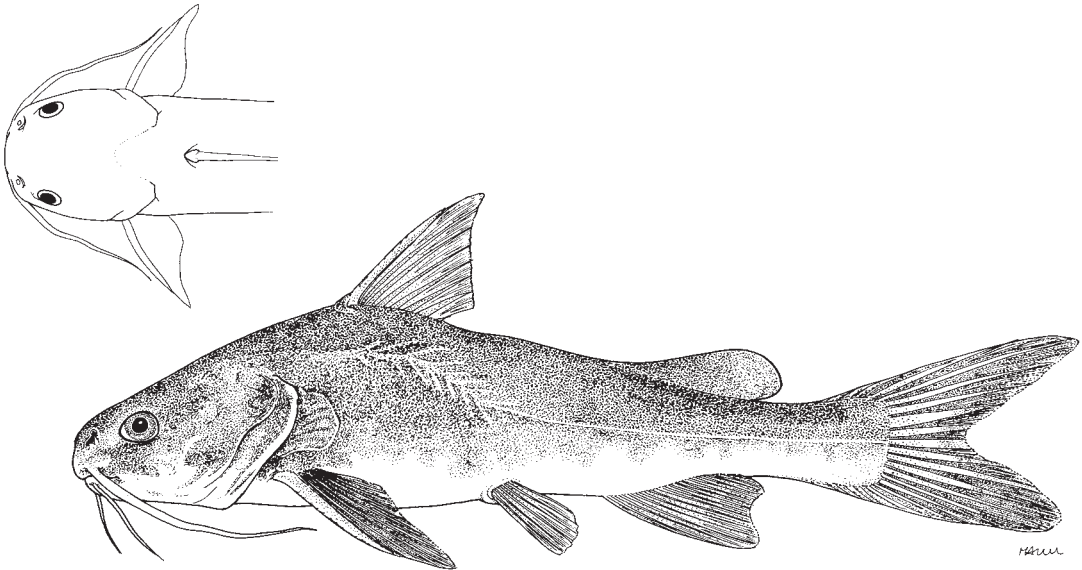
Distribution: In the area, only around Walvis Bay (Namibia); outside of eastern central Atlantic extending along coast of South Africa to Margate, southern Natal.



Galeichthys feliceps Valenciennes, 1840

Frequent synonyms / misidentifications: *Tachysurus feliceps* (Valenciennes, 1840), *Arius feliceps* (Valenciennes, 1840) / None.

FAO names: **En** – White barbel; **Fr** – Barbillon blanc; **Sp** – Bagre barba blanca.



Diagnostic characters: Head arched, only slightly flattened above; snout rounded transversely; mouth inferior; 3 pairs of barbels (1 maxillary and 2 mental) around mouth, maxillary barbels reaching beyond pectoral-fin bases. Head relatively smooth above, shield not prominent; no fleshy groove in median depression of head or groove very shallow. Teeth on palate villiform, in 2 transverse patches joining medially and tapering at edges. Numerous gill rakers present on posterior surfaces of all arches; anterior gill rakers on first arch 11 to 14; posterior gill rakers on first arch 12 to 19; anterior gill rakers on second arch 12 to 16; posterior gill rakers on second arch 14 to 17. Humeral process fan-shaped. Dorsal and pectoral fins each with strong, serrated, erectile spine; soft rays in pectoral fins 9 to 11; adipose fin well developed; anal fin with 16 to 21 rays. Caudal fin deeply forked, its lobes pointed and long; caudal peduncle relatively slender, its depth less than half its length. Colour: greyish to greenish brown above, sides and ventral surfaces clearly lighter, dark specks sometimes present laterally on belly but never midventrally; sometimes with a whitish or silvery band superimposed over lateral line on body.

Size: Maximum to about 55 cm and 3.8 kg; common to 33 cm.

Habitat, biology, and fisheries: Common in estuaries and in marine waters over sandy and muddy substrata; taken as deep as 126 m, common to 60 m. Feeds on muddy bottoms mainly on crayfish, small fishes, and crabs. Separate statistics are not reported for this species. Caught chiefly with gillnets and on hook-and-line. Utilized mostly fresh.

Distribution: In the area, from southern Angola to northern Namibia. Outside of eastern central Atlantic, extends across South Africa to southern Natal.



New Index

A

ARIIDAE	1742
<i>Arius</i>	1747
<i>Arius ater</i>	1749
<i>Arius capellonis</i>	1748
<i>Arius feliceps</i>	1750
<i>Arius gambensis</i>	1747
<i>Arius gigas</i>	1745
<i>Arius granulatus</i>	1748
<i>Arius heudeloti</i>	1748
<i>Arius heudelotii</i>	1746
<i>Arius latiscutatus</i>	1747
<i>Arius mercatoris</i>	1746
<i>Arius parkii</i>	1748

B

Bagre barba blanca	1750
Bagre bocalisa	1746
Bagre cabecirugoso	1747
Bagre de Guinea	1748
Bagre gigante	1745
Bagre negro	1749
Bagrid catfishes	1743
BAGRIDAE	1743
Barbillon blanc	1750
Black sea catfish	1749

C

<i>Carlarius gigas</i>	1743,1745
<i>Carlarius heudelotii</i>	1746
<i>Carlarius latiscutatus</i>	1747
<i>Carlarius parkii</i>	1748
CLARIIDAE	1743

G

<i>Galeichthys ater</i>	1749
<i>Galeichthys feliceps</i>	1750
Giant sea catfish	1745
Guinean sea catfish	1748

K

Kob.....	1749
----------	------

M

MOCHOKIDAE	1743
Mâchoiron banderille	1746

Mâchoiron de Guinée.....	1748
Mâchoiron de tête rugueuse	1747
Mâchoiron géant	1745
Mâchoiron noir	1749

R

Rough-head sea catfish.....	1747
-----------------------------	------

S

SILURIFORMES	1742
SCIAENIDAE	1749
Sea catfishes	1742
Smoothmouth sea catfish	1746
SYNODIDAE	1743

T

TACHYSURIDAE	1743
<i>Tachysurus capellonis</i>	1748
<i>Tachysurus feliceps</i>	1750
<i>Tachysurus gambensis</i>	1747
<i>Tachysurus heudelotii</i>	1748
<i>Trachysurus lagoensis</i>	1747

W

White barbel	1750
--------------------	------

A

<i>ater, Arius</i>	1749
<i>ater, Galeichthys</i>	1749

C

<i>capellonis, Arius</i>	1748
<i>capellonis, Tachysurus</i>	1748

F

<i>feliceps, Arius</i>	1750
<i>feliceps, Galeichthys</i>	1750
<i>feliceps, Tachysurus</i>	1750

G

<i>gambensis, Arius</i>	1747
<i>gambensis, Trachysurus</i>	1747
<i>gigas, Arius</i>	1745
<i>gigas, Carlarius</i>	1743,1745
<i>granulatus, Arius</i>	1748

H

<i>heudeloti, Arius</i>	1748
<i>heudelotii, Arius</i>	1746

heudelotii, *Carlarius* 1746

heudelotii, *Tachysurus* 1748

L

lagoensis, *Trachysurus* 1747

laticutatus, *Arius* 1747

laticutatus, *Carlarius* 1747

M

mercatoris, *Arius* 1746

P

parkii, *Arius* 1748

parkii, *Carlarius* 1748

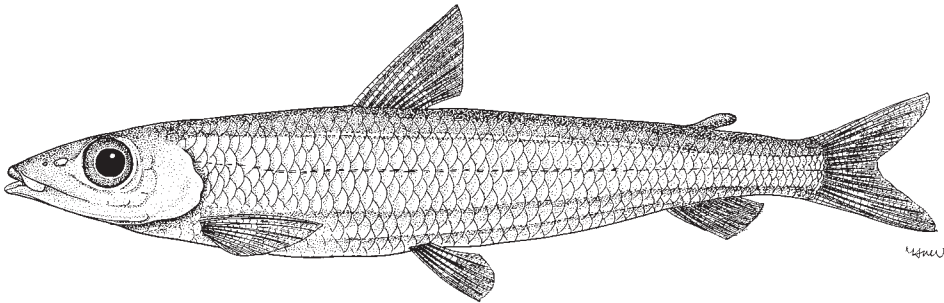
Order ARGENTINIFORMES

ARGENTINIDAE

Argentines

by K.E. Hartel, Harvard University, Massachusetts, USA and
T.M. Orrell, National Museum of Natural History, Washington DC, USA

Diagnostic characters: Small to medium-sized (10 to 30 cm SL) with elongated, slender to robust body, usually convex head profile, small terminal mouth, ending in front of eye; **teeth absent on premaxillary and maxillary**. Branchiostegal rays 4 to 6. Dorsal fin single with soft rays near midpoint of body, followed by **adipose dorsal fin above anal fin**; **pectoral fins placed low, on ventrolateral contours of body**; pelvic fins beneath or behind dorsal fin. **No spines in fins**; **dorsal fin with 10 to 14 rays, anal fin with 10 to 17 rays, pectoral fins with 11 to 25 rays, pelvic fins with 10 to 15 rays**. Swimbladder present, sometimes with bright silvery pigment. Scales cycloid, easily detached. **Colour:** light straw to silvery, often iridescent. Usually with silvery or brownish band along sides.



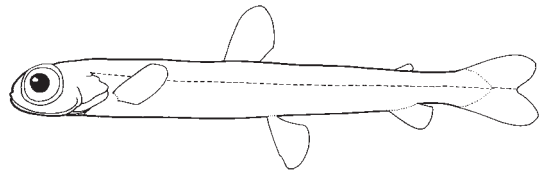
Habitat, biology, and fisheries: On outer shelf and upper slope; usually pelagic near bottom. Some species locally abundant, taken in shrimp trawls. Eggs and young pelagic, usually over shelf. Adult *Argentina* live close to bottom above slope. *Glossanodon* mesopelagic. Feed on planktonic invertebrates and euphausiids, small fishes. Some members of genus *Argentina* important to fisheries, used fresh or in fishmeal. Atlantic, Indian, and Pacific oceans.

Similar families occurring in the area

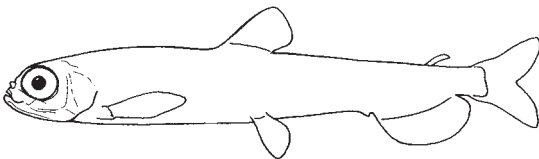
Microstomatidae: pectoral fins high on sides of body; lateral-line scales extending onto caudal fin.

Bathylagidae: no swimbladder, branchiostegal rays usually 2.

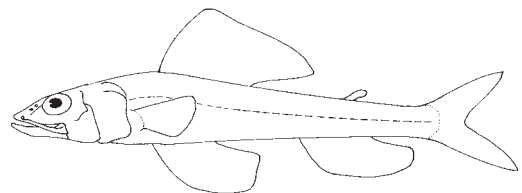
Aulopidae, Chlorophthalmidae, Synodontidae: pectoral fins high on sides of body; teeth (sometimes very small) present on premaxillary.



Microstomatidae



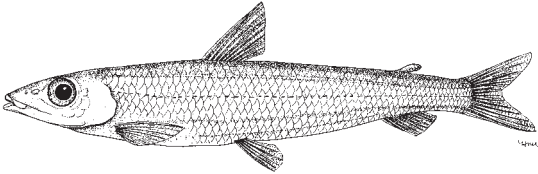
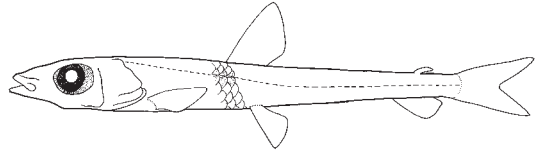
Bathylagidae





Aulopidae

Key to the species of Argentinidae occurring in the area

- 1a. Gill rakers on upper arch 5 or fewer; rakers quite robust and conical (Fig. 1). . . ***Argentina sphyraena***
 1b. Gill rakers on upper arch 10 or more; rakers thin and long. → 2
- 2a. Dentary teeth extend only half distance from gape to symphysis ***Glossanodon leioglossus***
 2b. Dentary teeth extend from gape to, or almost to, symphysis (Fig. 2) ***Glossanodon polli***

Fig. 1 *Argentina sphyraena*Fig. 2 *Glossanodon polli***List of species occurring in the area**

The symbol  is given when species accounts are included.

 *Argentina sphyraena* Linnaeus, 1758.

Glossanodon leioglossus (Valenciennes, 1848). To 16 cm SL. Only in western Mediterranean and south to about 24°N in area, meso-benthopelagic.

Glossanodon polli Cohen, 1958. To 15 cm SL. Off African coast between 10°N to 3°S and off the Amazon mouth in western Atlantic; 150–405 m.

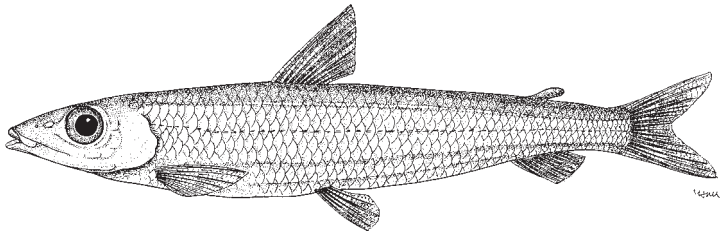
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Argentina sphyraena Linnaeus, 1758

En – Argentine; **Fr** – Petite argentine; **Sp** – Pez plata.

To 32 cm SL. Probably schools along coastal shelf and slope between 90 and 500 m. Feeds on benthic invertebrates and occasionally pelagic invertebrates and fishes. Found in eastern Atlantic from Norway, Iceland, and Mediterranean south to at least 20°N.

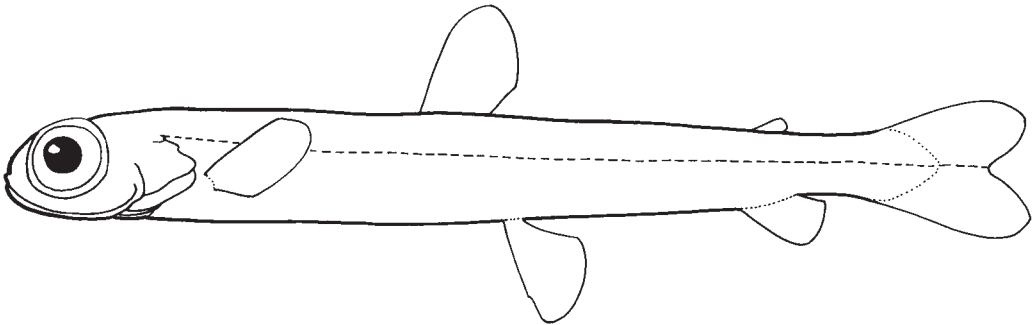


MICROSTOMATIDAE

Pencilsmelts

by K.E. Hartel, Harvard University, Massachusetts and
T.M. Orrell, National Museum of Natural History, Washington, DC, USA

Diagnostic characters: Small-sized (10 to 21 cm SL) with slender body. **Eye large, more than twice the length of snout;** small terminal mouth, teeth on vomer but not on premaxilla or maxilla; mesocoracoid absent; orbitosphenoid present. **No spines in fins;** dorsal fin well behind midpoint of body (except in *Nansenia*), with 9 to 12 rays; dorsal adipose fin present or absent; anal fin with 7 to 10 rays; pelvic fins with 8 to 12 rays; **pectoral-fin base near midbody on side.** **Lateral line and lateral-line scales extending onto tail.** No light organs present. **Colour:** body silvery, often dark near tail.



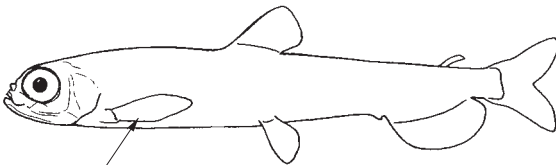
Habitat, biology, and fisheries: Mesopelagic to bathypelagic, marine, deep water, solitary, feed on zooplankton. Temperate to tropical seas of Atlantic, Pacific and Indian oceans. No interest to commercial fisheries.

Remarks: An expanded Microstomatidae may include the Bathylagidae as the subfamily Bathylaginae.

Similar families occurring in the area

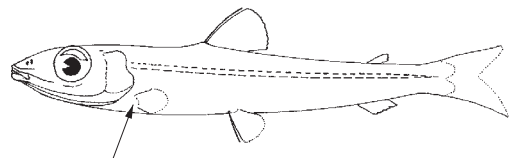
Bathylagidae: pectoral fin low on body.

Argentinidae: pectoral-fin base on ventrolateral surface.



pectoral fin low
on body

Bathylagidae



pectoral-fin base on
ventrolateral surface

Argentinidae

Key to the species of Microstomatidae occurring in the area

Note: The genus *Nansenia* can be difficult to distinguish from Bathylagidae at times and the *Nansenia* species are difficult to separate. The keys tentatively modified from Kawaguchi and Butler (1984).

- 1a. Eyes of adults tubular, directed forward
(Fig. 1) *Xenophthalmichthys danae*
- 1b. Eyes of adults non-tubular, lateral . . . → 2



Fig. 1 *Xenophthalmichthys*

- 2a. Dorsal adipose fin absent; pelvic fins inserted ahead of dorsal-fin origin (Fig. 2) ***Microstoma microstoma***
- 2b. Dorsal adipose fin present; pelvic fins inserted behind dorsal-fin origin (Fig. 3) → 3

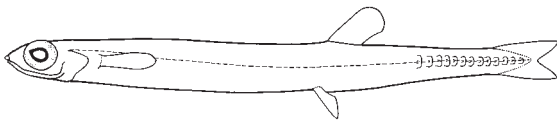


Fig. 2 *Microstoma microstoma*

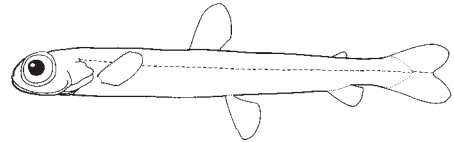


Fig. 3 *Nansenia*

- 3a. Three branchiostegal rays ***Nansenia groenlandica***
- 3b. Four branchiostegal rays → 4
- 4a. Vertebrae 38 or 39 ***Nansenia pelagica***
- 4b. Vertebrae 41 or more → 5
- 5a. Predorsal length 49% or more of standard length → 6
- 5b. Predorsal length 48% or less of standard length → 7
- 6a. Proximal part of dorsal adipose fin densely pigmented; gill rakers 30 to 36 ***Nansenia atlantica***
- 6b. Proximal part of dorsal adipose fin not pigmented; gill rakers 28 to 30 ***Nansenia oblita***
- 7a. Gill rakers 21 to 23; vertebrae 44 or 45 ***Nansenia megalopa***
- 7b. Gill rakers 23 to 27; vertebrae 47 to 50 ***Nansenia longicauda***

List of species occurring in the area

- Microstoma microstoma* (Risso, 1810). To 21 cm SL. Temperate and tropical Atlantic endemic, from 50°N to at least 30°S.
- Nansenia atlantica* Blache and Rossignol, 1962 To 17 cm SL. Endemic to area between 20°N to 10°S.
- Nansenia groenlandica* (Reinhardt, 1840) To 18 cm SL. Boreal, possibly S to about 35°N in area.
- Nansenia longicauda* Kawaguchi and Butler, 1984. To 13 cm SL. Subtropical and temperate Atlantic and Pacific; one area record at 33°N.
- Nansenia megalopa* Kawaguchi and Butler, 1984. To 14 cm SL. Eastern Atlantic 10°N to 20°S.
- Nansenia oblita* (Facciola, 1887). To 18 cm SL. Endemic to Mediterranean and its outflow; possibly marginal in area.
- Nansenia pelagica* Kawaguchi and Butler, 1984. To 11 cm SL. Central tropical Atlantic and Pacific between 15°N and 10°S, east to 16°W.
- Xenophthalmichthys danae* Regan, 1925. To 10 cm SL. Rare; tropical and subtropical Atlantic and Pacific.

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Gon, O. & Stewart, L. 2014. Description of a new species of *Microstoma* (Pisces, Microstomatidae) from the southwestern Pacific Ocean. *Zootaxa*, 3884(1): 55–64.

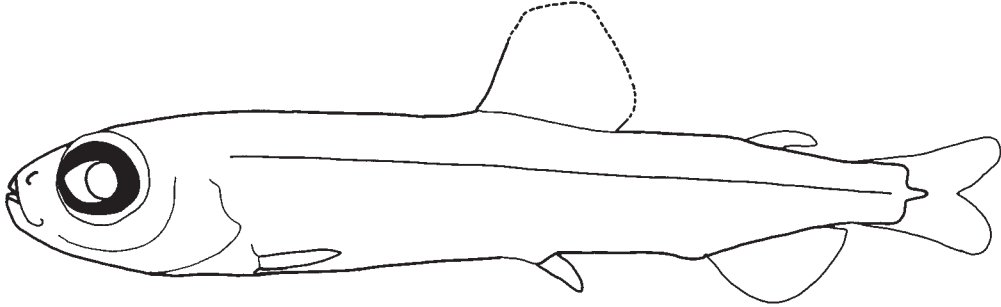
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BATHYLAGIDAE

Deepsea smelts

by C.P. Kenaley and K.E. Hartel, Harvard University, Massachusetts, USA

Diagnostic characters: Small-sized (adults 6 to 20 cm standard length), with elongate body, convex head profile, terminal mouth, and moderate to large eyes. **Branchiostegal rays 2.** Fins without spines; dorsal-fin rays 6 to 14, anal-fin rays 10 to 28, pectoral-fin rays 7 to 13, pelvic-fin rays 7 to 10. Adipose fin present; **pectoral-fin base near ventral surface; swimbladder absent; no orbitosphenoid.** **Colour:** head and body range from pale, somewhat silvery to dark brown and black.



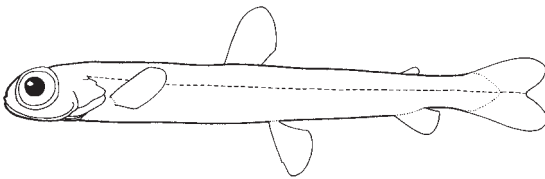
Habitat, biology, and fisheries: Mesopelagic to bathypelagic, between 100 and 1 400 m, though may be taken at the surface at night. Planktivorous. Oviparous, with planktonic eggs and larvae. Little or no interest to fisheries. Atlantic, Pacific, Indian, and Southern oceans.

Remarks: Bathylagidae is alternatively placed as a subfamily (Bathylaginae) within the closely related Microstomatidae.

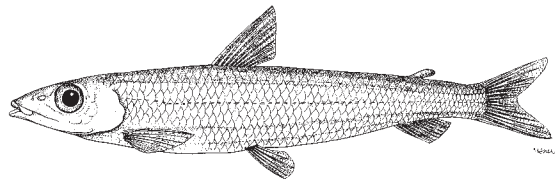
Similar families occurring in the area

Microstomatidae: lateral line and scales extending onto tail; pectoral fins on side of body.

Argentiniidae: swimbladder present; branchiostegal rays 4 to 6.



Microstomatidae



Argentiniidae

Key to species of Bathylagidae occurring in the area

- 1a. Body light in colour; appears scaleless but light-coloured scale pockets may be present → 2
- 1b. Body dark in colour; scaled or with ragged, dark scale pockets → 4

2a. Anal-fin rays 17 or more; vertebrae 49 or more (Fig. 1) ***Dolicholagus longirostris***

2b. Anal-fin soft rays fewer than 17; vertebrae 46 or fewer → 3

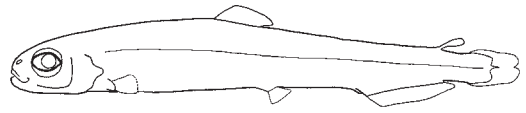


Fig. 1 *Dolicholagus longirostris*

3a. About 4 rudimentary gill raker-like structures on inner surface of first epibranchial; anal-fin rays 13 to 16; pyloric caecae 8 or fewer (Fig. 2) . . ***Bathylagoides argyrogaster***

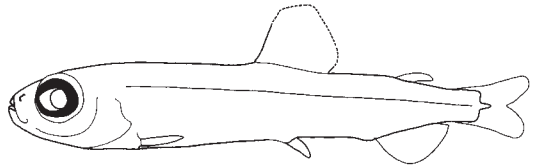


Fig. 2 *Bathylagoides argyrogaster*

3b. No structures as in 3a on inner surface of first epibranchial; anal-fin rays 10 to 13; pyloric caecae 10 or more (Fig. 3) ***Bathylagichthys greyae***

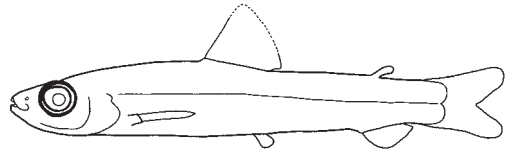


Fig. 3 *Bathylagichthys greyae*

4a. Eye <8.0% of standard length; light mandibular pores made obvious by surrounding dark pigment; about 50 lateral-line scales or scale pockets (Fig. 4) ***Melanolagus bericoides***

4b. Eye >8.5% of standard length; mandibular pores not obvious or outlined by dark pigment; about 30 to 40 lateral-line scales (Fig. 5) → 5

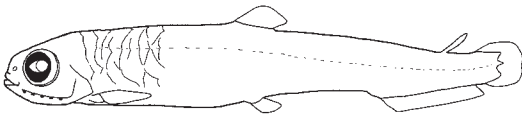


Fig. 4 *Melanolagus bericoides*

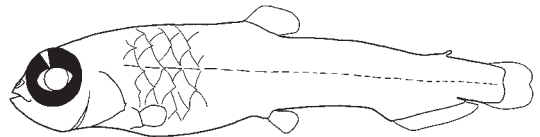


Fig. 5 *Bathylagus euryops*

5a. Eye 71% of body depth at pectoral-fin base and directed slightly anterodorsally (Fig. 6a); vertebrae 44 to 46 . . . ***Bathylagus euryops***

5a. Eye 71% of body depth at pectoral-fin base and directed laterally (Fig. 6b); vertebrae 48 to 52 ***Bathylagus antarcticus***

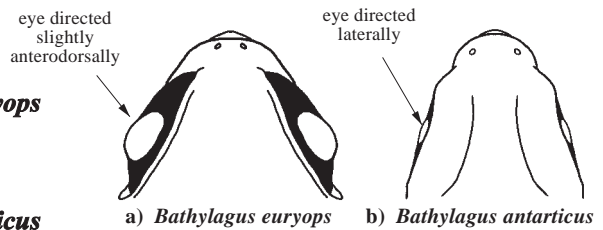


Fig. 6 dorsal view of head

List of species occurring in the area

Bathylagichthys greyae (Cohen, 1958). To 16 cm SL. Rare. Tropical and subtropical Atlantic and Pacific. Known in northern part of area south to 17°N and in the southern part of the area north to 21°S.

Bathylagoides argyrogaster (Norman, 1930). To 11 cm SL. Equatorial and tropical E Atlantic. Found throughout area.

Bathylagus antarcticus Günther, 1878. To 14 cm SL. Circum-Antarctic Southern Ocean; temperate and sub-Antarctic S Atlantic, Indian and Pacific. Known from only a few records in the southern part of area north to 17°S.

Bathylagus euryops Goode and Bean, 1896. To 20 cm SL. Antitropical Atlantic. Known from only a few records in area.

Dolicholagus longirostris (Maul, 1948). To 18 cm SL. Tropical and subtropical Atlantic. Found throughout area.

Melanolagus bericoides (Borodin, 1929). To 20 cm SL. Tropical and temperate Atlantic. Found throughout area.

Note: A rare species, *Bathylagichthys problematicus* (Lloris and Rucabado, 1985), is known from just south of the area, off the coast of Namibia.

References

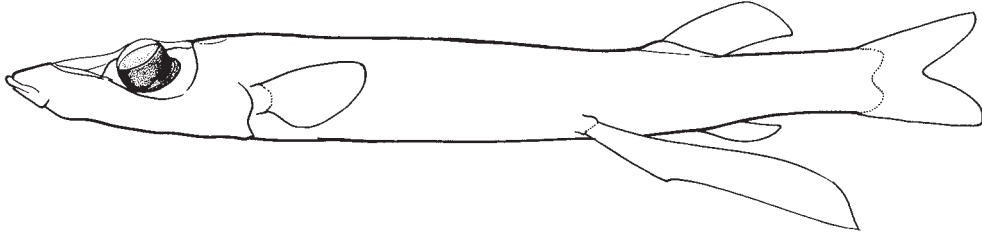
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OPISTHOPROCTIDAE

Barreleyes (spookfishes)

by K.E. Hartel, Harvard University, Massachusetts, USA and
T.M. Orrell, National Museum of Natural History, Washington, DC, USA

Diagnostic characters: Small-sized (18 to 30 cm SL), body either subcylindrical or somewhat foreshortened and compressed, large head with short to moderate snout. **Eyes tubular, directed upward or forward, except in *Bathylychnops* and some *Dolichopteryx*.** **Branchiostegal rays 2 to 4.** Premaxillary absent or reduced, teeth on vomer serve as upper jaw. Pelvic-fin base on side in some; adipose fin in some; photophores in some; most lack swimbladder; a ventral light organ present in *Opisthoproctus*. **Colour:** silvery in *Opisthoproctus* and various shades of brown in other genera.



Habitat, biology, and fisheries: Mesopelagic to bathypelagic, from depths of 300 to 2 000 m; oviparous; feeds mainly on small crustaceans, mostly copepods. Eggs and larvae epipelagic. All oceans. No interest to fisheries.

Similar families occurring in the area

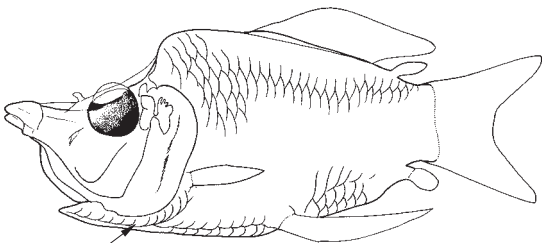
None.

Key to the species of Opisthoproctidae occurring in the area

- 1a. Body laterally compressed and moderately to extremely short. → 2
- 1b. Body subcylindrical and elongate → 5

- 2a. Belly with a flattened scaly ventral sole from head to anus (Figs 1 and 2); anus behind pelvic-fin base → 3
- 2b. Belly without ventral sole (Figs 3 and 4); anus between pelvic-fin bases → 4

- 3a. Anal fin obvious, not apressed to caudal area (Fig.1) ***Opisthoproctus grimaldii***
- 3b. Anal fin rudimentary or absent, apressed to caudal area and not often visible without dissection (Fig. 2) ***Opisthoproctus soleatus***



ventral sole
Fig. 1 *Opisthoproctus grimaldii*

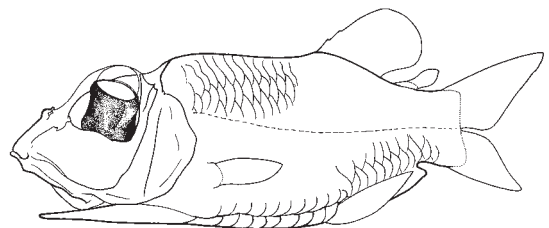


Fig. 2 *Opisthoproctus soleatus*

- 4a. Snout short, about equal to orbit width, eyes directed forward (Fig. 3) *Winteria telescopa*
- 4b. Snout longer than orbit width (Fig. 4), eyes directed upward *Rhynchohyalus natalensis*

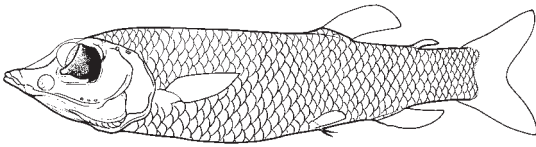


Fig. 3 *Winteria telescopa*

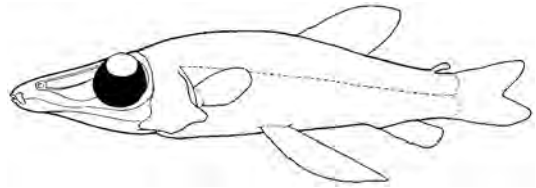


Fig. 4 *Rhynchohyalus natalensis*

- 5a. Eyes protruding but not tubular, with pearly accessory corneal bodies; vomer with a single tooth row; vertebrae 80 to 84 (Fig. 5) *Bathylychnops brachyrhynchus*
- 5b. Eyes tubular, directed upward, without accessory corneal bodies; vomer with two or more tooth rows; vertebrae 40 to 52 → 6



Fig. 5 *Bathylychnops brachyrhynchus*

- 6a. Adipose fin present; base of pelvic fin ahead vertical of dorsal-fin origin; snout long; snout to pelvic base less than 70% SL (Fig. 6) *Dolichopteryx rostratus*
- 6b. No adipose fin; snout to pelvic fin over 70% SL → 7

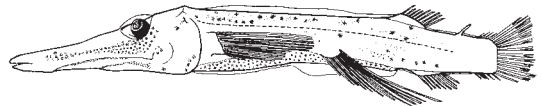


Fig. 6 *Dolichopteryx rostratus*

- 7a. Pectoral fin short, about 12% SL (Fig. 7); vertebrae 46 to 47 *Dolichopteryx longipes*
- 7b. Pectoral fin long, about 60% SL if not damaged; (Fig. 8); vertebrae 58 *Dolichopteroides binocularis*

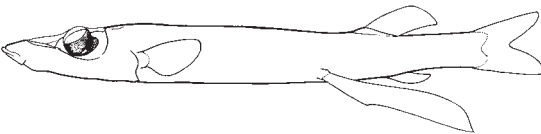


Fig. 7 *Dolichopteryx longipes*

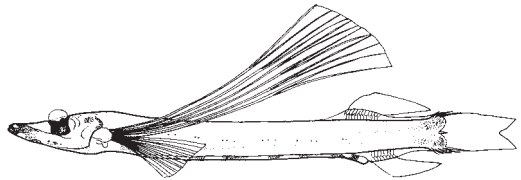


Fig. 8 *Dolichopteroides binocularis*

List of species occurring in the area

Note: very rare fishes and adults of *Bathylychnops* and *Dolichopteryx* know from only a few specimens. J. Badcock; N. Parin (pers. com. 2010) recognized undescribed species of *Dolichopteryx* in the area.

Bathylychnops brachyrhynchus (Parr, 1937). To 11 cm SL. Rare, Atlantic and Indian oceans; area records from off Madeira and the Canary Islands to the equator.

Dolichopteroides binocularis (Beebe, 1932). To about 24 cm SL. Circumtropical.

Dolichopteryx longipes (Vaillant, 1888). To 18 cm SL. Circumtropical.

Dolichopteryx rostratus Fukui and Kitagawa, 2006. N Atlantic.

Opisthoproctus grimaldii Zugmayer, 1911. To about 8 cm SL. Tropical to subtropical Atlantic and Pacific oceans.

Opisthoproctus soleatus Vaillant, 1888. To 11 cm SL. Temperate to tropical, circumglobal.

Rhynchohyalus natalensis (Gilchrist and von Bonde, 1924). To 16 cm SL. Temperate to tropical Atlantic.

Winteria telescopa Brauer, 1901. To 15 cm SL. Circumtropical.

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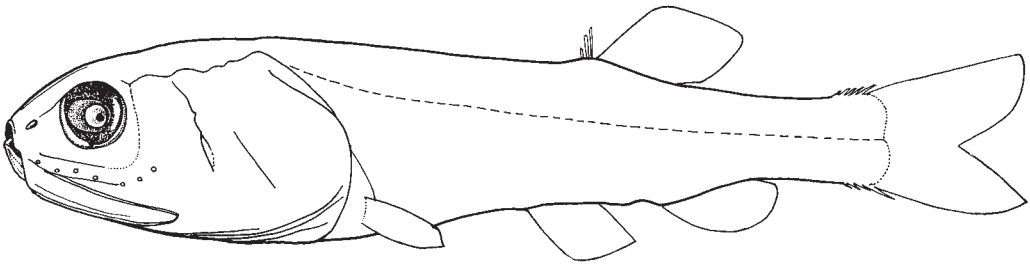
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LEPTOCHILICHTHYIDAE

Tongueless smooth-heads

by T.M. Orrell, National Museum of Natural History, Washington, DC, USA and
K.E. Hartel, Harvard University, Massachusetts, USA

Diagnostic characters: Medium-sized (20 to 31 cm SL) deepwater fishes. Head large; **terminal mouth with distinct notch at symphysis of upper jaw, premaxilla and maxilla toothless**, maxilla reaches past the eye; **tongue (basihyal) absent**; suprapreopercle present; **branchiostegal rays 12 or 13**. Dorsal fin anterior to anal fin, but both fins located far back on body; pectoral fins originate near ventral surface, abdominal pelvic fins, no adipose fin. Cycloid scales, **absent from head**. **Colour:** body brown, bluish head.



Habitat, biology and fisheries: Meso- to bathypelagic. Rare (known from only a few collection records) and of no fisheries value. Life history not well known. Both eastern central Atlantic species have large eggs.

Remarks: Single genus in the family, *Leptochilichthys* Garman, 1899. Sometimes included in family Alepocephalidae

Similar families occurring in the area

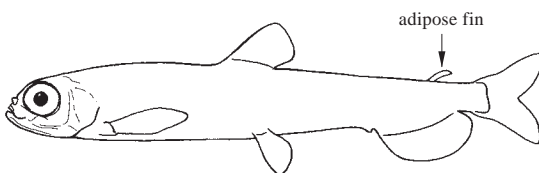
Alepocephalidae: tongue present.

Bathylagidae: adipose fin present.

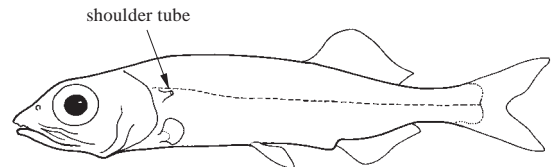
Platyroctidae: shoulder tube present.



Alepocephalidae



Bathylagidae



Platyroctidae

Key to the species of *Leptochilichthys* occurring in the area (modified from Markle and Quéro, 1984)

- 1a. Dorsal-fin rays 11 to 15; anal-fin rays 11 to 13; lateral-line scales 47 to 53 (Fig. 1)
 ***Leptochilichthys agassizii***
- 1b. Dorsal-fin rays 16 to 21; anal-fin rays 14 to 18; lateral-line scales 53 to 55 (Fig. 2)
 ***Leptochilichthys pinguis***

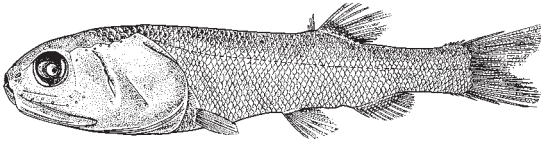


Fig. 1 *Leptochilichthys agassizii*

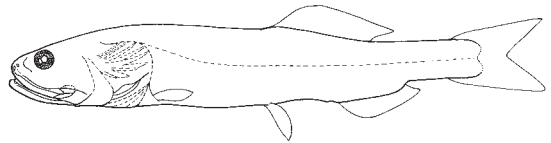





Fig. 1 *Leptochilichthys pinguis*

List of species occurring in the area

The symbol  is given when species accounts are included

-  *Leptochilichthys agassizii* Garman, 1899.
-  *Leptochilichthys pinguis* (Vaillant, 1886).

References

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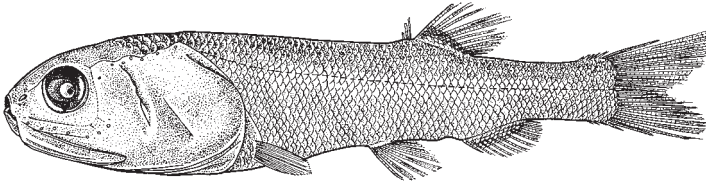
Markle, D.F. & Quero, J.-C. 1984. Leptochilichthidae. In P.J.P. Whitehead, M.-L. Bauchot, J.-C. Hureau, J. Nielsen & E. Tortonese, eds. *Fishes of the north-eastern Atlantic and the Mediterranean*. UNESCO, Paris, 1: 254–255.

Markle, D.F. & Sazonov, Y.I. 1990. Leptochilichthyidae. In J.-C. Quero, J.-C. Hureau, C. Karrer, A. Post & L. Saldanha, eds. *Check-list of the fishes of the eastern tropical Atlantic*. UNESCO, Paris, 244–245.

***Leptochilichthys agassizii* Garman, 1899**

En – Agassiz's tongueless smooth-head.

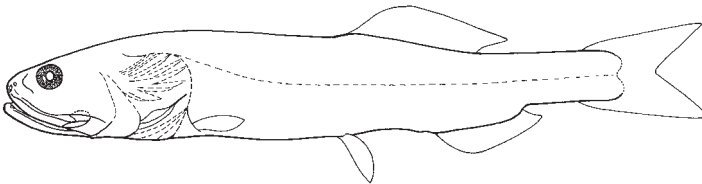
To about 31 cm. Bathypelagic at 2 000 to 3 100 m. Area records from 50° to 14°N, plus Senegal; also found in eastern Pacific.



***Leptochilichthys pinguis* (Vaillant, 1886)**

En – Vaillant's tongueless smooth-head.

To about 25 cm. Meso- to bathypelagic at 800 to 1 400 m. Only area record is the holotype collected off Morocco; also in the Indian Ocean and tropical eastern Pacific.

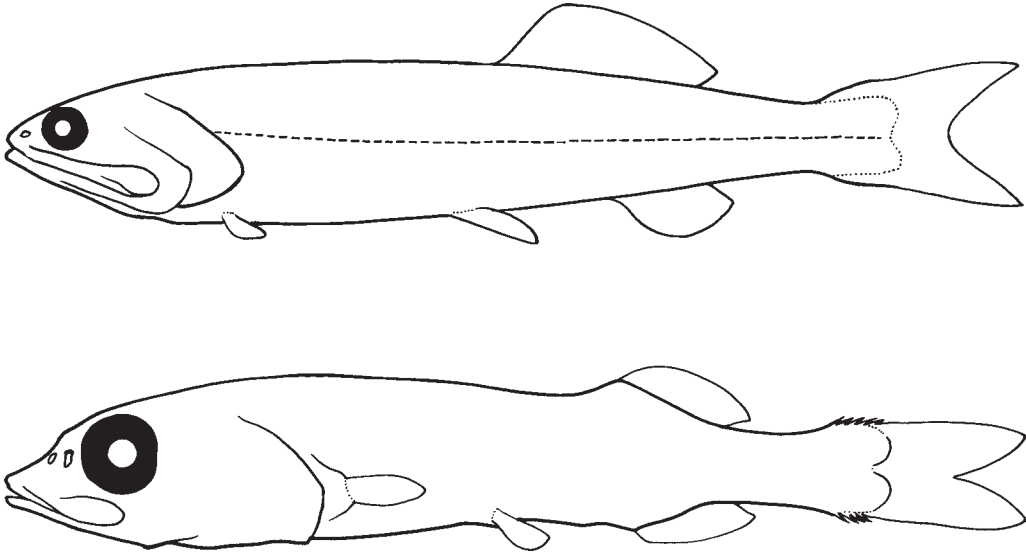


ALEPOCEPHALIDAE

Slickheads

by K.E. Hartel, Harvard University, Massachusetts, USA and
T.M. Orrell, National Museum of Natural History, Washington, DC, USA

Diagnostic characters: Small to medium-sized (1 to 10 cm SL) with body shape variable, from moderately deep to elongate and almost eel-like; tissue often soft. Head compressed to slightly rounded with a large mouth. Tongue present, usually without teeth; roof and floor of mouth usually with papillae; dentition of jaw and roof of mouth variable, but **premaxilla and mandible usually toothed; no premaxillary tusks. Head without scales;** papillae and raised sensory pores frequently present on head and opercles; **opercles often large**, sometimes covering pectoral-fin base. Gill rakers moderate to long, with small tooth-like structures. **No spinous fin rays;** single dorsal and anal fins variable in position, often placed far back and opposite each other; no adipose fin; pectoral fins, if present, moderately high on body; **pelvic fins abdominal**, outer soft ray sometimes with supporting splint bone. **Lateral line present or absent, if present composed of a pored tube supported by ring-like scales**, or papillae. Scales on body present or absent, if present always cycloid, easily abraded. Naked forms usually with black integument and nodular photophores or papillae on body. No shoulder tube above pectoral fin. **Colour:** predominantly brown to black some genera with bright blue skin on head and fin bases.



Habitat, biology, and fisheries: Benthic to midwater fishes (600 to 5 000 m), most numerous below 1 000 m. Feed on wide range of food items including ctenophores, crustaceans, echinoderms, polychaetes, decapods, tunicates, and fishes. At present, slickheads have no economic importance in the North Atlantic. Some species are known to congregate in commercial-sized quantities in the North Atlantic.

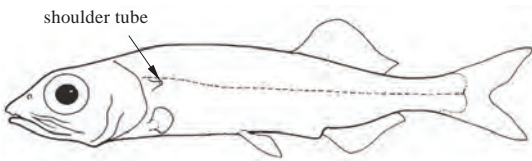
Distribution: Worldwide.

Remarks: About 23 genera and 90 species.

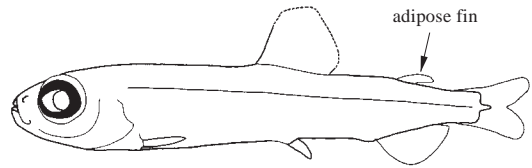
Similar families occurring in the area

Platyroctidae: presence of a well pigmented external tube on shoulder; premaxillary tusks.

Bathylagidae: presence of adipose fin.



Platyroctidae



Bathylagidae

Remarks: Species list and keys to some species tentative, especially *Alepocephalus*

Key to the Alepocephalidae occurring in the area (modified from Markle and Quéro, 1984)

- 1a. Body completely scaleless (except for modified lateral-line scales in *Rouleina*). → 2
- 1b. Body entirely or partly scaled → 7

- 2a. Lateral line in a tube supported by modified ring-like scales (Fig. 1) . . . ***Rouleina***
- 2b. Lateral line, if present, without modified scales as above → 3

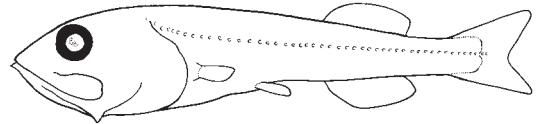


Fig. 1 *Rouleina*

- 3a. Light organs present on body → 4
- 3b. No light organs on body → 5

- 4a. Photophores on raised stalks; ventral outline of upper jaw with obtuse angle at end of premaxilla; anal-fin rays 16 to 19 (Fig. 2) ***Photostylus pycnopterus***
- 4b. Photophores nodular, not on stalks; ventral outline of premaxilla and maxilla approximately straight; anal-fin rays 26 to 33 (Fig. 3) ***Xenodermichthys copei***

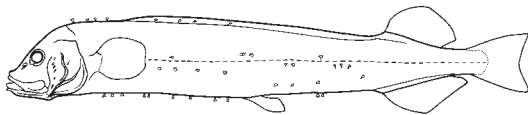


Fig. 2 *Photostylus pycnopterus*

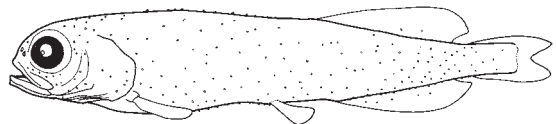


Fig. 3 *Xenodermichthys copei*

- 5a. Dorsal-fin origin distinctly behind anal-fin origin; body elongate and tapering (Fig. 4) ***Leptoderma macrops***
- 5b. Dorsal-fin origin above or before anal-fin origin; body not tapering to a point → 6

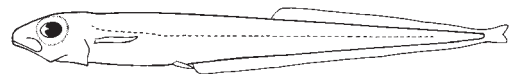


Fig. 4 *Leptoderma macrops*

- 6a. Dorsal-fin origin approximately opposite anal-fin origin; no teeth in jaws or mouth (Fig. 5) ***Mirognathus normani***
- 6b. Dorsal-fin origin before anal-fin origin; teeth present in both jaws and on roof of mouth (Fig. 6) ***Rinoctes nasutus***

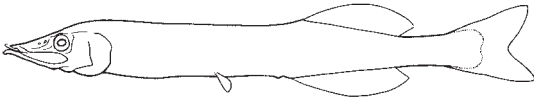


Fig. 5 *Mirognathus normani*

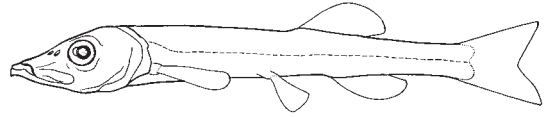


Fig. 6 *Rinoctes nasutus*

- 7a. No teeth on maxilla or vomer → 8
- 7b. Teeth present on maxilla and/or vomer → 11
- 8a. Dorsal-fin origin usually above anal-fin origin → 9
- 8b. Dorsal-fin origin usually behind anal-fin origin → 11
- 9a. Area from gill cavity to pectoral-fin base scaled; pectoral fin not fan-like, upper-rays longer than lower rays (Fig. 7) ***Alepocephalus***
- 9b. Area from gill cavity to pectoral-fin base naked or with naked strip; pectoral fin fan-like with upper and lower rays shortened (Fig. 8) ***Asquamiceps***
- 10a. Lower jaw ends under orbit; palatine with teeth; body cavity lining darkly pigmented (Fig. 9) ***Conocara***
- 10b. Lower jaw ends behind posterior margin of orbit; no palatine teeth; body cavity lining unpigmented or slightly pigmented (Fig. 10) ***Einara***



Fig. 7 *Alepocephalus*

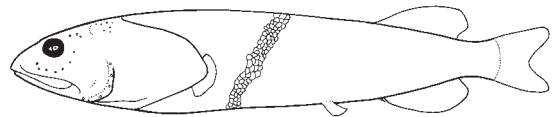


Fig. 8 *Asquamiceps*



Fig. 9 *Conocara*

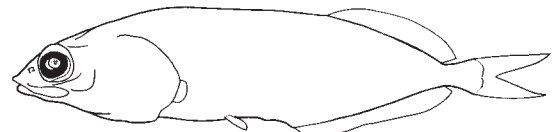


Fig. 10 *Einara*

- 11a. Lower jaw without teeth (Fig. 11) ***Herwigia kreffti***
- 11b. Lower jaw with teeth. → 12
- 12a. Dorsal-fin origin approximately opposite anal-fin origin → 13
- 12b. Dorsal-fin origin before anal-fin origin → 14

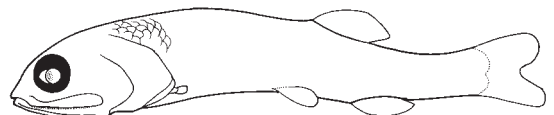


Fig. 11 *Herwigia kreffti*

- 13a. Body elongate; pectoral fin reduced; upper jaw with relatively long pointed teeth; no spot near base of dorsal-fin ray (Fig. 12) ***Bathypriion danae***
- 13b. Body moderately deep; pectoral fin well developed, often with produced rays; upper jaw without long fang-like teeth; a black wart-like spot near base of sixth dorsal-fin ray, often abraded (Fig. 13) ***Talismania***

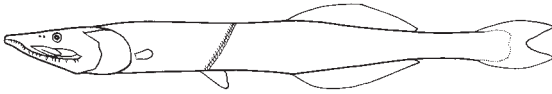


Fig. 12 *Bathypriion danae*

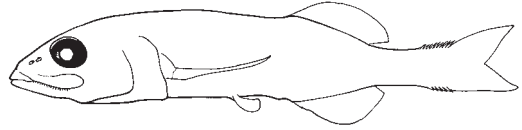


Fig. 13 *Talismania*

- 14a. Teeth near anterior tips of upper and lower jaws in more than 1 series (Fig. 14) ***Narcetes***
- 14b. Teeth near anterior tips of upper and lower jaws in single series → 15

- 15a. Tip of lower jaw with a prominent conical knob directed ventrally (Fig. 15) ***Bajacalifornia***
- 15b. Lower jaw without a prominent knob → 16

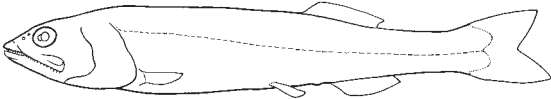


Fig. 14 *Narcetes*



Fig. 15 *Bajacalifornia*

- 16a. Upper jaw ends well behind posterior margin of orbit (Fig. 16) ***Bathylaco***
- 16b. Upper jaw ends approximately below posterior margin of orbit; pointed knob on lower jaw (Fig. 17) ***Bathytroctes***



Fig. 16 *Bathylaco*

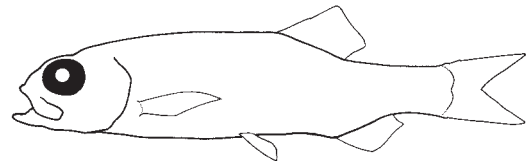


Fig. 17 *Bathytroctes*

List of species occurring in the area

Note: Many species and their distributions poorly known and some genera, like *Alepocephalus*, are in need of revision.

- Alepocephalus agassizii* Goode and Bean, 1883. Usually 50–70 SL cm. Boreal to temperate Atlantic; south to 21°N in eastern Atlantic.
- Alepocephalus australis* Barnard, 1923. To 42 cm SL. Temperate, south to 4°N in eastern Atlantic. Nominal *A. australis* from off South Africa may differ from North Atlantic form.
- Alepocephalus bairdii* Goode and Bean, 1879. To 100 cm SL. Temperate N Atlantic; south to 17° in eastern Atlantic.
- Alepocephalus productus* Gill, 1883. To 43 cm SL. Subtropical to temperate, circumglobal.
- Alepocephalus rostratus* Risso, 1820. To 47 cm SL. In eastern Atlantic from off Ireland south to the Cape Verde Islands.

- Asquamiceps caeruleus* Markle, 1980. To 34 cm SL. Tropical, Indian and Atlantic oceans, from 30°N to 21°S in eastern Atlantic.
- Asquamiceps hjorti* (Koefoed, 1927). To 25 cm SL. In eastern Atlantic from 22°N to 20°S.
- Asquamiceps velaris* Zugmayer, 1911. To 17 cm SL. Probably worldwide, in eastern N Atlantic only from the type locality off Gibraltar and other records off South Africa.
- Bajacalifornia arcylepis* Markel and Krefft, 1985. To 21 cm SL. Known from eastern Atlantic from one specimen off Africa at 14°N and from the central Atlantic and Arabian Sea.
- Bajacalifornia calcarata* (Weber, 1913). To 38 cm SL. Known from 10°N to 4°N in eastern Atlantic and in the Indian Ocean and western Pacific.
- Bajacalifornia megalops* (Lütken, 1898). To 28 cm SL. Tropical to temperate, all oceans.
- Bathylaco nielsenii* Sazanov and Ivanov, 1980. To 29 cm SL. Known from one area record at 3°S 26°W and from equatorial Indian Ocean.
- Bathylaco nigricans* Goode and Bean, 1896. To 34 cm. Common just north of area and one record at 22°S. Temperate and tropical, circumglobal.
- Bathypriion danae* Marshall, 1966. To 39 cm SL. Anti-tropical 55°N to 30°N and 22°S to 27°S in eastern Atlantic and also in other areas of Atlantic and western Pacific.
- Bathytroctes macrolepis* Günther, 1887. To 35 cm SL. Temperate and tropical, circumglobal.
- Bathytroctes michaelsarsi* Koefoed, 1927. To 31 cm SL. Temperate and tropical Atlantic, in eastern Atlantic from Iberian Basin to Angola, 8°S.
- Bathytroctes microlepis* Günther, 1878. To 30 cm SL. Tropical and temperate, all oceans, in eastern Atlantic from about 40°N to 22°S.
- Bathytroctes oligolepis* (Krefft, 1970). To 15 cm SL. Temperate and tropical Atlantic, in eastern Atlantic from 7°N to 10°S.
- Bathytroctes squamosus* Alcock, 1890. To 31 cm SL. Tropical Atlantic and Indian oceans.
- Conocara fiolenti* Sazonov and Ivanov, 1979. To 37 cm SL. Known from just south of area at 31°S.
- Conocara macropterum* (Vaillant, 1888). To 34 cm SL. Temperate and tropical Atlantic, eastern Atlantic from 30°N to 11°S.
- Conocara microlepis* (Lloyd, 1909). To 30 cm SL. One eastern Atlantic record from 30°N.
- Conocara murrayi* (Koefoed, 1927). To 34 cm SL. Temperate and tropical, circumglobal, eastern Atlantic records from off Ireland to 25°N.
- Conocara salmoneum* (Gill and Townsend, 1897). To 73 cm SL. Temperate Atlantic and Pacific, probably in area.
- Conocara wernerii* Nybelin, 1947. Only known from type (34 cm) off Morocco.
- Einara edentula* (Alcock, 1892). To 18 cm SL. Temperate and tropical, all oceans, 35°N to 18°N in eastern Atlantic.
- Einara macrolepis* (Koefoed, 1927). To 22 cm SL. Isolated eastern Atlantic records from off Madeira and at 5°30'S and from Indian and eastern Pacific oceans.
- Herwigia krefftii* (Nielsen and Larsen, 1970). To 38 cm SL. Temperate and tropical, Atlantic and Pacific, from 55°N to 22°S in eastern Atlantic.
- Leptoderma macrops* Vaillant, 1886. To 24 cm SL. Temperate and tropical Atlantic.
- Mirognathus normani* Parr, 1951. To 20 cm SL. Very rare, temperate N and S Atlantic, eastern Atlantic from south of Iceland and off western Spain.
- Narcetes erimelas* Alcock, 1890. To 29 cm SL. Known from 01°N 0°24'W in the eastern Atlantic and from the Indian Ocean.
- Narcetes stomias* (Gilbert, 1890). To 53 cm SL. Temperate and tropical, circumglobal.
- Photostylus pycnopterus* Beebe, 1933. To 11 cm SL. Temperate and tropical, circumglobal.
- Rinoctes nasutus* (Koefoed, 1927). To at least 19 cm SL. Temperate and tropical N Atlantic.

- Rouleina attrita* (Vaillant, 1888). To 38 cm SL. Temperate and tropical, circumglobal.
- Rouleina maderensis* Maul, 1948. To 32 cm SL. Tropical, circumglobal.
- Talismania antillarum* (Goode and Bean, 1896). To at least 15 cm SL. Tropical, circumglobal, from about 35°N to 9°S in eastern Atlantic.
- Talismania homoptera* (Vaillant, 1888). To 29 cm SL. North Atlantic, from 31°N to 4°S in the eastern Atlantic.
- Talismania longifilllis* (Brauer, 1902). To 46 cm SL. In area from 23°N to 11°S; also in Indian and Pacific oceans.
- Talismania mekistonema* Sulak, 1975. To at least 21 cm SL. Tropical, Atlantic and Indian oceans, eastern Atlantic from about 40°N to 9°S.
- Xenodermichthys copei* (Gill, 1884). To 17 cm SL. Temperate and tropical, circumglobal, in the eastern Atlantic from Greenland to 11°S.

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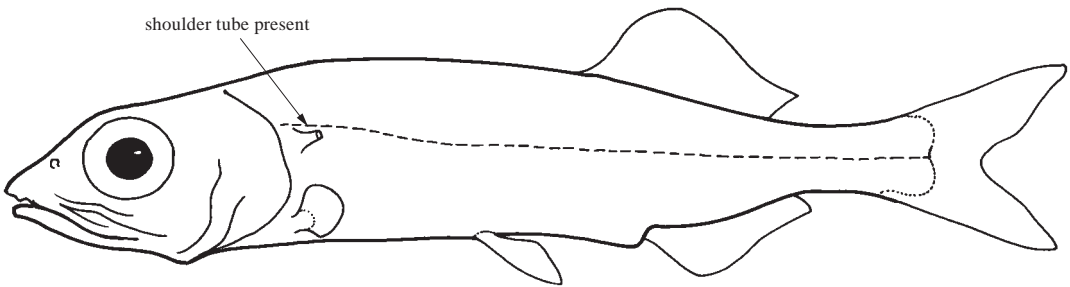
PLATYTROCTIDAE

(= SEARSIIDAE)

Tubeshoulders

by T.M. Orrell, National Museum of Natural History, Washington, DC, USA and
K.E. Hartel, Harvard University, Massachusetts, USA

Diagnostic characters: Small-sized fishes (to 30 cm, SL) with slender to highly compressed body, tissue often soft, terminal mouth with slightly convex head profile. Four to 8 branchiostegal rays. Fourteen to 28 pectoral-fin rays; 6 to 10 pelvic-fin rays (none in *Platytroctes apus*); no adipose fin. **Subcutaneous canal system often connected to scale pockets by pores**; many species with 44 to 55 modified lateral-line scales (third larger than normal body scales); swimbladder absent. **External black tube on shoulder connects to sac that produces luminous fluid**; photophores (light organs) present in most species (horizontally oriented in young and ventrally oriented in adults). Forty to 52 vertebrae. Cycloid scales present on body, but absent from head. **Colour:** black to dark brown.

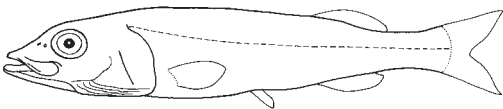


Habitat, biology, and fisheries: Marine, deep water, mesopelagic, bathypelagic to benthopelagic; 100 to 2 000 m most common between 300 and 1 000 m. Of no commercial interest to fisheries. All oceans, but absent from the Mediterranean Sea. Range in eastern Atlantic from Greenland to the Southern Ocean with the majority of species having a north to south distribution along the mid-Atlantic ridge and continents. Most eastern Atlantic species found from 65° N to 40° S and east of 30° W.

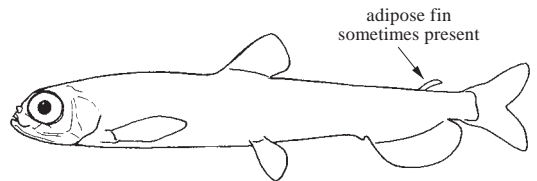
Similar families occurring in the area

Alepocephalidae: lacks shoulder tube.

Bathylagidae: has adipose fin, lacks shoulder tube.



Alepocephalidae



Bathylagidae

Key to the species of Platytroctidae occurring in the area (modified from Matsui and Rosenblatt, 1987)

- 1a. Body deep and strongly compressed, upper and lower margins forming a keel; predorsal margin sharp, 1 scale wide; pelvic fin absent ***Platytroctes apus***
- 1b. Body shallow to deep, moderately compressed to round in cross-section, upper and lower keels shallow or absent; predorsal margin more than 1 scale wide; pelvic fin present. → 2

- 2a. Dentary with a gap in teeth caused by lower jaw ligament; vomerine teeth well separated; lateral scales large, about 45 to 55 (Fig. 1) **Barbantus** → 3
- 2b. Dentary without a gap in teeth or ligament; vomerine teeth closely spaced; lateral scales smaller, usually more than 55 (except *Mentodus*) → 4

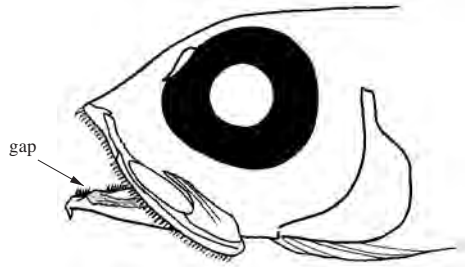


Fig. 1 dentary gap caused by ligament

- 3a. Dorsal-fin origin ahead of anal-fin origin by at most half its basal length; dorsal-fin rays 16 to 19; anal-fin rays 12 to 15 **Barbantus curvifrons**
- 3b. Entire dorsal fin before anal fin and dorsal-fin base twice as long as anal-fin base; dorsal-fin rays 13 to 15; anal-fin rays 10 or 11 **Barbantus elongatus**

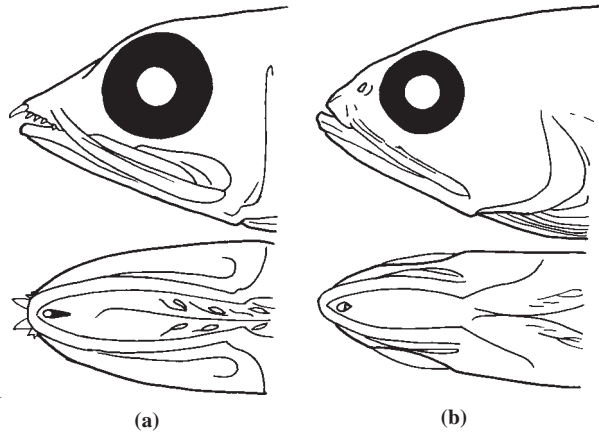


Fig. 2 premaxillary tusks

- 4a. Premaxillary tusks present (Fig. 2a) → 5
- 4b. Premaxillary tusks absent or rudimentary (Fig. 2b) . . . **Sagamichthys schnakenbecki**
- 5a. Cleithral symphysis normal, not a spine; upper jaw partly overlapped by first or second infraorbital (not by lacrimal); pelvic-fin rays usually 9 (except 6 to 8 in *Searsia*) → 6
- 5b. Cleithral symphysis produced as a spine (variable in *Mentodus*); upper jaw partly overlapped by lacrimal (or no overlap); pelvic-fin rays 6 to 8 → 11
- 6a. Maxilla ending between mideye and posterior margin of eye; pelvic-fin rays 6 to 8; one-fourth or less of dorsal fin in advance of anal-fin origin; single curved premaxillary tusk **Searsia koefoedi**
- 6b. Maxilla ending behind eye; pelvic-fin rays 8 or 9 (usually 9); one-third or more of dorsal fin in advance of anal-fin origin; single uncurved premaxillary tusk **Holtbyrnia** → 7
- 7a. Photophores absent in young, rudimentary in adults **Holtbyrnia anomala**
- 7b. Photophores well developed in adults; interventral and posterior gular organs (GO₁ & GO₂) (Fig. 3) present in young → 8

- 8a. Anal organ (AO) (Fig. 3) present. ***Holtbyrnia cyanocephala***
- 8b. Anal organ absent. → 9

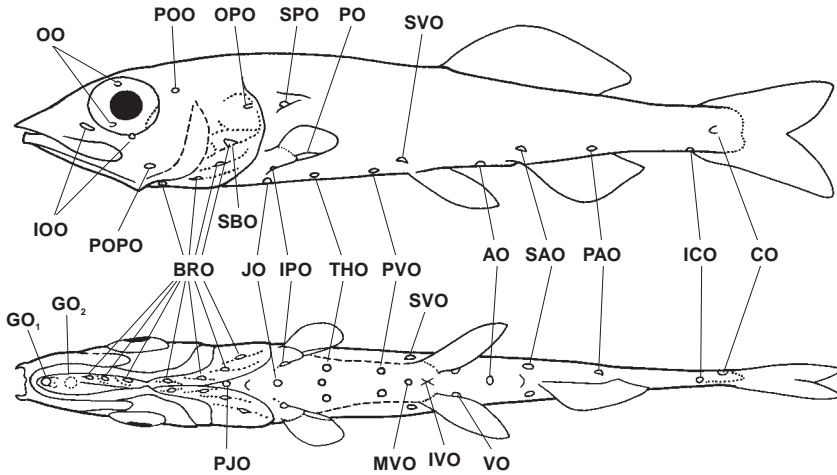


Fig. 3 positions of photophores (light organs)
after Matsui and Rosenblatt (1987)

- 9a. Gill rakers 22 to 23; scales in midlateral series 94 to 104; anal-fin rays 17. . . ***Holtbyrnia innesi***
- 9b. Gill rakers 27 to 29; scales in midlateral series 100 to 111; anal-fin rays 15 or 16
. ***Holtbyrnia macrops***

- 11a. Frontals widest over mideye (Fig. 4) ***Maulisia* → 12**
- 11b. Frontals widest over posterior end of eye to behind eye → 15

- 12a. Photophores absent; 7 to 15 teeth behind tusks. ***Maulisia* subgenus *Aphanichthys* → 13**

- 12b. Photophores present; 4 to 8 teeth behind tusks ***Maulisia* subgenus *Maulisia* → 14**

- 13a. Modified lateral-line scales absent
. ***Maulisia (Aphanichthys) acuticeps***
- 13b. Approximately 50 modified lateral-line scales present ***Maulisia (Aphanichthys) microlepis***

- 14a. Thoracic organ (THO, Fig. 3) a transverse bar ***Maulisia (Maulisia) argipalla***
- 14b. Thoracic organ (THO, Fig. 3) round ***Maulisia (Maulisia) maui***

- 15a. Body compressed, dorsal margin relatively sharp; anal and dorsal fins nearly opposed
. ***Normichthys operosus***
- 15b. Body moderately compressed, dorsal margin rounded; dorsal fin ahead of anal-fin origin by one-fourth to one-third of dorsal-fin base → 16

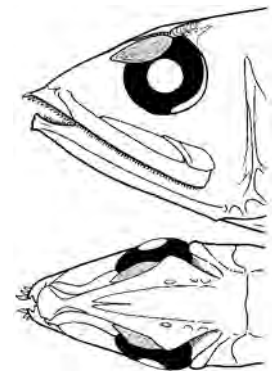



Fig. 4 position of frontals

- 16a.** Scales large, 47 to 75 along midline; cephalic lateral line without any side branches; eyes directed anterolaterally → **17**
- 16b.** Scales small, 75 to 100 on midline; cephalic lateral-line canals complete; eyes directed laterally → **18**
- 17a.** Premaxillary tusks small (not much larger than other teeth); cleithral symphysis not ending in spine; midline scales 47 to 58 ***Mentodus facilis***
- 17b.** Premaxillary tusks large; cleithral symphysis ending in spine; midline scales more than 70 ***Mentodus longirostris***
- 18a.** No modified lateral-line scales, lateral line marked with neuromasts or papillae → **19**
- 18b.** Approximately 50 modified lateral-line scales → **20**
- 19a.** Cephalic lateral-line canals unbranched or with few branches ***Mentodus crassus***
- 19b.** Cephalic lateral-line canals with many branches ***Mentodus perforatus***
- 20a.** White tissue in front of eye, but no white tissue behind eye (on infraorbital bones) ***Mentodus rostratus***
- 20b.** White tissue around eyes ***Mentodus mesalirus***

List of species occurring in the area

The symbol  is given when species accounts are included.

-  *Barbantus curvifrons* (Roule and Angel, 1931).
-  *Barbantus elongatus* Krefft, 1970.
-  *Holtbyrnia anomala* Krefft, 1980.
-  *Holtbyrnia cyanocephala* (Krefft, 1967).
-  *Holtbyrnia innesi* (Fowler, 1934).
-  *Holtbyrnia macrops* Maul, 1957.
-  *Maulisia (Aphanichthys) acuticeps* Sazanov, 1976.
-  *Maulisia (Aphanichthys) microlepis* Sazanov and Golovan, 1976.
-  *Maulisia (Maulisia) argipalla* Matsui and Rosenblatt, 1979.
-  *Maulisia (Maulisia) maui* Parr, 1960.
-  *Mentodus crassus* Parr, 1960.
-  *Mentodus facilis* Parr, 1951.
-  *Mentodus longirostris* Sazonov and Golovan, 1976.
-  *Mentodus mesalirus* (Matsui and Rosenblatt, 1987).
-  *Mentodus perforatus* Sazonov and Trunov, 1978.
-  *Mentodus rostratus* (Günther, 1878).
-  *Normichthys operosus* Parr, 1951.
-  *Platyroctes apus* Günther, 1878.
-  *Sagamichthys schnakenbecki* (Krefft, 1953).
-  *Searsia koefoedi* Parr, 1937.

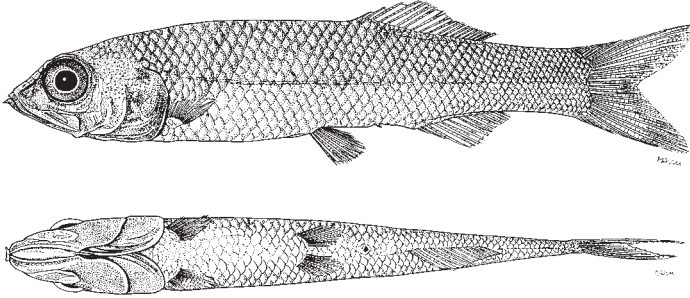
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***Barbantus curvifrons* (Roule and Angel, 1931)**

En – Palebelly searsid.

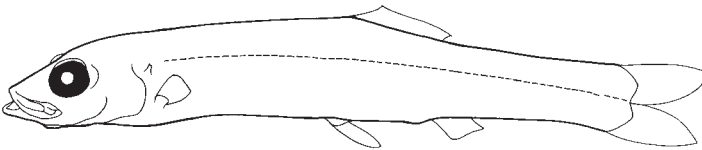
Mesopelagic from 800 to 1 000 m. In eastern Atlantic from 50°N to Angola in the south; also in tropical and subtropical Indian and Pacific oceans.



***Barbantus elongatus* Krefft, 1970**

En – Elongate searsid.

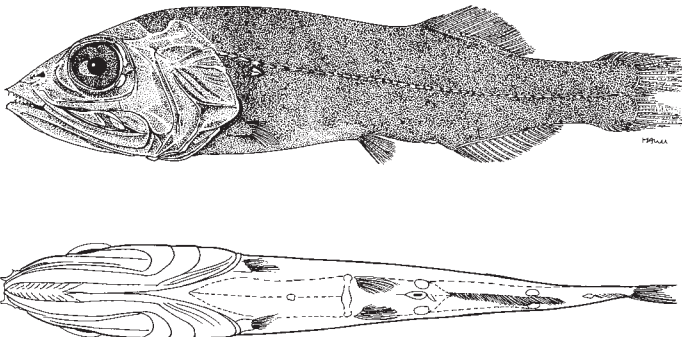
Bathypelagic between 1 800 and 2 000 m. Endemic to eastern Atlantic. Rare, known from only a few samples collected along the mid-Atlantic ridge in area between 25°W to 6°W and 6°S to 16°S.



***Holtbyrnia anomala* Krefft, 1980**

En – Bighead searsid.

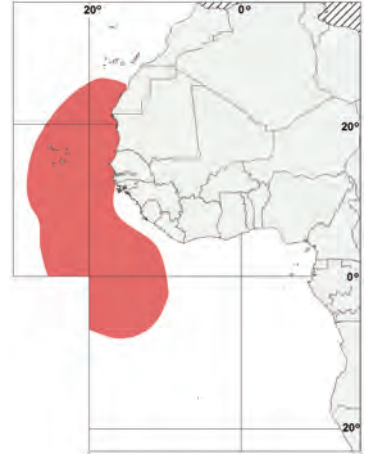
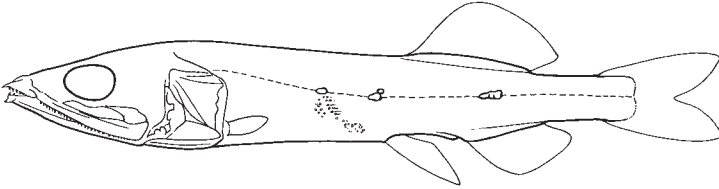
Meso- to bathypelagic, most often between 700 to 2 700 m. Eastern Atlantic from Greenland to Namibia.



***Holtbyrnia cyanocephala* (Kreffft, 1967)**

En – Bluehead tubeshoulder.

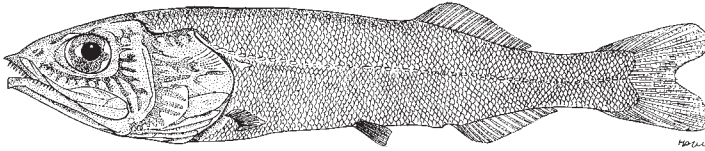
Meso- to bathypelagic from 150 to 1 500 m. Eastern Atlantic from 25°N to 8°S; also in western North Atlantic and Indian Ocean.



***Holtbyrnia innesi* (Fowler, 1934)**

En – Teardrop tubeshoulder.

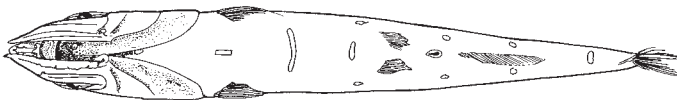
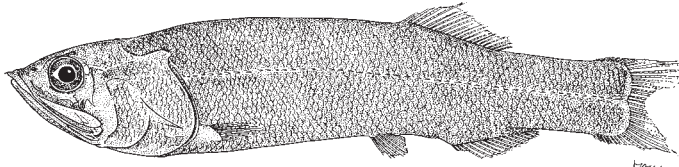
Mesopelagic between 250 and 1 000 m. In the area from Gulf of Guinea. Records in western Atlantic, Pacific, and Bering Straights.



***Holtbyrnia macrops* Maul, 1957**

En – Bigeye searsid.

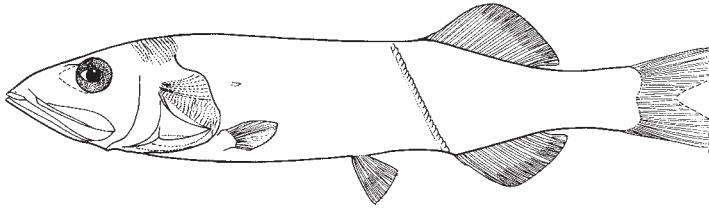
Mesopelagic from 300 to 1 000 m; rises to shallower waters <200 m at night. Eastern Atlantic endemic from Greenland to Madeira and to 5°S.



***Maulisia (Aphanichthys) acuticeps* Sazanov, 1976**

En – Sharphead searsid.

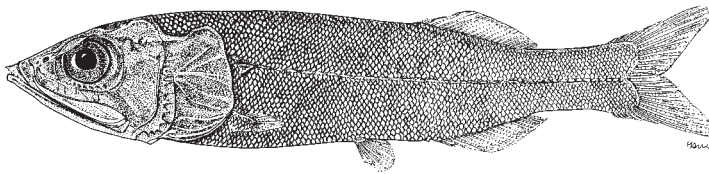
Meso- to bathypelagic from 800 to 1 500 m. Single record in the area (22°00'S, 12°14'E); also in the Pacific.



***Maulisia (Aphanichthys) microlepis* Sazanov and Golovan, 1976**

En – Smallscale searsid.

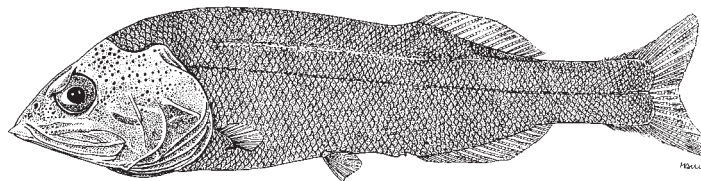
Meso- to bathypelagic from 700 to 2 000 m. Eastern Atlantic endemic from off Greenland to 22°S.



***Maulisia (Maulisia) argipalla* Matsui and Rosenblatt, 1979**

En – Palegold searsid.

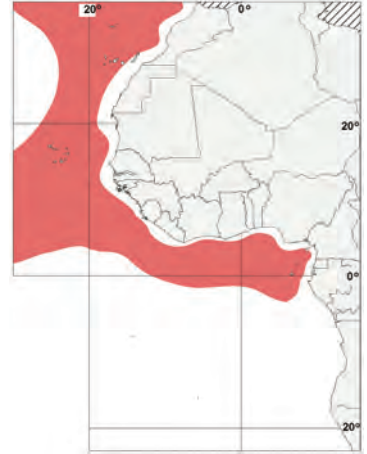
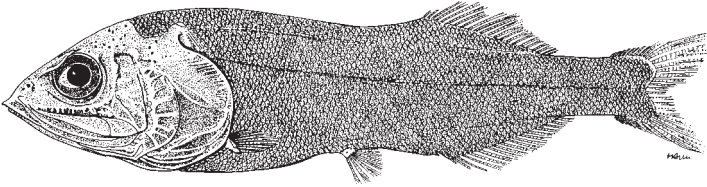
Mesopelagic from 850 to 1 000 m. Eastern north Atlantic, Medeira and elsewhere in the area although some records may be *M. mauli*. Also in the eastern Pacific off of California.



***Maulisia (Maulisia) mauli* Parr, 1960**

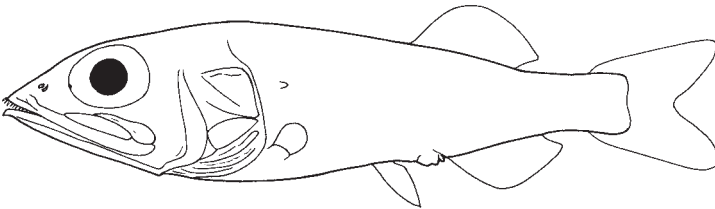
En – Maul's searsid.

Mesopelagic from 400 to 1 000 m. Distribution from Iceland to Gulf of Guinea. Also in the Pacific and western Indian Ocean.

***Mentodus crassus* Parr, 1960**

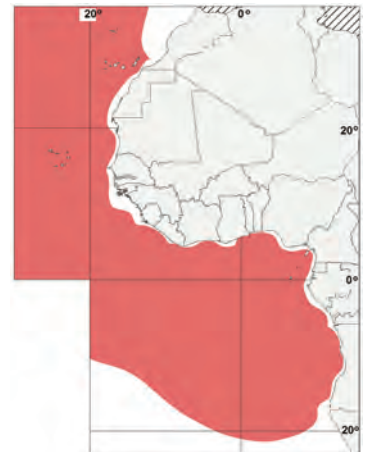
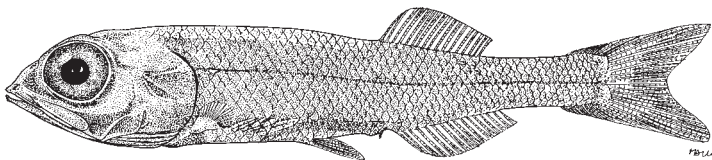
En – Stout searsid.

Meso- to bathypelagic from 800 to 1 500 m. Known from south of the area (26°S, 5°E) and in the eastern Pacific.

***Mentodus facilis* Parr, 1951**

En – Dark searsid.

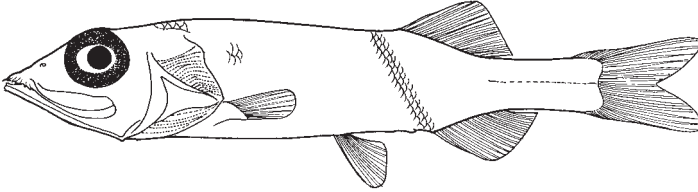
Meso- to bathypelagic from 650 to greater than 2 000 m. Eastern central Atlantic from the Azores to 21°S. Also in Indian and Pacific oceans.



***Mentodus longirostris* Sazonov and Golovan, 1976**

En – Longbill searsid.

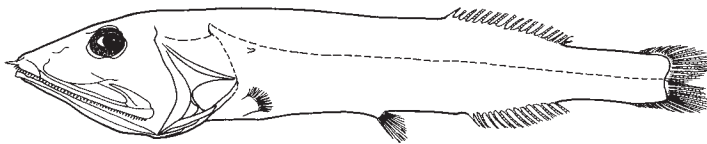
Bathypelagic from 1 400 to 1 700 m. Eastern tropical Atlantic endemic. Rare in the area with records 12°N, 15°S and 22°S.



***Mentodus mesalirus* (Matsui and Rosenblatt, 1987)**

En – Midridged searsid.

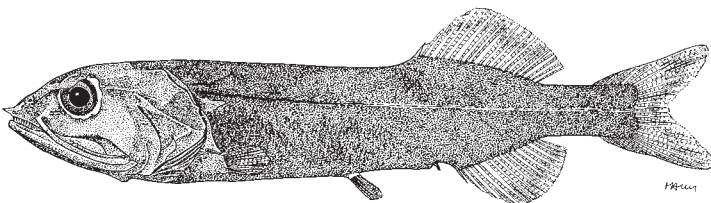
Bathypelagic. Two records in eastern Atlantic from 7°N to 27°S. Questionable records in the Indian and Pacific oceans.



***Mentodus perforatus* Sazonov and Trunov, 1978**

En – Largepore tubeshoulder.

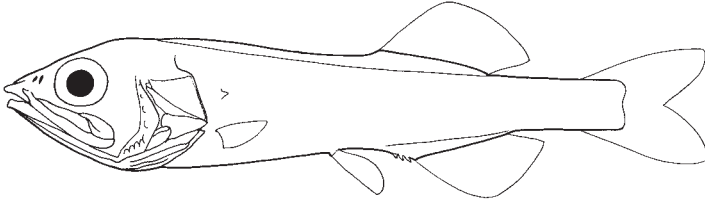
Bathypelagic from 1 000 to 2 000 m. Eastern Atlantic endemic. Records in the area from 12°N to 26°S.



***Mentodus rostratus* (Günther, 1878)**

En – Beaked searsid.

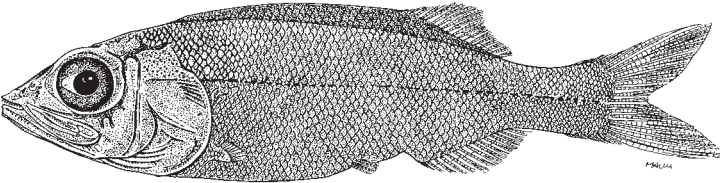
Bathypelagic from 1 000 to 1 500 m. Tropical central Atlantic endemic from 12°N to 8°S. Note: Matsui and Rosenblatt (1987) as *Tragularis perforatus* (15°N to 30+°S).



***Normichthys operosus* Parr, 1951**

En – Multipore searsid.

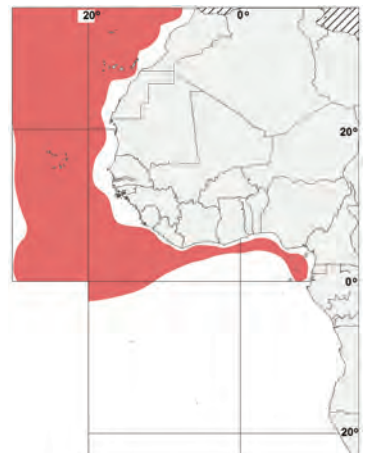
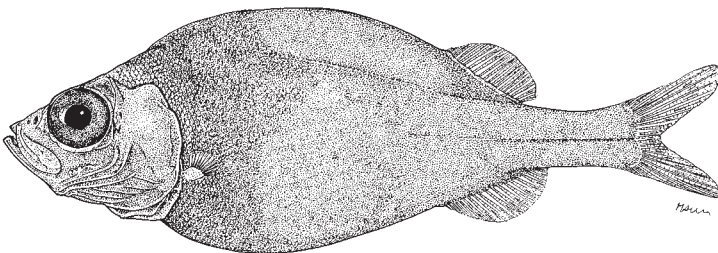
Meso- to bathypelagic from 750 to 1 000 m or deeper. Eastern central Atlantic endemic from the Azores to 9°S, northern range continues to Greenland.



***Platyroctes apus* Günther, 1878**

En – Legless searsid.

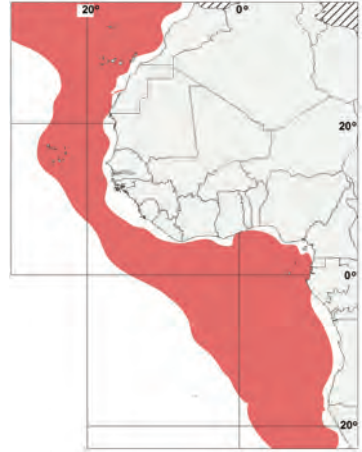
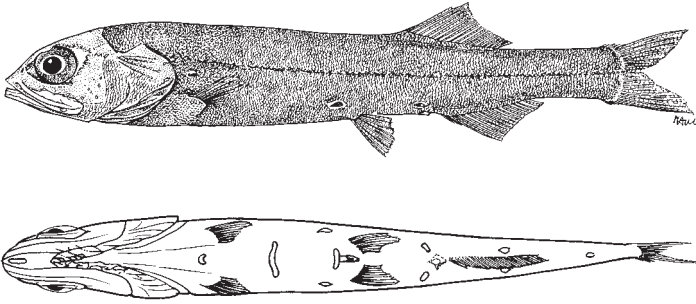
Mesopelagic from 350 to 1 000 m. Eastern Atlantic from Iceland to equator. Also in Pacific and Indian oceans.



***Sagamichthys schnakenbecki* (Kreffft, 1953)**

En – Schnakenbeck's searsid.

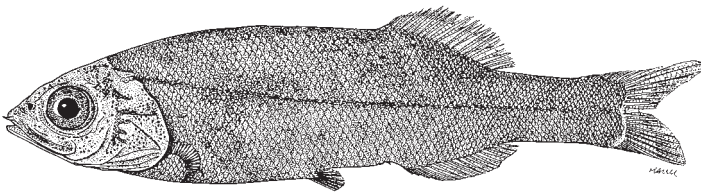
Mesopelagic from 350 to 850 m. Eastern Atlantic endemic from Greenland to about 18°S (*Holtbyrnia ophiocephala* Sazonov and Golovan (1976) not valid per Matsui and Rosenblatt (= *S. schnakenbecki*) but listed in Quéro *et al.* (1990) - taxon based on a single specimen from stomach contents).



***Searsia koefoedi* Parr, 1937**

En – Koefoed's searsid.

Meso- to bathypelagic from 450 to 1 500 m. Widespread in the eastern Atlantic from Greenland and to equator. Also in Pacific and Indian oceans.



A

ALEPOCEPHALIDAE	1765
ARGENTINIDAE	1751
ARGENTINIFORMES	1751
Agassiz's tongueless smooth-head	1764
ALEPOCEPHALIDAE	1762,1771
<i>Alepocephalus</i>	1766
<i>Argentina</i>	1751
<i>Argentina sphyraena</i>	1753
Argentine	1753
Argentines	1751
ARGENTINIDAE	1754,1756
AULOPIDAE	1751

B

BATHYLAGIDAE	1756
<i>Barbantus curvifrons</i>	1776
<i>Barbantus elongatus</i>	1776
Barreleyes	1759
BATHYLAGIDAE	1751,1754,1762,1766,1771
BATHYLAGINAE	1754,1756
<i>Bathylchnops</i>	1759-1760
Beaked searsid	1781
Bigeye searsid	1777
Bighead searsid	1776
Bluehead tubeshoulder	1777

C

CHLOROPHTHALMIDAE	1751
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D

Dark searsid	1779
Deepsea smelts	1756
<i>Dolichopteryx</i>	1759-1760

E

Elongate searsid	1776
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G

<i>Glossanodon</i>	1751
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H

<i>Holtbyrnia anomala</i>	1776
<i>Holtbyrnia cyanocephala</i>	1777
<i>Holtbyrnia innesi</i>	1777
<i>Holtbyrnia macrops</i>	1777
<i>Holtbyrnia ophiocephala</i>	1782

K

Koefoed's searsid	1782
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L

LEPTOCHILICHTHYIDAE	1762
Largepore tubeshoulder	1780
Legless searsid	1781
<i>Leptoichilichthys</i>	1762
<i>Leptoichilichthys agassizii</i>	1764
<i>Leptoichilichthys pinguis</i>	1764
Longbill searsid	1780

M

MICROSTOMATIDAE	1754
<i>Maulisia (Aphanichthys) acuticeps</i>	1778
<i>Maulisia (Aphanichthys) microlepis</i>	1778
<i>Maulisia (Maulisia) argipalla</i>	1778
<i>Maulisia (Maulisia) maui</i>	1779
<i>Maulisia maui</i>	1778
Maul's searsid	1779
<i>Mentodus crassus</i>	1779
<i>Mentodus facilis</i>	1779
<i>Mentodus longirostris</i>	1780
<i>Mentodus mesalirus</i>	1780
<i>Mentodus perforatus</i>	1780
<i>Mentodus rostratus</i>	1781
MICROSTOMATIDAE	1751,1756
Midridged searsid	1780
Multipore searsid	1781

N

<i>Nansenia</i>	1754
<i>Normichthys operosus</i>	1781

O

OPISTHOPROCTIDAE	1759
<i>Opisthoproctus</i>	1759

P

PLATYTROCTIDAE	1771
Palebelly searsid	1776
Palegold searsid	1778
Pencilsmelts	1754
Petite argentine	1753
Pez plata	1753
<i>Platyroctes apus</i>	1771,1781
PLATYTROCTIDAE	1762,1766

S

<i>Sagamichthys schnakenbecki</i>	1782
Schnakenbeck's searsid	1782
<i>Searsia koefoedi</i>	1782

SEARSIIDAE	1771	<i>facilis</i> , <i>Mentodus</i>	1779
Sharphead searsid	1778	I	
Slickheads	1765	<i>innesi</i> , <i>Holtbyrnia</i>	1777
Smallscale searsid	1778	K	
Spookfishes	1759	<i>koefoedi</i> , <i>Searsia</i>	1782
Stout searsid	1779	L	
SYNODONTIDAE	1751	<i>longirostris</i> , <i>Mentodus</i>	1780
T		M	
Teardrop tubeshoulder	1777	<i>macrops</i> , <i>Holtbyrnia</i>	1777
Tongueless smooth-heads	1762	<i>mauli</i> , <i>Maulisia</i>	1778
<i>Tragularis perforatus</i>	1781	<i>mauli</i> , <i>Maulisia</i> (<i>Maulisia</i>)	1779
Tubeshoulders	1771	<i>mesalirus</i> , <i>Mentodus</i>	1780
V		<i>microlepis</i> , <i>Maulisia</i> (<i>Aphanichthys</i>)	1778
Vaillant's tongueless smooth-head	1764	O	
A		<i>operosus</i> , <i>Normichthys</i>	1781
<i>acuticeps</i> , <i>Maulisia</i> (<i>Aphanichthys</i>)	1778	<i>ophiocephala</i> , <i>Holtbyrnia</i>	1782
<i>agassizii</i> , <i>Leptochilichthys</i>	1764	P	
<i>anomala</i> , <i>Holtbyrnia</i>	1776	<i>perforatus</i> , <i>Mentodus</i>	1780
<i>apus</i> , <i>Platyroctes</i>	1771,1781	<i>perforatus</i> , <i>Tragularis</i>	1781
<i>argipalla</i> , <i>Maulisia</i> (<i>Maulisia</i>)	1778	<i>pinguis</i> , <i>Leptochilichthys</i>	1764
C		R	
<i>crassus</i> , <i>Mentodus</i>	1779	<i>rostratus</i> , <i>Mentodus</i>	1781
<i>curvifrons</i> , <i>Barbantus</i>	1776	S	
<i>cynocephala</i> , <i>Holtbyrnia</i>	1777	<i>schnakenbecki</i> , <i>Sagamichthys</i>	1782
E		<i>sphyraena</i> , <i>Argentina</i>	1753
<i>elongatus</i> , <i>Barbantus</i>	1776		
F			

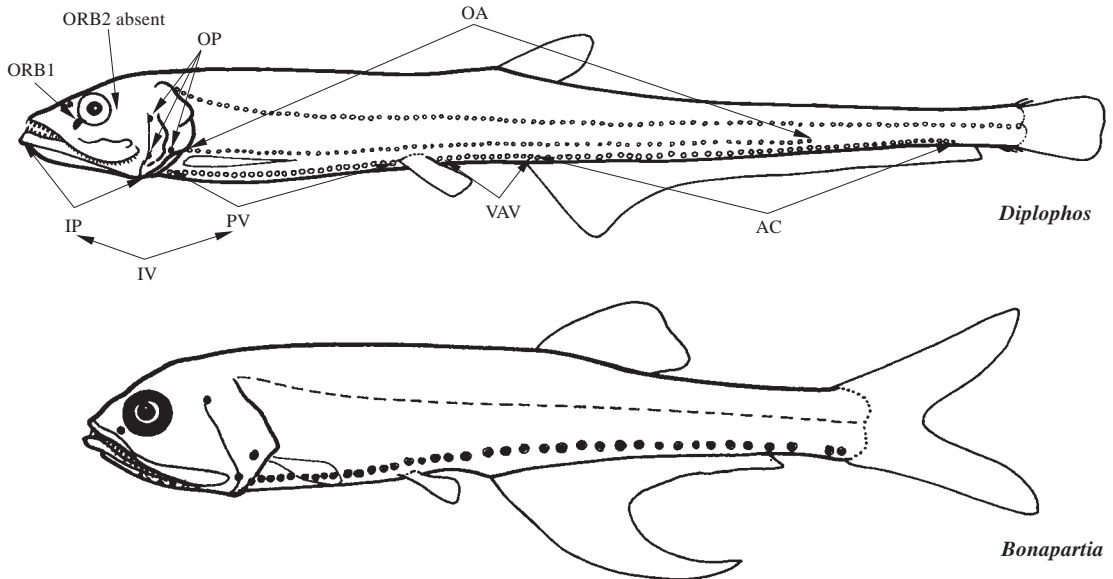
Order STOMIIFORMES

GONOSTOMATIDAE

Bristlemouths

by A.S. Harold, Grice Marine Laboratory, Department of Biology, College of Charleston, Charleston, SC, USA

Diagnostic characters: Maximum size about 36 cm. Body moderately elongate; head and body compressed. Relative size of head highly variable. Eye very small to moderately large. Nostrils high on snout, prominent in dorsal view. Mouth large, angle of jaw posterior to eye. Premaxillary teeth uniserial (except in *Triplophos*); dentary teeth biserial near symphysis. **Chin barbel absent.** Gill openings very wide. Branchiostegals 12 to 16 (4 to 6 on posterior ceratohyal). **Gill rakers well developed.** Pseudobranchiae usually absent (present in *Diplophos* and *Margrethia*). **Dorsal fin at or slightly posterior to middle of body (except in *Triplophos* in which it is anterior).** Anal-fin base moderately to very long. Dorsal fin with 10 to 20 rays; anal fin with 16 to 68 rays; caudal fin forked; pectoral-fin rays 8 to 16; pelvic-fin rays 5 to 9. **Dorsal adipose fin present or absent;** ventral adipose fin absent. Scales deciduous. **One or more rows of discrete photophores on body; isthmus photophores (IP) present or absent; postorbital photophore (ORB 2) absent.** Parietals well developed; epioccipitals separated by supraoccipital. Four pectoral-fin radials (except *Cyclothone*, which has one). **Colour:** skin varying from colourless through brown to black; black and silvery pigmentation associated with photophores.



AC – ventral series posterior to anal-fin origin
 BR – series on the branchiostegal membranes
 IP – ventral series anterior to pectoral-fin base
 IV – ventral series anterior to pelvic-fin base
 OA – lateral series

OP – opercular photophores
 ORB – anterior (ORB 1) and posterior (ORB 2) to eye
 PV – ventral series between bases of pectoral and pelvic fins
 VAV – ventral series between pelvic-fin base and origin of anal fin

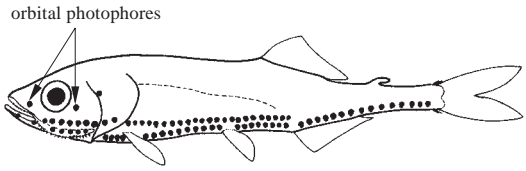
abbreviated terminology of photophores

Habitat, biology, and fisheries: Mesopelagic and bathypelagic, oceanic. Development, especially of photophores, protracted. Diet consists of other fishes and crustaceans. Sexual dimorphism and/or hermaphroditism present in many species.

Remarks: The family has undergone considerable revision since Grey's (1964) treatment, primarily by Weitzman (1974). Some genera were moved to the Sternoptychidae while others to a completely new family, the Photichthyidae (= Phosichthyidae of this account) (Weitzman, 1974). Seven genera are recognized here (see key), with *Sigmops* as a junior synonym of *Gonostoma*.

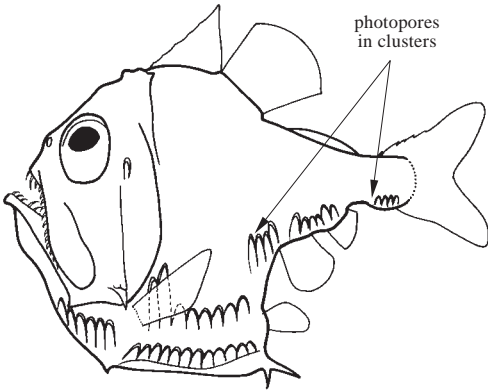
Similar families occurring in the area

Phosichthyidae: row of photophores on isthmus (IP); usually 2 orbital photophores (posterior of the 2 [postorbital] lacking in *Polymetme* and *Yarrella*); 3 bony pectoral-fin radials.

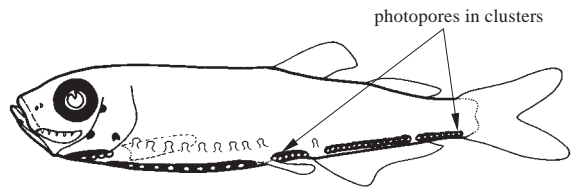


Phosichthyidae

Sternoptychidae: pseudobranch present; ventral photophore series with disjunct clusters of 2 or more photophores; branchiostegal photophores (BR) 6 or 7; 4 bony pectoral-fin radials.



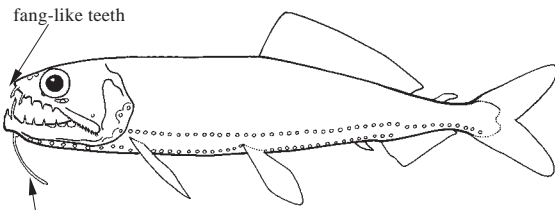
Sternoptychidae



Sternoptychidae

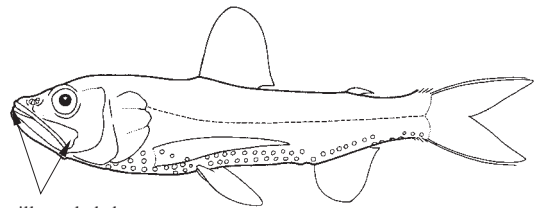
Astronesthidae, Chauliodontidae, Idiacanthidae, Malacosteidae, Melanostomiidae and Stomiidae: body generally more elongate; chin barbel usually present but reduced or absent in Chauliodontidae, absent in males of Idiacanthidae, and absent in *Malacosteus* and *Photostomias* (Malacosteidae); jaw teeth greatly enlarged, fang-like; gill rakers absent in adults; usually 3 bony pectoral-fin radials.

Myctophidae and Neoscopelidae: myctophiform families with photophores but usually with less elongate body and the maxilla is toothless and completely excluded from the gape by the premaxilla; ventral photophores are usually more widely spaced and in less regular rows.



chin barbel present

Astronesthidae



maxilla excluded from gape by premaxilla

Neoscopelidae

Key to genera occurring in the area (adapted from Schaefer *et al.*, 1986 and Grey, 1964)

Remarks on key characters: Gonostomatids are quite delicate and the skin and photophores are frequently damaged or lost during capture in deepwater trawls. However, presence or absence of certain photophore groups, fin positions, and fin-ray counts in conjunction with general body form will usually be adequate for identification.

1a. Anal-fin rays 36 to 39; dorsal-fin origin well in advance of anal-fin origin, posterior insertion of dorsal fin directly above or slightly anterior to anal-fin origin; IP photophores present on isthmus (Fig. 1); IV photophores 24 to 50

... → 2

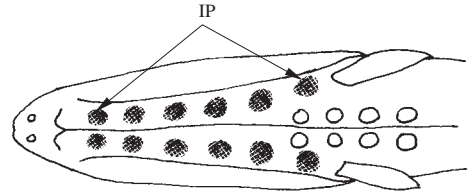


Fig. 1 ventral view of head

1b. Anal-fin rays 16 to 31; dorsal-fin origin not well in advance of anal-fin origin; IP photophores not present on isthmus; IV photophores 13 to 17

.....
..... → 4

2a. Dorsal fin at or behind midpoint of body; VAV photophores 12 to 17 (Fig. 2); ORB photophore below or slightly ahead of anterior margin of eye; lower gill rakers 7 to 10; a row of small photophores on posterior half of lower jaw; pseudobranchs present; IV photophores 29 to 51. → 3

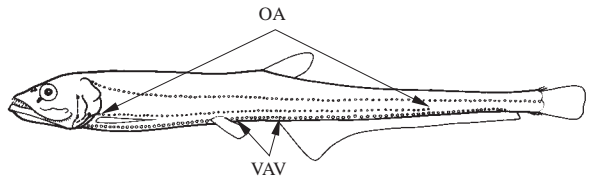


Fig. 2

2b. Dorsal fin well ahead of midpoint of body; VAV photophores 5 to 7 (Fig.3); ORB photophore below centre of eye; lower gill rakers 12 to 16; no photophores on posterior half of lower jaw; pseudobranchs absent; IV photophores 24 to 30 **Triplophos**

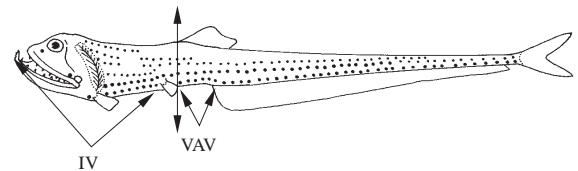


Fig. 3 *Triplophos*

3a. OA photophores 60 to 77 (Fig. 2); IV photophores 31 to 51; AC photophores 32 to 51; IC photophores 76 to 119; distance from tip of snout to anal-fin origin usually about 47.5 to 51.2% standard length (61.2 to 64.4% standard length in *D. rebaini*) **Diplophos**

3b. OA photophores 45 to 48 (Fig. 4); IV photophores 29 to 33; AC photophores 28 to 39; IC photophores 69 to 86; distance from tip of snout to anal-fin origin about 59.0 to 63.0% standard length **Manducus**

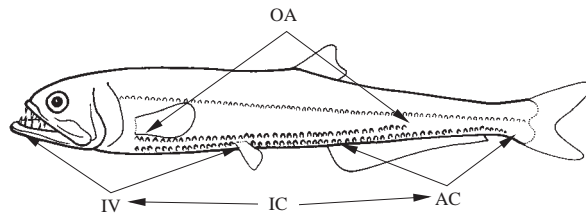


Fig. 4 *Manducus*

- 4a. Dorsal-fin origin anterior to anal-fin origin (Fig. 5); pseudobranchs well developed ***Margrethia***
- 4b. Dorsal-fin origin above or posterior to anal-fin origin (Fig. 6); pseudobranchs inconspicuous or absent → **5**

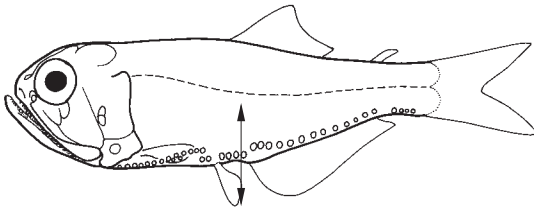


Fig. 5 *Margrethia*

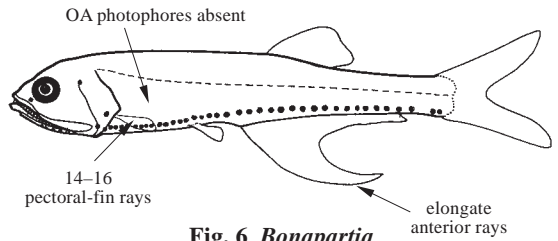


Fig. 6 *Bonapartia*

- 5a. Anal fin with elongate anterior rays (Fig. 6); OA photophores absent; pectoral-fin rays 14 to 16 ***Bonapartia***
- 5b. Anterior rays of dorsal and anal fins not elongate; OA photophores present (6 to 16); pectoral-fin rays 7 to 13 → **6**

- 6a. Eyes moderate to small (Fig. 7a); OA photophores 11 to 21; SO photophore usually present (absent in *G. bathyphilum*); maxilla with a series of elongate teeth separated by a series of shorter, subequal teeth (Fig. 8a); palatine teeth in a single row; anal-fin rays 20 to 32 ***Gonostoma***
- 6b. Eyes very small (Fig. 7b); OA photophores 6 to 10; SO photophore absent; maxillary teeth short but enlarging posteriorly or with occasional slightly longer teeth distributed at roughly equal intervals (Fig. 8b); palatine teeth in an anterior patch; anal-fin rays 16 to 21 ***Cyclothone***

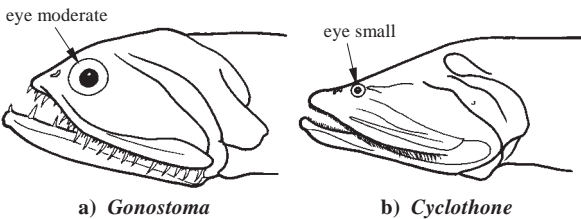


Fig. 7 lateral view of head

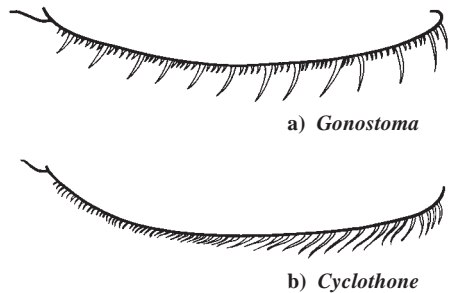


Fig. 8 teeth on maxilla (upper jaw)

List of species occurring in the area

- Bonapartia pedaliota* Goode and Bean, 1896. To 7 cm. Subtropical to temperate Atlantic.
- Cyclothone acclinidens* Garman, 1899. To 4 cm. Circumglobal, tropical to temperate.
- Cyclothone alba* Brauer, 1906. To 3 cm. Circumglobal, tropical to temperate.
- Cyclothone braueri* Jespersen and Täning, 1926. To 4 cm. Circumglobal, subtropical to temperate.
- Cyclothone livida* Brauer, 1902. Males to 4 cm, females to 5 cm. Tropical to temperate E Atlantic.
- Cyclothone microdon* (Günther, 1878). To 7 cm. Circumglobal, subtropical to temperate.
- Cyclothone obscura* Brauer, 1902. To 6 cm. Circumtropical.
- Cyclothone pallida* Brauer, 1902. To 7 cm. Circumglobal, tropical to subtropical.

- Cyclothone parapallida* Badcock, 1982. To 7 cm. Circumglobal, equatorial, Areas 34 and 47.
- Cyclothone pseudopallida* Mukhacheva, 1964. To 6 cm. Circumglobal, tropical to temperate.
- Cyclothone pseudoacclinidens* Quéro 1974. To 5 cm. Circumglobal, tropical.
- Diplophos taenia* Günther, 1873. To 28 cm. Circumglobal, tropical to subtropical.
- Gonostoma atlanticum* Norman, 1930. To 7 cm. Tropical and subtropical Atlantic and Pacific.
- Gonostoma bathyphilum* (Vaillant in Filhol, 1884). To 15 cm. Tropical to temperate Atlantic. Some authors assign this species to the genus *Sigmops*, renaming it *S. bathyphilus*.
- Gonostoma denudatum* Rafinesque, 1810. To 14 cm. Subtropical to temperate N Atlantic and Mediterranean.
- Gonostoma elongatum* Günther, 1878. To 28 cm. Circumglobal, tropical to subtropical. Some authors assign this species to the genus *Sigmops*, renaming it *S. elongatus*.
- Manducus maderensis* (Johnson, 1890). To 22 cm. Tropical to subtropical Atlantic.
- Margrethia obtusirostra* Jespersen and Tåning, 1919. To 8 cm. Tropical to temperate N Atlantic.
- Triphosphos hemingi* (McArdle, 1901). To 36 cm. Circumglobal, tropical.

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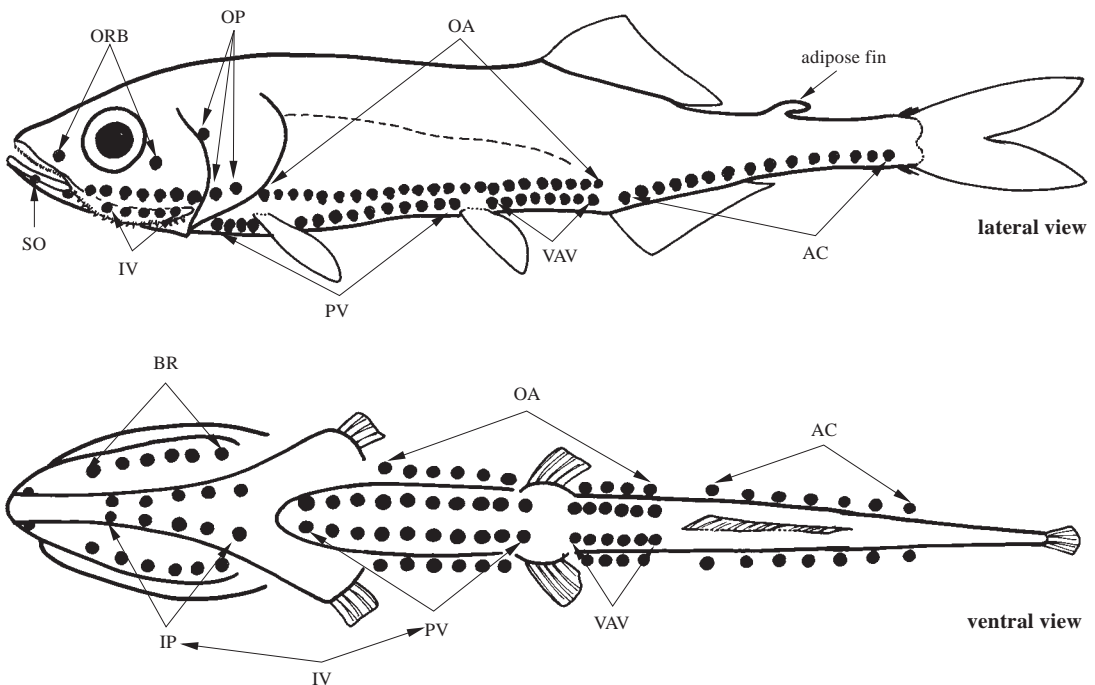
PHOSICHTHYIDAE

(= PHOTICHTHYIDAE)

Lightfishes, lighthousefishes

by A.S. Harold, Grice Marine Laboratory, Department of Biology, College of Charleston, Charleston, SC, USA

D **Diagnostic characters:** Maximum size about 32 cm. Body generally moderately elongate, somewhat deep-bodied in some *Ichthyococcus* species, head small to moderately large. Head and body compressed. Mouth large; **teeth** ranging in size from small to large but **not highly elongate and fang-like**. **Chin barbel absent**. Eleven to 22 branchiostegal rays, 4 to 7 on posterior ceratohyal. **Gill rakers well developed (but true gill rakers restricted to angle of arch in *Woodsia*)**. Pseudobranchiae absent, except *Woodsia meyerwardeni*. **Dorsal fin usually near middle of body, its origin well in advance of that of anal fin (except *Pollichthys* which has dorsal-fin origin immediately above that of anal fin)**. **Dorsal adipose fin present (except *Yarrella*)**. Anal fin with moderately long base but terminating posteriorly ahead of most constricted portion of caudal peduncle. Dorsal fin with 10 to 16 rays; anal fin with 12 to 33 rays; caudal fin forked; pectoral-fin rays 7 to 11; pelvic-fin rays 6 to 8. Scales present, deciduous. Two ventrolateral rows of well-developed photophores on body, rows of accessory photophores dorsal to main rows in *Yarrella*; OA 17 to 53; IV 19 to 28; VAV 7 to 17; AC 12 to 28; **paired row of photophores on isthmus (IP); 2 orbital photophores, except *Polymetme* and *Yarrella* which lack the posterior (ORB 2)**. Three pectoral-fin radials. Usually 2 supramaxillae. **Colour:** skin varying from light brown in *Pollichthys* to dark brown or nearly black in *Yarrella*.



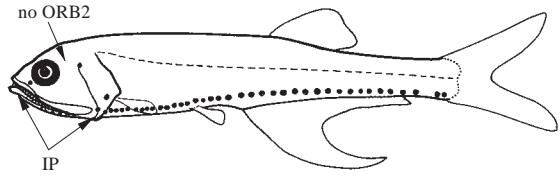
- | | |
|---|---|
| AC – ventral series posterior to anal-fin origin | OP – opercular photophores |
| BR – on branchiostegal membranes | ORB – anterior (ORB 1) and posterior (ORB 2) to eye |
| IP – ventral series anterior to pectoral-fin base | PV – ventral series between bases of pectoral and pelvic fins |
| IV – ventral series anterior to pelvic-fin base | SO – paired photophores near symphysis of lower jaw |
| OA – lateral series | VAV – ventral series between pelvic-fin base and origin of anal fin |

abbreviated terminology of photophores

Habitat, biology, and fisheries: Mesopelagic and bathypelagic adults (*Yarella* and *Polymetme* may be benthopelagic). Larvae nearer surface than adults. Diet consists mainly of zooplankton, crustaceans in particular.

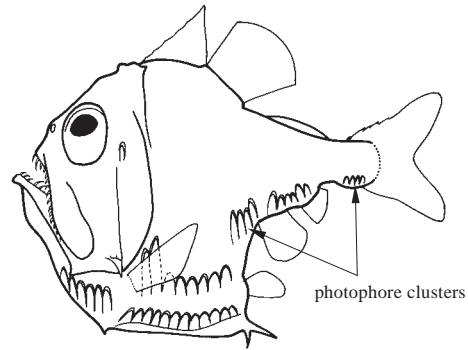
Similar families occurring in the area

Gonostomatidae: photophores present on isthmus (IP) (*Diplophos*, *Manducus* and *Triplophos*) or absent (*Bonapartia*, *Cyclothone*, *Gonostoma* and *Margrethia*); posterior orbital (ORB2) photophore absent; 4 bony pectoral-fin radials.

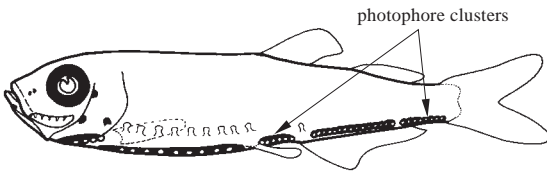


Gonostomatidae

Sternoptychidae: pseudobranch present; ventral photophore series with clusters of 2 or more photophores; posterior orbital (ORB2) photophore absent; 4 bony pectoral-fin radials.



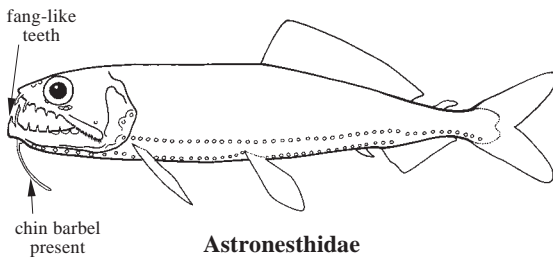
Sternoptychidae



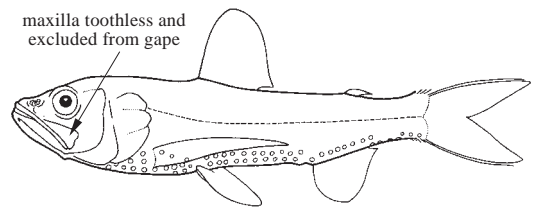
Sternoptychidae

Astronesthidae, Chauliodontidae, Idiacanthidae, Malacosteidae, Melanostomiidae and Stomiidae: similar arrangement of photophores but body generally more elongate; chin barbel usually present but reduced or absent in Chauliodontidae, absent in males of Idiacanthidae, and absent in *Photostomias* and *Malacosteus* (Malacosteidae); jaw teeth greatly enlarged, fang-like; gill rakers absent in adults.

Myctophidae and Neoscopelidae: maxilla toothless and completely excluded from gape by premaxilla.



Astronesthidae



Neoscopelidae

Key to the genera occurring in the area (adapted from Grey, 1964 and Badcock, 1984)

- 1a. Two ORB photophores, 1 anteroventral, 1 midventral to posteroventral to eye; premaxillary teeth uniserial → 2
- 1b. One ORB photophore, anteroventral to eye; premaxillary teeth biserial → 5

- 2a. Anal-fin origin beneath or slightly behind vertical through posteriormost dorsal-fin ray base; BR photophores 8 or 9 → 3
- 2b. Anal-fin origin well behind posteriormost dorsal-fin ray base; BR photophores 11 to 18 → 4

- 3a. Anal- and dorsal-fin bases about equal in length (Fig. 1); anal-fin rays 12 to 16; AC photophores 12 to 16, with 6 or 7 over anal fin ***Vinciguerria***
- 3b. Anal-fin base length more than twice that of dorsal-fin (Fig. 2); anal-fin rays 22 to 30; AC photophores 19 to 21, with 13 to 15 over anal fin. ***Pollichthys***

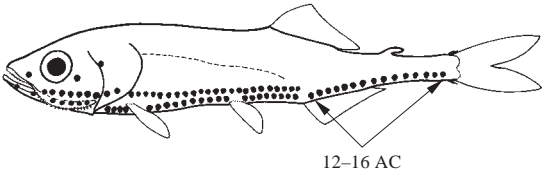


Fig. 1 *Vinciguerria*

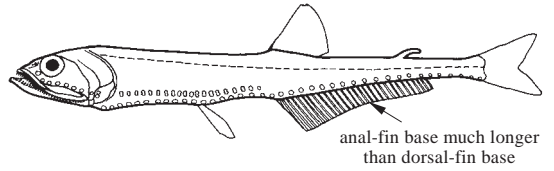


Fig. 2 *Pollichthys*

- 4a. Pelvic-fin base posterior to vertical through dorsal-fin origin (Fig. 3); posterior ORB photophore midventral to eye; eyes tubular; dorsal adipose-fin base long, about length of anal-fin base ***Ichthyococcus***
- 4b. Pelvic-fin base anterior to dorsal-fin origin (Fig. 4); posterior ORB photophore posteroventral to eye; eyes lateral, not tubular; dorsal adipose-fin base short, much shorter than anal-fin base length ***Woodisia***

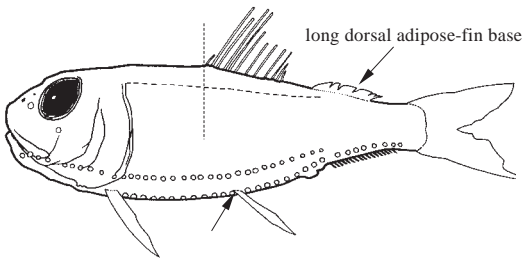


Fig. 3 *Ichthyococcus*

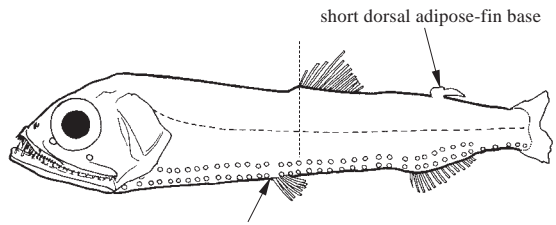


Fig. 4 *Woodisia*

- 5a. Body with 2 rows of serial photophores; dorsal adipose fin present (Fig. 5); VAV photophores 7 or 8; ninth or tenth IV photophore elevated; 1 or 2 anterior AC photophores elevated; dorsal-fin rays 11 to 13 ***Polymetme***
- 5b. Body with more than two rows of serial photophores; dorsal adipose fin absent (Fig. 6); VAV photophores 9 to 12; IV and AC photophore series straight, no photophores elevated; dorsal-fin rays 14 to 17 ***Yarella***

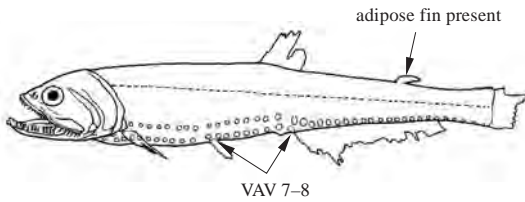


Fig. 5 *Polymetme*

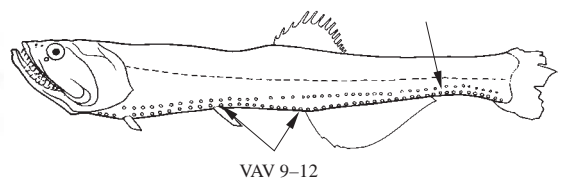


Fig. 6 *Yarella*

List of species occurring in the area

- Ichthyococcus ovatus* (Cocco, 1838). To 6 cm. Circumglobal, subtropical to temperate; Areas 34 and N 47.
- Ichthyococcus polli* Blanche, 1964. To 9 cm. Equatorial Atlantic; Areas S 34, N 47.
- Phosichthys argenteus* Hutton, 1872. To 26 cm. S Atlantic, Pacific; Area NE 47.
- Pollichthys mauli* (Poll, 1953). To 6 cm. Subtropical to temperate Atlantic, W Pacific; Areas 34, N 47.
- Polymetme thaeocoryla* Parin and Borodulina, 1990. To 22 cm. Tropical to temperate Atlantic.
- Vinciguerria attenuata* (Cocco, 1838). To 5 cm. Tropical and subtropical Atlantic; Areas 34, N 47.
- Vinciguerria nimbaria* (Jordan and Williams in Jordan and Starks, 1895). To 5 cm. Tropical and subtropical Atlantic, W Indian; Areas 34, 47.
- Vinciguerria poweriae* (Cocco, 1838). To 4 cm. Tropical to temperate N Atlantic, Pacific; Area 34.
- Woodsia nonsuchae* (Beebe, 1932). To 9 cm. Subtropical N Atlantic, E Pacific.
- Yarrella blackfordi* Goode and Bean, 1896. To 32 cm. Tropical and subtropical Atlantic; Areas 34, N 47.

References

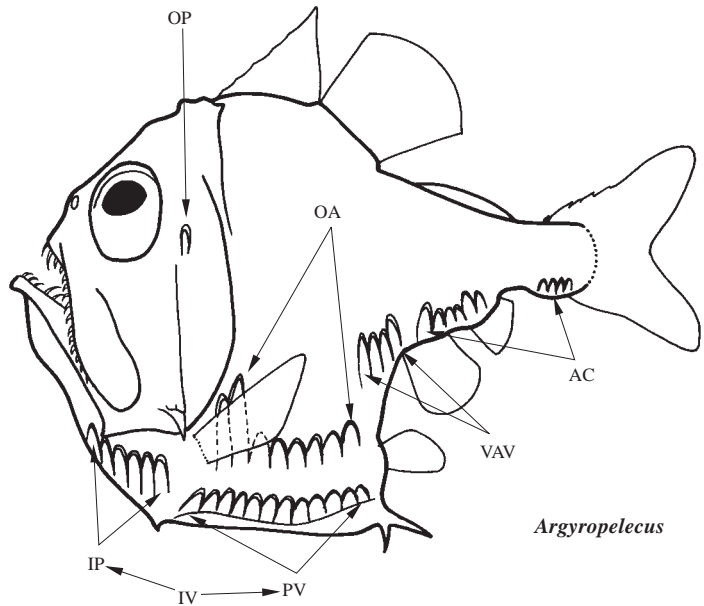
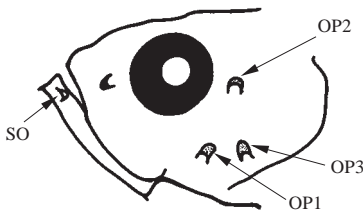
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STERNOPTYCHIDAE

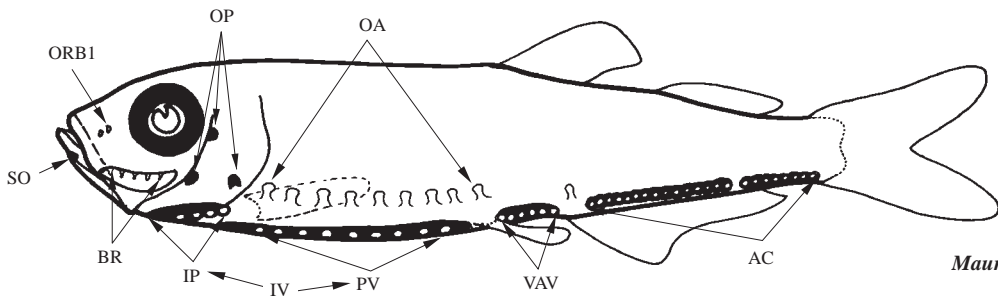
Hatchetfishes

by A.S. Harold, Grice Marine Laboratory, Department of Biology, College of Charleston, Charleston, SC, USA

Diagnostic characters: Maximum size about 10 cm. Elongate to deep-bodied. Head moderate to very large, more than one-third of standard length in *Sternoptyx*. Eye large, up to about half of head length, directed vertically and telescopic in some *Argyropelecus*. Snout short. **Mouth** small to moderate in size, terminal, **oblique to nearly vertical**; jaw teeth generally small, some *Argyropelecus* species with well-developed canine teeth. Chin barbel absent. Branchiostegals 6 to 10. **Pseudobranch present. Gill rakers well developed.** Dorsal-fin origin usually near middle of body (anterior in *Danaphos*, posterior in *Araiophos*). Anal fin moderate to long-based, interrupted centrally by a group of photophores in some genera (e.g. *Argyripnus*, *Argyropelecus*, *Polyipnus*). Dorsal fin with 6 to 20 soft rays; anal fin with 17 to 38 soft rays; caudal fin forked; pectoral fin with 11 to 18 soft rays; pelvic fins with 5 to 7 soft rays. Dorsal adipose fin usually present. Scales present, deciduous. **Ventral photophore series with disjunct clusters of 2 or more photophores.** Two ventrolateral rows of photophores on body; OA 0 to 10; IV 10 to 24; VAV 3 to 32; AC 3 to 51; paired row of photophores on isthmus (IP); branchiostegal photophores 6 (7 in *Sonoda*); 1 orbital photophore present (ORB 1), posterior orbital photophore (ORB 2) absent. **Three branchiostegal rays originating on posterior ceratohyal.** Four pectoral-fin radials. **Colour:** skin light to dark brown, often with reflective guanine pigment on side of body; silvery and black pigmentation usually associated with photophores. Some species with dark dorsum pigment and/or with saddle-like markings and lateral bars or incomplete stripes as in *Polyipnus*.



Argyropelecus



Maurolicus

- | | |
|---|---|
| AC – ventral series posterior to anal-fin origin | OP – opercular photophores |
| BR – on branchiostegal membranes | ORB1 – anterior to eye |
| IP – ventral series anterior to pectoral-fin base | PV – ventral series between bases of pectoral and pelvic fins |
| IV – ventral series anterior to pelvic-fin base | SO – paired photophores near symphysis of lower jaw |
| OA – lateral series | VAV – ventral series between pelvic-fin base and origin of anal fin |

abbreviated terminology of photophores

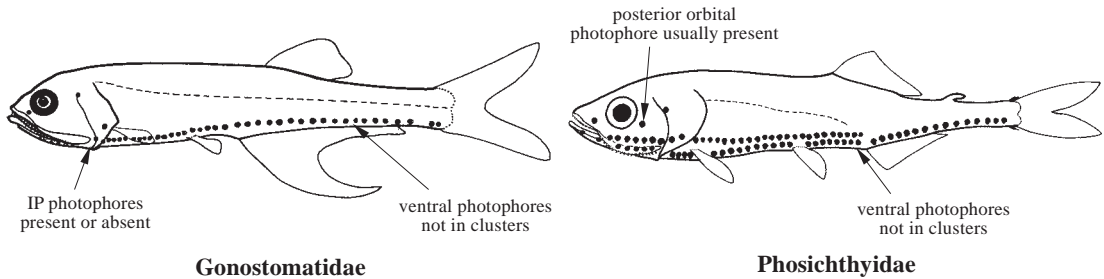
Habitat, biology, and fisheries: Mainly mesopelagic as adults, occasionally bathypelagic or benthopelagic (*Argyripnus*, *Sonoda*, *Polyipnus*). Development, especially of photophores, protracted. Diet consists of small fishes and zooplankton, including crustaceans, annelids, chaetognaths, and molluscs.

Remarks: The family Sternoptychidae, as recognized here, is consistent with Weitzman's (1974) revision. The elongate species had previously (Grey, 1964) been placed with the Gonostomatidae, with which they bear superficial resemblance. Specialized photophore structure and other details of anatomy described by Weitzman (1974) indicated they should be placed with the deep-bodied hatchetfishes in an expanded Sternoptychidae.

Similar families occurring in the area

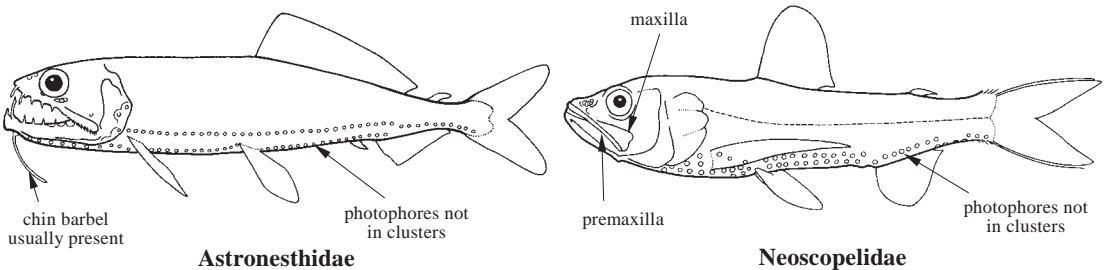
Gonostomatidae: pseudobranch usually absent (present in *Diplophos* and *Margrethia*); IP photophores present or absent (*Bonapartia*, *Cyclothone*, *Gonostoma* and *Margrethia*); postorbital photophore absent; ventral photophore series (PV, VAV, AC) not in clusters.

Phosichthyidae: pseudobranch absent; usually 2 orbital photophores but postorbital (ORB2) lacking in *Polymetme* and *Yarella*; ventral photophore series not in clusters; 3 bony pectoral-fin radials.



Astronesthidae, Chauliodontidae, Idiacanthidae, Malacosteidae, Melanostomiidae and Stomiidae: similar arrangement of photophores, although not in clusters; body generally more elongate; chin barbel usually present but reduced or absent in Chauliodontidae, absent in males of Idiacanthidae, and absent in *Photostomias* and *Malacosteus* (Malacosteidae); jaw teeth greatly enlarged, fang-like; gill rakers absent in adults; usually 3 bony pectoral-fin radials.

Myctophidae and Neoscopelidae: maxilla toothless and completely excluded from gape by premaxilla. Photophores, when present, not in clusters.



Key to the genera of Sternoptychidae occurring in the area (modified from Badcock, 1984)

- 1a. Body laterally compressed, deep, greatest body depth 0.8 to 2.0 times in standard length; exposed bony dorsal blade ahead of dorsal fin; iliac ("postabdominal") spines present → 2
- 1b. Body fusiform, greatest body depth 3.7 to 7.7 times in standard length; dorsal blade and iliac spines absent → 4

- 2a. Eyes tubular, directed dorsally (Fig. 1); PV photophores 12 . . . ***Argyropelecus***
- 2b. Eyes not tubular, directed laterally; PV photophores 10 → 3
- 3a. Dorsal blade a single median flattened spine and prominent; BR photophores 3, IP 5 (Fig. 2) . . . ***Sternoptyx***
- 3b. Dorsal blade comprising 2 posteriorly-directed spines, reduced; BR photophores 6, IP 6 (Fig. 3) → ***Polyipnus***

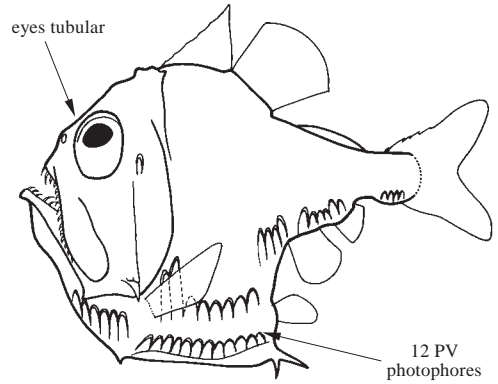


Fig. 1 *Argyropelecus*

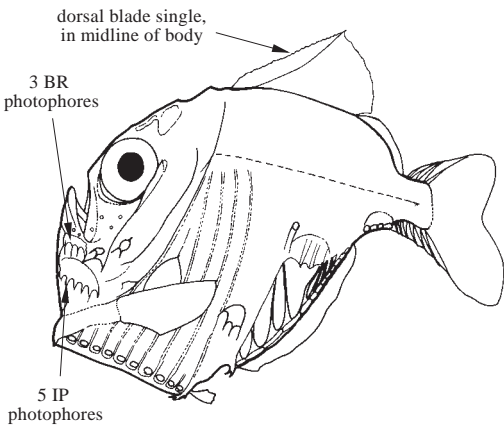


Fig. 2 *Sternoptyx*

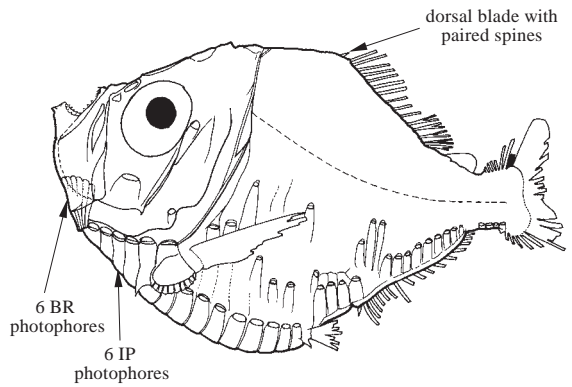


Fig. 3 *Polyipnus*

- 4a. AC photophores in 3 to 6 groups, each of 2 to 4 photophores (Fig. 4); IP in 2 groups, of 3 and 4 photophores; gill rakers on first arch 12 or 13 on lower limb and 2 to 4 on upper limb, total 14 to 16 . . . ***Valenciennellus***
- 4b. AC with 2 or 3 groups of 5 or more photophores; IP in a single group of 6 (rarely 7) photophores; gill rakers on first arch 11 to 22 on lower limb and 3 to 8 on upper limb, total 15 to 30 → 5

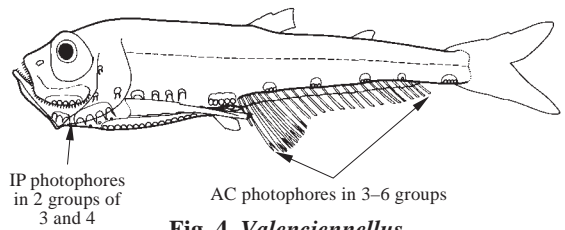


Fig. 4 *Valenciennellus*

- 5a. Dorsal-fin origin behind middle of body (Fig. 5); anal fin not divided by a cluster of AC photophores into 2 distinctly separate parts; SO photophore present; OP 3 similar to other OP photophores, directed ventrally ***Maurolicus***
- 5b. Dorsal-fin origin at or ahead of middle of body; anal fin divided by a cluster of AC photophores into 2 distinctly separate parts (Fig. 6); SO photophore absent; OP3 greatly enlarged relative to other OP photophores, elongated dorsoventrally ***Argyripnus***

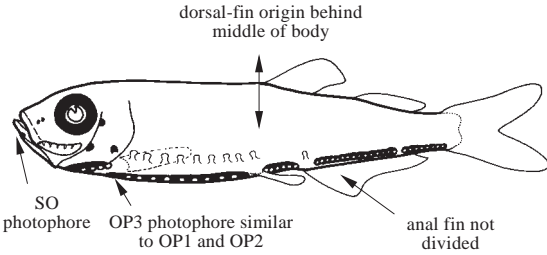


Fig. 5 *Maurolicus*

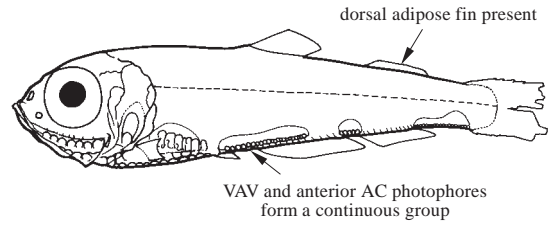


Fig. 6 *Argyripnus*

List of species occurring in the area

- Argyripnus atlanticus* Maul, 1952. To 7 cm. Subtropical to temperate N Atlantic; Area NE 34.
- Argyropelecus aculeatus* Valenciennes in Cuvier and Valenciennes, 1850. To 8 cm. Circumglobal, tropical to temperate; Area N 34.
- Argyropelecus affinis* Garman, 1899. To 8 cm. Circumglobal, tropical to temperate; Areas S 34, N 47.
- Argyropelecus gigas* Norman, 1930. To 12 cm. Circumglobal, tropical to temperate, except N Pacific; Areas 34, N 47.
- Argyropelecus hemigymnus* Cocco, 1829. To 4 cm. Circumglobal, tropical to temperate; Areas 34, NE 47.
- Argyropelecus sladeni* Regan, 1908. To 7 cm. Circumglobal, tropical to temperate, except equatorial E Pacific; Areas S 34, N 47.
- Maurolicus amethystinopunctatus* Cocco, 1838. To 5 cm. Subtropical to temperate eastern N Atlantic; Area 34.
- Maurolicus walvisensis* Parin and Kobylansky, 1993. To 5 cm. Eastern S Atlantic and E Indian; Areas 34 and 47.
- Maurolicus weitzmani* Parin and Kobylansky, 1993. To 5 cm. Disjunct western N Atlantic and Equatorial Atlantic; Areas S 34, N 47.
- Polyipnus polli* Schultz, 1961. To 5 cm. Equatorial to tropical central and E Atlantic; S 34, NE 47.
- Sternoptyx diaphana* Hermann, 1781. To 5 cm. Circumglobal, tropical to temperate; Areas 34, N 47.
- Sternoptyx pseudodiaphana* Borodulina, 1977. To 6 cm. Circumglobal, tropical to temperate; Area S 47.
- Sternoptyx pseudobscura* Baird, 1971. To 6 cm. Circumglobal, tropical to temperate; Areas N 34, SE 34, NE 47, SE 47.
- Valenciennellus tripunctulatus* (Esmark, 1871). To 8 cm. Tropical to temperate Atlantic and Pacific; Areas 34, 47.

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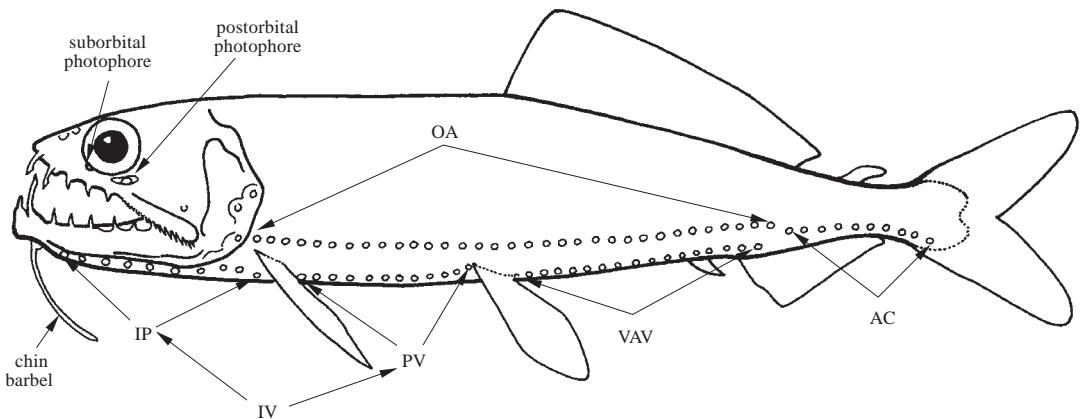
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ASTRONESTHIDAE

Snaggletooths

by A.S. Harold, Grice Marine Laboratory, Department of Biology, College of Charleston, Charleston, SC, USA

Diagnostic characters: Maximum size about 41 cm, but rare at lengths greater than 15 cm. Body fusiform and slightly compressed. Head moderately large, about 25% of standard length. Eye small, less than one-quarter of head length. Snout short to moderate, its length at most twice eye diameter. Mouth large with a small number of teeth ranging in size from small to large and fang-like. Vomerine and palatine teeth present. **Chin barbel present;** terminal bulb present or absent. Branchiostegal rays 14 to 25. **Gill rakers rudimentary in adults. Dorsal fin usually near middle of body, its origin about over pelvic fins.** Anal fin terminating posteriorly on constricted portion of caudal peduncle. Dorsal fin with 9 to 21 rays; anal fin with 12 to 28 rays; caudal fin forked; pectoral fin with 6 to 9 rays; pelvic fin with 5 to 9 rays. **Dorsal adipose fin present (except in *Rhadinesthes*).** Scales absent, no hexagonal areas on body. Two ventrolateral rows of photophores on body; OA 11 to 56; IV 9 to 46; VAV 7 to 28; AC 6 to 18; **anterior portion of lower row (PV) curving upward at pelvic-fin base and appearing disjunct from posterior portion of row (VAV);** row of photophores on isthmus (IP); many small photophores covering much of body and head, their greatest concentration ventrally; suborbital photophore small, inconspicuous, located at anteroventral margin of eye; **postorbital photophore prominent, located posteroventrally to eye.** Three pectoral-fin radials. Stomach usually large and black, intestine originating near its anterior end; 1 or 2 pyloric caecae present. **Colour:** skin usually black, silvery pigmentation occasionally present on flank; **patches of luminous tissue on body in many species.**



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|---|---|
| AC – ventral series posterior to anal-fin origin | OA – lateral series |
| IP – ventral series anterior to pectoral-fin base | PV – ventral series between bases of pectoral and pelvic fins |
| IV – ventral series anterior to pelvic-fin base | VAV – ventral series between pelvic-fin base and origin of anal fin |

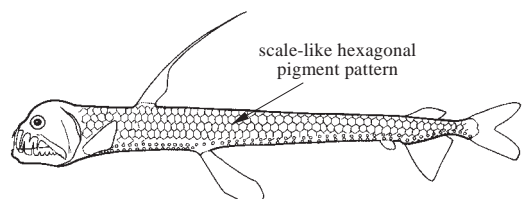
abbreviated terminology of photophores

Habitat, biology, and fisheries: Mainly mesopelagic adults (some species benthopelagic), juveniles have been caught at the surface at night. Diet consists of other mesopelagic fishes and crustaceans.

Remarks: Snaggletooths currently considered as a subfamily (Astronesthinae) of Stomiidae by Eschmeyer's Catalog of Fishes. Family designations made by the author at the time of writing have been retained for this sake of organization.

Similar families occurring in the area

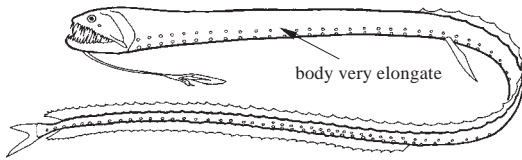
Chauliodontidae: chin barbel reduced or absent in adults; dorsal fin anteriorly positioned, its origin about one head length behind pectoral girdle; scale-like hexagonal pigment pattern on body.



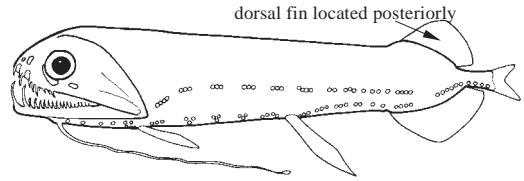
Chauliodontidae

Idiacanthidae: body highly elongate, eel-like; dorsal fin with very long base (54 to 74 rays).

Malacosteidae: no membrane in floor of mouth; dorsal fin located posteriorly, just ahead of caudal fin and above anal fin.



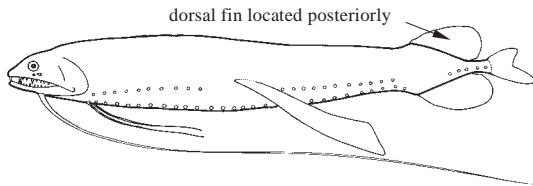
Idiacanthidae



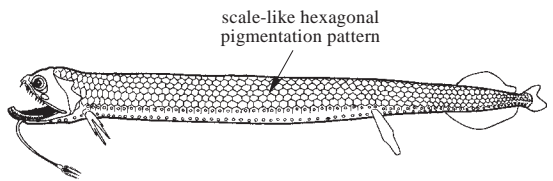
Malacosteidae

Melanostomiidae: dorsal fin located posteriorly, just ahead of caudal fin and above anal fin.

Stomiidae: scale-like hexagonal pigment pattern on body; dorsal fin located posteriorly, just ahead of caudal fin and above anal fin.



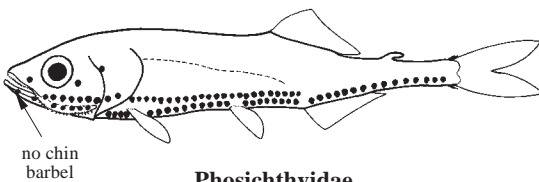
Melanostomiidae



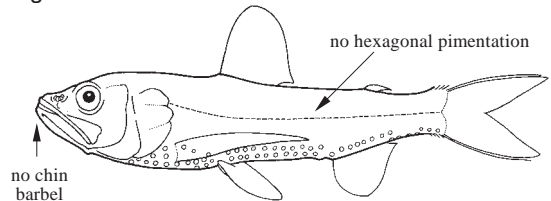
Stomiidae

Gonostomatidae, Phosichthyidae and Sternoptychidae: these remaining stomiiform families often with somewhat similar body form, but have gill rakers as adults and lack the hexagonal pigmentation pattern, chin barbels and enlarged, fang-like jaw teeth.

Myctophidae and Neoscopelidae: myctophiform families with photophores but with less elongate bodies, no chin barbels, and maxilla toothless and completely excluded from gape by premaxilla. Ventral photophores usually more widely spaced and not arranged in such regular rows as in Astronesthidae.



Phosichthyidae



Neoscopelidae

Key to genera and species occurring in the area (adapted from Gibbs, 1964, 1984)

1a. Anal-fin rays 22 to 27; snout appearing upturned at tip; gill bars with closely-spaced needle-like spines anteriorly along their length (Fig. 1) ***Neonesthes capensis***

1b. Anal-fin rays 20 or fewer; snout not appearing upturned at tip; gill bars with separated groups of short spines anteriorly along their length (Fig. 2) → 2

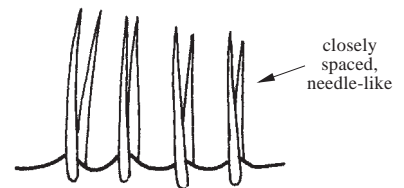


Fig. 1 gill bars (*Neonesthes*)

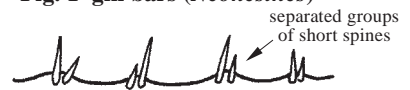


Fig. 2 gill bars

- 2a. Ventral series of photophores arranged in irregular groups of 1 to 5; PV photophores more than 32; OV more than 33 ***Heterophotus ophistoma***
- 2b. Ventral series of photophores arranged in regular, continuous rows; PV photophores 26 or fewer; OV 24 or fewer → 3

- 3a. Teeth on maxilla (posterior portion of upper jaw), comb-like, closely spaced, slanting backward (Fig. 3) ***Astronesthes***
- 3b. Teeth on maxilla slender, distinctly separated, not slanting backward → 4

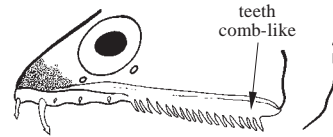


Fig. 3 teeth on maxilla (*Astronesthes*)

- 4a. Greatest body depth less than 10% standard length; teeth in jaws all short and slender, no large fang-like teeth (Fig. 4); dorsal adipose fin absent ***Rhadinesthes decimus***
- 4b. Greatest body depth almost always greater than 10% standard length; long, fang-like teeth in anterior portion of upper and lower jaws; dorsal adipose fin present ***Borostomias***

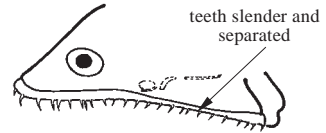


Fig. 4 teeth on maxilla (*Rhadinesthes decimus*)

List of species occurring in the area

- Astronesthes atlanticus* Parin and Borodulina, 1996. To 16 cm. Tropical and subtropical Atlantic; Areas 34, 47.
- Astronesthes caulophorus* Regan and Trewavas, 1929. To 26 cm. Endemic to eastern N and S Atlantic; endemic in Areas 34, 47.
- Astronesthes cyclophotus* Regan and Trewavas, 1929. To 6 cm. Subtropical to temperate N Atlantic; Area NW 34 only. Questionably a synonym of *A. neopogon*.
- Astronesthes decoratus* Parin and Borodulina, 2002. To 10 cm. Equatorial E and SE Atlantic; Areas S 34, 47.
- Astronesthes gemmifer* Goode and Bean, 1896. To 17 cm. Circumglobal; Areas 34, NW 47.
- Astronesthes haplophos* Parin and Borodulina, 2002. To 9 cm. Eastern central Atlantic; Area SW 34.
- Astronesthes indicus* Brauer, 1902. To 18 cm. Circumglobal; Area 34.
- Astronesthes karsteni* Parin and Borodulina, 2002. To 10 cm. Eastern central Atlantic; Area SW 34.
- Astronesthes leucopogon* Regan and Trewavas, 1929. To 12 cm. Eastern Atlantic; Areas 34, 47.
- Astronesthes macropogon* Goodyear and Gibbs, 1970. To 16 cm. Tropical to subtropical N and S Atlantic; Areas 31, 34, N 41, N 47.
- Astronesthes micropogon* Goodyear and Gibbs, 1970. To 8 cm. Tropical and subtropical Atlantic; Areas 34, W 47.
- Astronesthes neopogon* Regan and Trewavas, 1929. To 19 cm. Temperate N Atlantic; N 34 only.
- Astronesthes niger* Richardson, 1845. To 16 cm. Tropical to temperate Atlantic; Areas 34, 47.
- Astronesthes richardsoni* (Poey, 1852). To 16 cm. Tropical to subtropical N Atlantic; Areas 34, N 47.
- Astronesthes zharovi* Parin and Borodulina, 1998. To 11 cm. Tropical Atlantic; Areas S34, N 47.
- Borostomias antarcticus* (Lönnberg, 1905). To 31 cm. N Atlantic and circumglobal Southern Ocean; Areas 34, 47.
- Borostomias elucens* (Brauer, 1906). To 34 cm. Circumglobal, tropical; Areas 34, N 47.
- Borostomias mononema* (Regan and Trewavas, 1929). To 31 cm. Subtropical to temperate N and S Atlantic, W Indian Ocean; Areas 34, N 47.
- Heterophotus ophistoma* Regan and Trewavas, 1929. To 36 cm. Tropical to subtropical N Atlantic; Areas 34, 47.

Neonesthes capensis (Gilchrist and von Bonde, 1924). To 17 cm. Tropical to temperate Atlantic, Indian and Pacific Oceans; Areas 34, 47.

Neonesthes microcephalus Norman, 1930. To 17 cm. Eastern S Atlantic and central Pacific; Areas 34, 47.

Rhadinesthes decimus (Zugmayer, 1911). To 41 cm. Temperate N Atlantic; Areas 34, 47.

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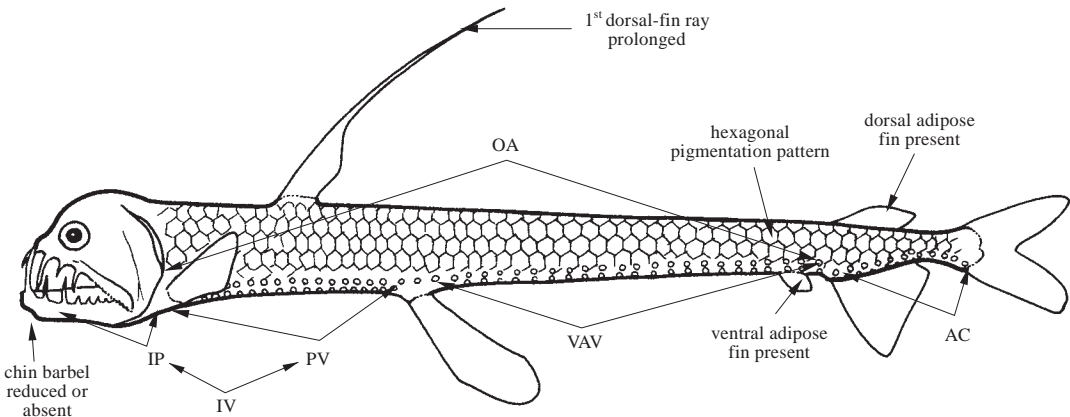
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CHAULIODONTIDAE

Viperfishes

by A.S. Harold, Grice Marine Laboratory, Department of Biology, College of Charleston, Charleston, SC, USA

D **Diagnostic characters:** Maximum size about 30 cm standard length. Body long, slender, covered by a gelatinous membrane (usually lost during capture) with luminous inclusions, maximum depth of body at back of head. Head short and about as deep as long. Eye diameter about 4 times into head length. Snout short, its length less than eye diameter. Mouth large with numerous very large teeth on premaxilla and dentary, some greatly elongated, fang-like, and extending over front of head to above eye when mouth is closed; posterior half of maxilla with numerous minute teeth. Vomerine teeth absent. Palatine teeth present. Chin barbel short and simple, reduced or absent during development. Branchiostegal rays 12 to 21. Gill rakers represented by tooth plates only. Dorsal fin near head, its origin about half way between that of pectoral and pelvic fins. First dorsal-fin ray prolonged. Anal fin located posteriorly, near caudal fin. Dorsal fin with 5 to 7 soft rays; anal fin with 10 to 13 soft rays; caudal fin forked; pectoral-fin rays 9 to 14; pelvic fin with 6 to 8 soft rays. Dorsal and ventral adipose fins present. Five longitudinal rows of scales covering body, delineated by hexagonal pigmentation pattern. Two ventrolateral rows of photophores on body; OA 39 to 50; IV 25 to 34; VAV 22 to 30; AC 8 to 13; paired row of photophores on isthmus (IP); one or more small photophores associated with each hexagonal area on body; suborbital and postorbital photophores present. Premaxillae not protractile. Three pectoral-fin radials. **Colour:** iridescent silver-grey to silver-blue in some species; body scales delineated by hexagonal pigmentation pattern.



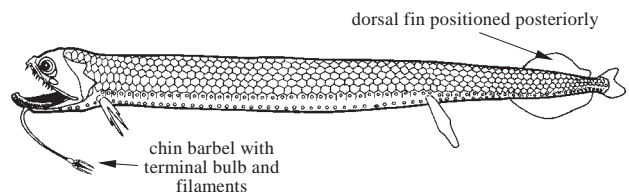
- AC – ventral series posterior to anal-fin origin
- IP – ventral series anterior to pectoral-fin base
- IV – ventral series anterior to pelvic-fin base
- OA – lateral series
- PV – ventral series between bases of pectoral and pelvic fins
- VAV – ventral series between pelvic-fin base and origin of anal fin

abbreviated terminology of photophores

Habitat, biology, and fisheries: Meso- to bathypelagic, to 2 800 m maximum, in open ocean; juveniles undergo vertical migration to near surface at night. Diet consists of other fishes and crustaceans.

Remarks: Viperfishes currently considered as a tribe under subfamily Stomiinae in family Stomiidae by Eschmeyer's Catalog of Fishes. Family designations made by the author at the time of writing have been retained for the sake of organization.

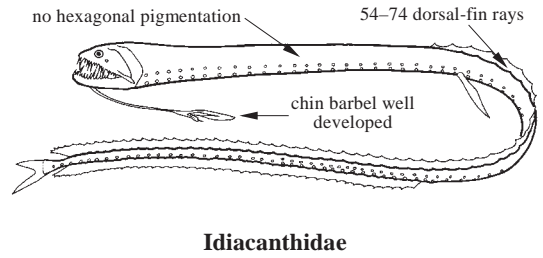
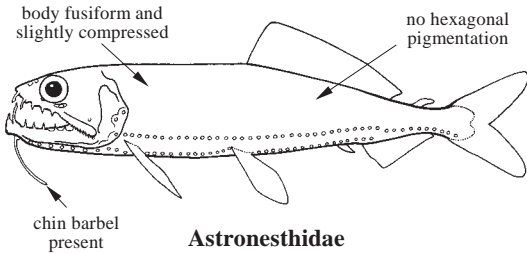
Similar families occurring in the area
Stomiidae: only other stomiiform family with hexagonal pigmentation pattern; body more elongate and slender; chin barbel present, with terminal bulb and filaments; dorsal fin located posteriorly, just ahead of caudal fin, and directly above anal fin; dorsal adipose fin absent.



Stomiidae

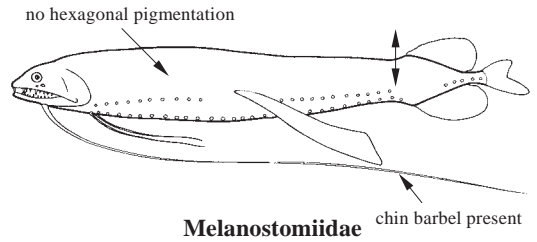
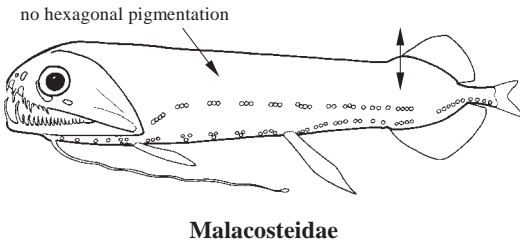
Astronesthidae: body fusiform and slightly compressed; chin barbel present, terminal bulb present or absent; dorsal fin near middle of body, origin well ahead of that of anal fin; no hexagonal pigment areas on body; anterior portion of ventral photophore row (PV) curving upward at pelvic-fin base.

Idiacanthidae: body elongate, eel-like; hexagonal pigmentation pattern not present on body; chin barbel well developed in females; dorsal fin with very long base (54 to 74 rays), its origin well anterior to midbody; bases of dorsal- and anal-fin rays with a small sharp spur; dorsal and ventral adipose fins absent; pectoral fins present in larvae, absent in adults; pelvic fins absent in males.



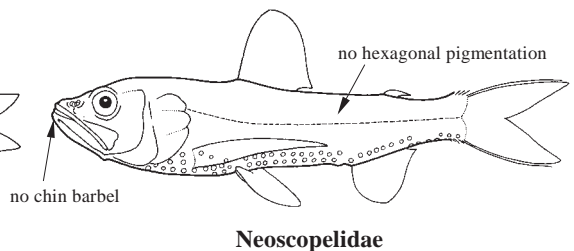
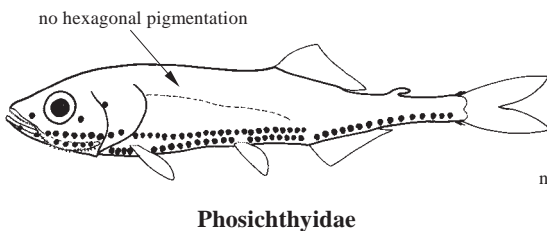
Malacosteidae: hexagonal pigmentation pattern not present on body; no membrane in floor of mouth; chin barbel present or absent; presence of preorbital light organ associated with suborbital organ (absent in *Photostomias*); dorsal fin located posteriorly, just ahead of caudal fin, and directly above anal fin; dorsal adipose fin absent; pectoral fins absent or consisting of only free, filamentous rays.

Melanostomiidae: hexagonal pigmentation pattern not present on body; maxillae with erect teeth anteriorly and small, oblique denticles posteriorly; chin barbel present, variable in length; pectoral fins present or absent.



Gonostomatidae, Phosichthyidae and Sternoptychidae: these remaining stomiiform families often with somewhat similar body form and photophore arrangement, but have gill rakers as adults and lack the hexagonal pigmentation pattern, chin barbel, and enlarged, fang-like jaw teeth.

Myctophidae and Neoscopelidae: myctophiform families with photophores but with less elongate body, lack a chin barbel at all stages, have gill rakers as adults, and the maxilla is toothless and completely excluded from the gape by the premaxilla; ventral photophores are usually more widely spaced and not arranged in such regular rows as in Chauliodontidae.



List of species occurring in the area

- Chauliodus danae* Regan and Trewavas, 1929. To 15 cm. Tropical to temperate N and S Atlantic, C and E Pacific.
- Chauliodus minimus* Parin and Novikova, 1974. To 15 cm. S Atlantic; Area 47; absent in Gulf of Guinea.
- Chauliodus schmidti* Ege, 1948. To 23 cm. Areas 34 and 47.
- Chauliodus sloani* Bloch and Schneider, 1801. To 30 cm. Circumglobal, tropical to temperate.

References

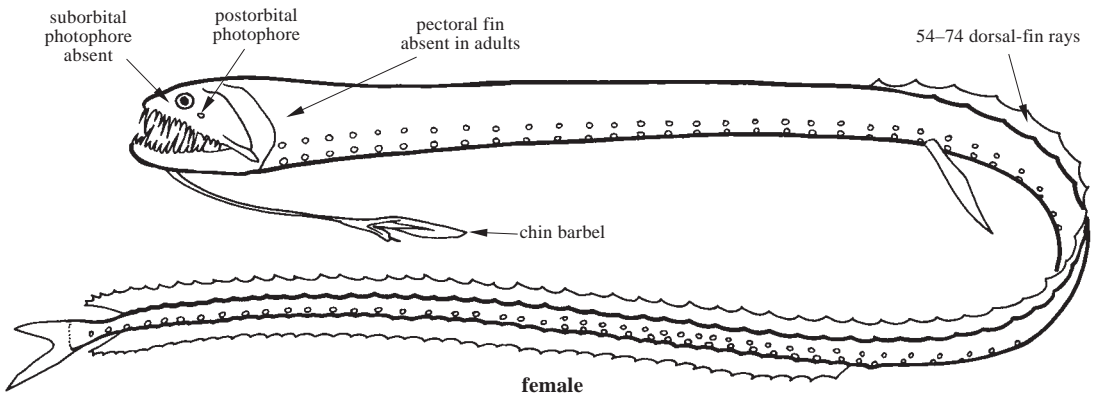
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IDIACANTHIDAE

Black dragonfishes

by A.S. Harold, Grice Marine Laboratory, Department of Biology, College of Charleston, Charleston, SC, USA

Diagnostic characters: Maximum size about 48 cm standard length for females, 7 cm for males. **Body markedly elongate, eel-like, slightly compressed.** Head small. Snout equal to or less than orbit diameter. Jaw teeth absent in males. Mouth large in adult females, with numerous barbed, hinged, fang-like teeth, variable in size; few teeth present on vomer and palatine. **Chin barbel length about twice head length in females, absent in males.** Gill arches without rakers or teeth. **Dorsal fin with very long base, its origin well anterior to midbody.** Anal-fin base about half the length of that of dorsal fin. Dorsal and anal fins terminating posteriorly on constricted portion of caudal peduncle. **Base of each dorsal- and anal-fin ray with a small, sharp spur.** Dorsal fin with 54 to 74 rays; anal fin with 29 to 49 rays; caudal fin forked; **pectoral fins present in larvae, absent in adults; pelvic fins with 6 rays in females, absent in males.** Dorsal adipose fin absent. Scales absent. Two main rows of photophores on body ventrolaterally (see family *Astronesthidae* family figure for definition of abbreviated terms); OA 52 to 61; IV 31 to 36; VAV 15 to 18; AC 13 to 18; paired row of photophores on isthmus (IP); small light organs scattered over head and body in patterns on each body segment; suborbital photophore absent; **postorbital photophore prominent, located posteroventrally, equal in size to eye in males, smaller in females.** Premaxillae not protractile. Gas bladder absent. **Colour:** skin usually black in females, males dark brown; hexagonal pigmentation pattern absent.

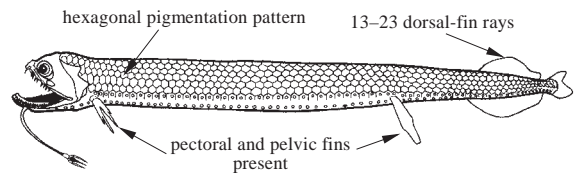


Habitat, biology, and fisheries: Meso- to bathypelagic, recorded to 2 000 m. Diet consists mainly of fishes. Markedly sexually dimorphic; males reaching about 15% of female body size, retaining some larval features; anterior anal-fin rays modified as intromittent organ. Eyes on the ends of long stalks in larvae.

Remarks: Black dragonfishes sometimes considered as a subfamily (*Idiacanthinae*) of *Stomiidae* by Eschmeyer's Catalog of Fishes. Family designations made by the author at the time of writing have been retained for the sake of organization.

Similar families occurring in the area

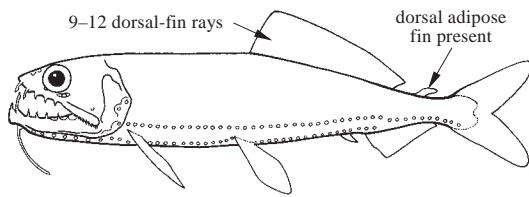
Stomiidae: hexagonal pigmentation pattern on body; dorsal fin short-based, located posteriorly, just ahead of caudal fin.



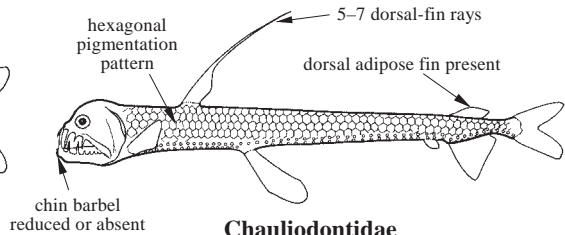
Stomiidae

Astronesthidae: dorsal-fin short-based, near middle of body (9 to 21 rays); dorsal adipose fin present; anterior portion of ventral photophore row (PV) curving upward at pelvic-fin base.

Chauliodontidae: chin barbel reduced or absent in adults; dorsal fin short-based (5 to 7 rays), located between pectoral and pelvic fins; dorsal adipose fin present; scale-like hexagonal pigmentation pattern on body.



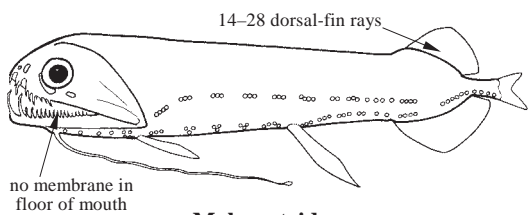
Astronesthidae



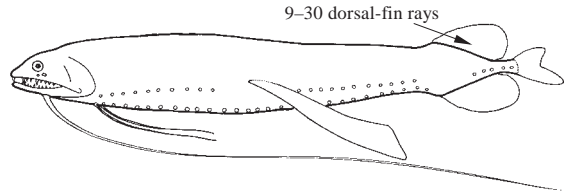
Chauliodontidae

Malacosteidae: no membrane in floor of mouth; dorsal fin short-based (14 to 28 rays), located posteriorly, over anal fin.

Melanostomiidae: dorsal fin short-based, located posteriorly, just ahead of caudal fin and above anal fin.



Malacosteidae



Melanostomiidae

List of species occurring in the area

Idiacanthus atlanticus Brauer, 1906. Females to 35 cm, males to 5 cm. Circumglobal in southern hemisphere, subtropical to temperate; Area 47.

Idiacanthus fasciola Peters, 1877. Females to 35 cm, males to 4 cm. Nearly circumglobal, absent in E Pacific, subtropical; Area NE 34.

References

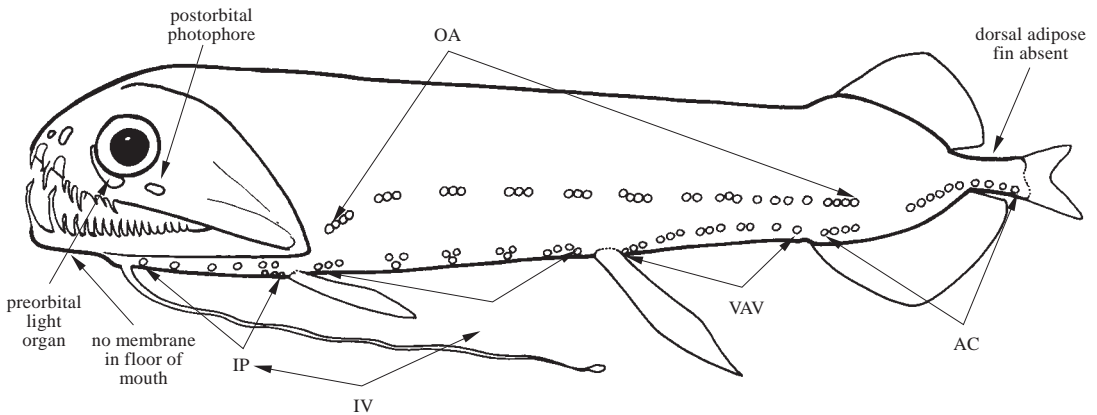
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MALACOSTEIDAE

Loosejaws

by A.S. Harold, Grice Marine Laboratory, Department of Biology, College of Charleston, Charleston, SC, USA

Diagnostic characters: Maximum size about 24 cm. Body elongate, compressed. Head and eye large relative to body. Snout usually quite short (elongate in *Aristostomias*). **Mouth large, jaws longer than skull, about 15 to 30% standard length; membranes forming floor of mouth absent.** Jaw teeth variable in size, some very large and barbed. Vomerine teeth absent. Palatine teeth present or absent. **Chin barbel present or absent.** Branchiostegal rays 9 to 15. **Gill arches without well-developed rakers.** **Dorsal fin located posteriorly near caudal fin and directly above anal fin.** Dorsal fin with 14 to 28 soft rays; anal fin with 17 to 32 soft rays; caudal fin small, forked; **pectoral fins absent or consisting of 2 to 17 soft rays;** pelvic fins at about midbody, with 5 to 9 soft rays. **Dorsal and ventral adipose fins absent.** Scales absent, no hexagonal areas on body. Two ventrolateral rows of photophores on body; OA 7 to 39; IC 12 to 22; paired row of photophores on isthmus (IP); many small light organs covering much of body and head; preorbital light organ present or absent; suborbital photophore present, varying in size from minute to very large, or absent; **postorbital photophore prominent, located posteroventrally to eye.** Premaxillae not protractile. First few vertebrae unossified. Stomach distensible, pigmented. Pyloric caecae present or absent. **Colour:** skin black to dark brown.



AC – ventral series posterior to anal-fin origin
IP – ventral series anterior to pectoral-fin base
IV – ventral series anterior to pelvic-fin base

OA – lateral series
PV – ventral series between bases of pectoral and pelvic fins
VAV – ventral series between pelvic-fin base and origin of anal fin

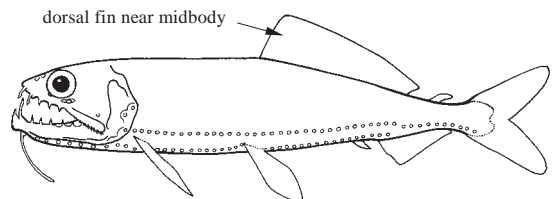
abbreviated terminology of photophores

Habitat, biology, and fisheries: Meso- to bathypelagic adults, at depths to 4 000 m. Diet consists of fishes and crustaceans. Floor of lower jaw lacks membranes, which allows the jaws to swing widely while feeding, hence the common name “loosejaws.”

Remarks: Loosejaws are currently considered as a subfamily (Malacosteinae) of Stomiidae by Eschmeyer's Catalog of Fishes. Family designations made by the author at the time of writing have been retained for the sake of organization.

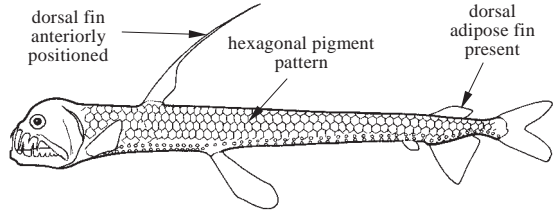
Similar families occurring in the area

Astronesthidae: membranes forming floor of mouth present; dorsal fin near middle of body; dorsal adipose fin usually present; anterior portion of ventral photophore row (PV) curving upward at pelvic-fin base.



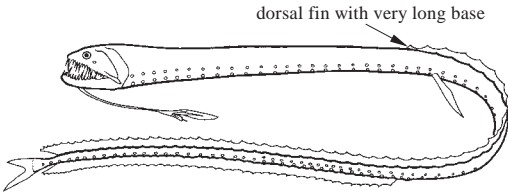
Astronesthidae

Chauliodontidae: membranes forming floor of mouth present; body elongate, maximum body depth at back of head; chin barbel reduced or absent in adults; dorsal fin anteriorly positioned between vertical through pectoral and pelvic-fin bases; hexagonal pigmentation pattern on body.



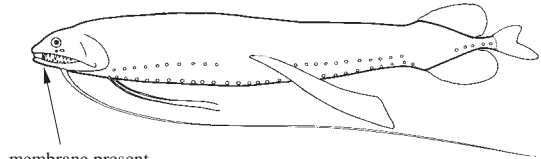
Chauliodontidae

Idiacanthidae: membranes forming floor of mouth present; body highly elongate, eel-like; dorsal fin with very long base, its origin anterior to midbody.



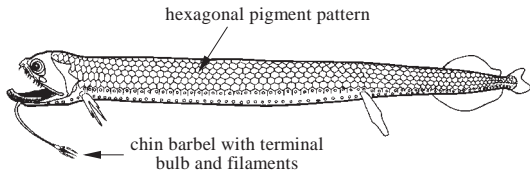
Idiacanthidae

Melanostomiidae: membranes forming floor of mouth present; maxillae with erect teeth anteriorly and small, oblique denticles posteriorly.



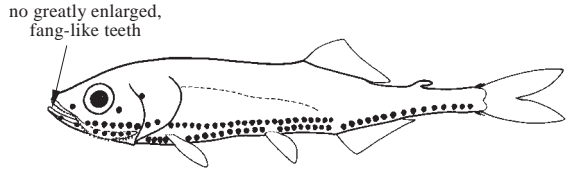
Melanostomiidae

Stomiidae: membranes forming floor of mouth present; chin barbel with terminal bulb and filaments; hexagonal pigmentation pattern on body.



Stomiidae

Gonostomatidae, Phosichthyidae and Sternoptychidae: membranes forming floor of mouth present; gill rakers present as adults; chin barbel absent; lack greatly enlarged, fang-like jaw teeth.



Phosichthyidae

Key to the genera of Malacosteidae occurring in the area (modified after Gibbs, 1984 and Goodyear and Gibbs, 1986)

- 1a. Pectoral fins present; suborbital photophore well-developed and crescentic → 2
- 1b. Pectoral fins absent; suborbital photophore small and elliptical in males, absent in females (Fig. 1) **Photostomias**

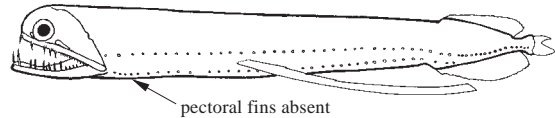


Fig. 1 *Photostomias*

- 2a. Chin barbel present (Fig. 2); snout longer than eye; pale luminous patches present on head, especially around eye; 2 pairs of nostrils on each side of snout. *Aristostomias*
- 2b. Chin barbel absent (Fig. 3); snout shorter than eye; no pale luminous patches on head; a single nostril on each side of snout *Malacosteus*

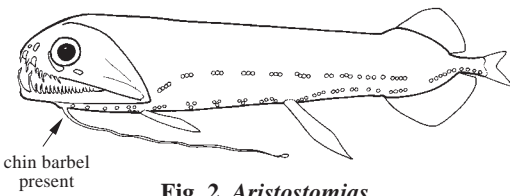


Fig. 2 *Aristostomias*

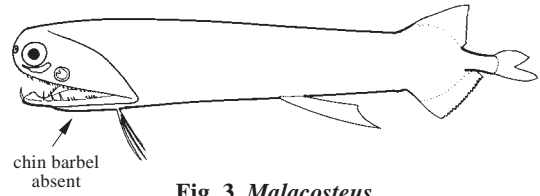


Fig. 3 *Malacosteus*

List of species occurring in the area

- Aristostomias grimaldii* Zugmayer, 1913. To 15 cm. Circumglobal, tropical to temperate; Area NW 34.
- Aristostomias lunifer* Regan and Trewavas, 1930. To 17 cm. Circumglobal, tropical to temperate; Area NE 34.
- Aristostomias polydactylus* Regan and Trewavas, 1930. To 22 cm. Circumglobal, tropical to temperate; Areas 34, NW 47.
- Aristostomias tittmanni* Welsh, 1923. To 9 cm. Tropical to temperate N Atlantic.
- Aristostomias xenostoma* Regan and Trewavas, 1930. To 13 cm. Circumglobal, tropical to subtropical; Areas 34, N 47.
- Malacosteus niger* Ayres, 1848. To 22 cm. Circumglobal, tropical to subarctic; Areas 34, N 47.
- Photostomias atrox* (Alcock, 1890). To 15 cm. Circumglobal, tropical to subtropical; Areas 34, 47.
- Photostomias goodyeari* Kenaley and Hartel, 2005. To 18 cm. Tropical to subtropical N Atlantic; Area 34.
- Photostomias guernei* Collett, 1889. To 16 cm. Subtropical to subarctic N and S Atlantic and Gulf of Mexico and Indo-West Pacific; Area 34.

References

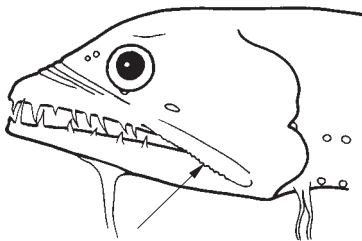
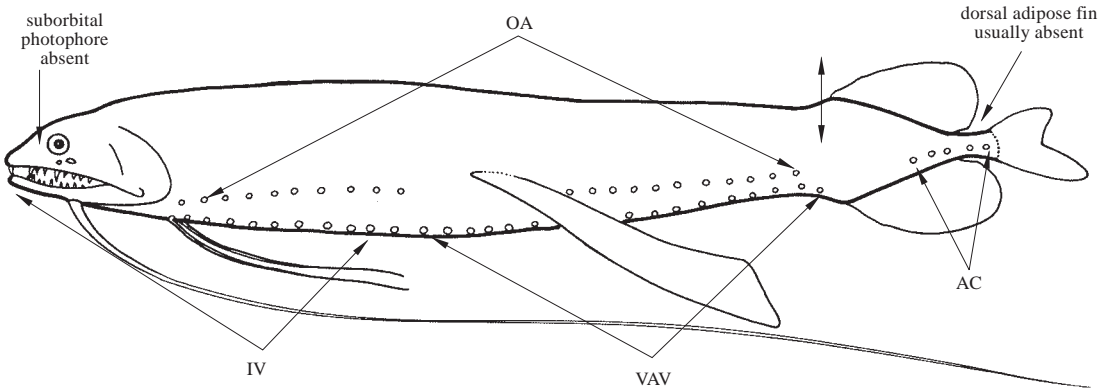
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MELANOSTOMIIDAE

Scaleless black dragonfishes

by A.S. Harold, Grice Marine Laboratory, Department of Biology, College of Charleston, Charleston, SC, USA

D **Diagnostic characters:** Maximum size about 50 cm standard length (to 40 cm. in the eastern central Atlantic). Body elongate, slender, slightly compressed (except *Bathophilus* in which the body is short and highly compressed). Head relatively small. Jaws large, their length about equal to that of head; membrane forming floor of mouth present. **Small, oblique denticles posteriorly on maxilla.** Vomerine and palatine teeth present or absent. **Chin barbel present; ranging widely in length, with or without branches or terminal elaborations.** Branchiostegal rays 8 to 22. **No true gill rakers,** arches with series of tooth plates only. **Dorsal fin located posteriorly near caudal fin and directly above anal fin.** Dorsal fin with 9 to 30 soft rays; anal fin with 9 to 46 soft rays; caudal fin small and forked; pectoral fins present or absent, 0 to 47 soft rays; pelvic fins present, usually with 7 soft rays, range 4 to 26. **Dorsal adipose fin absent (except in *Chirostomias*).** Scales absent, no hexagonal pigmentation areas on body. Two ventrolateral rows of prominent photophores on body, (reduced in some *Bathophilus* species); OA 18 to 72; IV 16 to 62; VAV 11 to 24; AC 5 to 25; paired row of photophores on isthmus (IP); many small photophores covering much of body and head, often occurring in vertical rows associated with segments of body musculature; preorbital photophore absent, except *Pachystomias*; **suborbital photophore absent; postorbital photophore usually present, located posteroventrally to eye, sometimes reduced or absent in females.** Anterior vertebrae at least slightly modified, allowing greater movement of head; highly reduced in some genera. Stomach long, moderately distensible, usually pigmented; typically 2 pyloric caecae present. **Colour:** skin usually black, sometimes iridescent silver, bronze, or green.



small oblique denticles on posterior portion of maxilla

lateral view of head

- AC – ventral series posterior to anal-fin origin
- IV – ventral series anterior to pelvic-fin base
- OA – lateral series
- VAV – ventral series between pelvic-fin base and origin of anal fin

abbreviated terminology of photophores

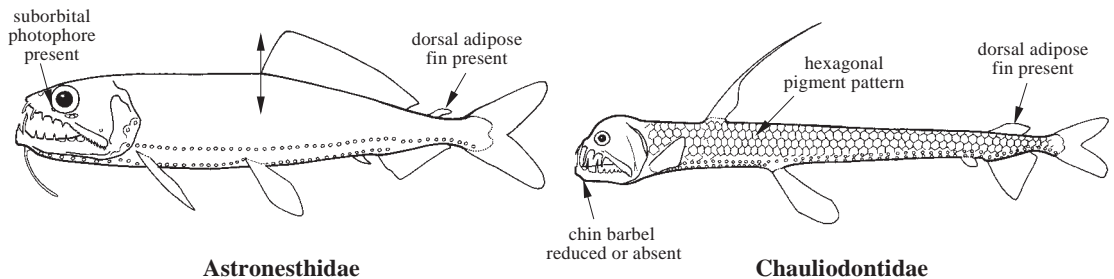
Habitat, biology, and fisheries: Mainly mesopelagic, occurring in the upper 1 000 m as adults, some species undergoing vertical migration to near the surface at night. Some species apparently benthopelagic as adults. Diet consists of other mesopelagic fishes and some crustaceans.

Remarks: Scaleless black dragonfishes are currently considered a subfamily (Melanostomiinae) in Stomiidae by Eschmeyer's Catalog of Fishes. Family designations made by the author at the time of writing have been retained for the sake of organization.

Similar families occurring in the area

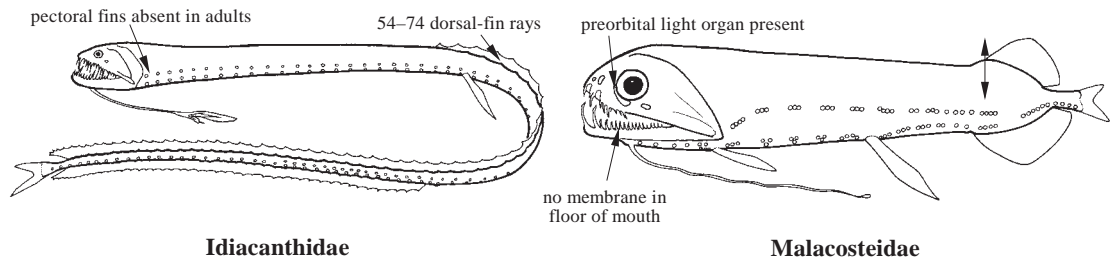
Astronesthidae: dorsal fin near middle of body, origin well ahead of that of anal fin; anterior portion of ventral photophore row (PV) curving upward at pelvic-fin base.

Chauliodontidae: chin barbel reduced or absent in adults; dorsal fin anteriorly positioned near head, anterior ray prolonged; scale-like hexagonal pigmentation pattern on body.



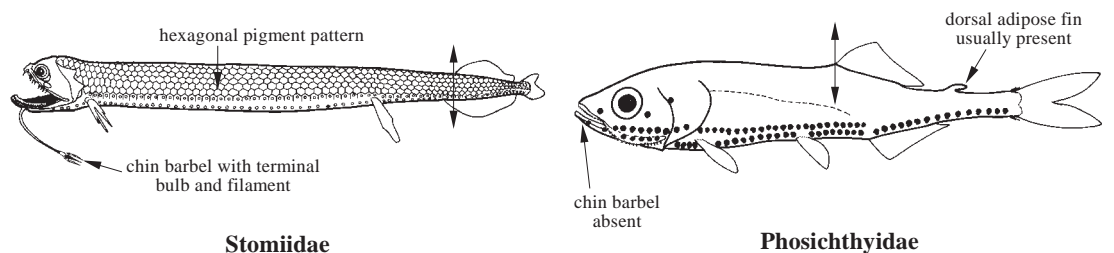
Idiacanthidae: body elongate, eel-like; dorsal fin with very long base (54 to 74 rays).

Malacosteidae: no membranes in floor of mouth; chin barbel present or absent; preorbital photophore present (absent in *Photostomias*, present in the melanostomiid *Pachystomias*); pectoral fins absent or consisting of only free, filament-like rays.

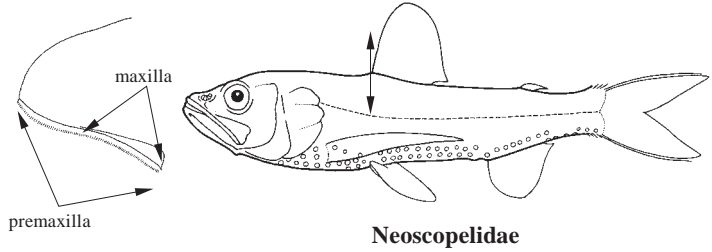


Stomiidae: chin barbel with terminal bulb and filaments; scale-like hexagonal pigmentation pattern on body; pectoral fins present.

Gonostomatidae, Phosichthyidae and Sternoptychidae: gill rakers present in adults, chin barbels and greatly enlarged, fang-like jaw teeth absent.



Myctophidae and Neoscopelidae: lack chin barbels, have gill rakers as adults, and the maxilla is completely excluded from the gape by the premaxilla.



Neoscopelidae

Key to the genera of Melanostomiidae occurring in the area (modified after Gibbs, 1984)

- 1a. Anal-fin base much longer than dorsal-fin base, its origin well ahead of dorsal-fin origin → 2
- 1b. Anal- and dorsal-fin bases about same length, anal-fin origin directly ventral to dorsal-fin origin. → 3

2a. First pectoral-fin rays separate, much longer than others; snout blunt, not protrusible (Fig. 1). **Flagellostomias**

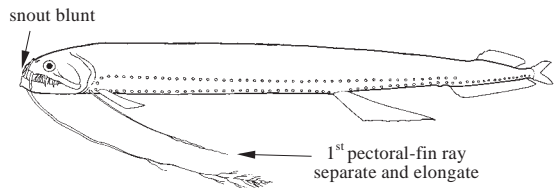


Fig. 1 *Flagellostomias*

2b. One or several pectoral-fin rays, none markedly longer than others (Fig. 2); snout slender and tapering, protrusible (Fig. 3). **Eustomias**

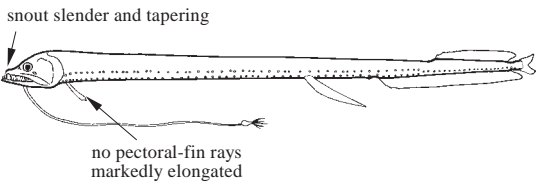


Fig. 2 *Eustomias*

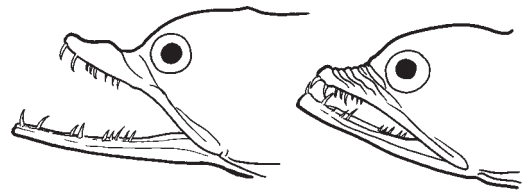


Fig. 3 *Eustomias* jaw protrusion

- 3a. Pelvic-fin bases high on body, near lateral midline on flank (see family figure) **Bathophilus**
- 3b. Pelvic-fin bases low on body (Fig. 4), close together near ventral midline → 4

4a. Long crescent-shaped suborbital photophore below eye (Fig. 4), and smaller organs in front (preorbital) and behind (postorbital) eye **Pachystomias**

4b. No suborbital or preorbital photophores; large postorbital organ present (Fig. 5) → 5

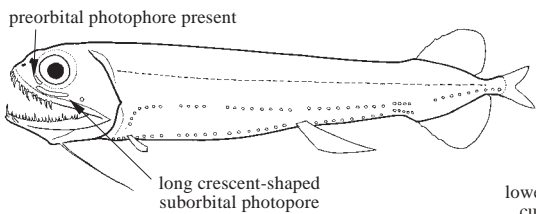


Fig. 4 *Pachystomias*

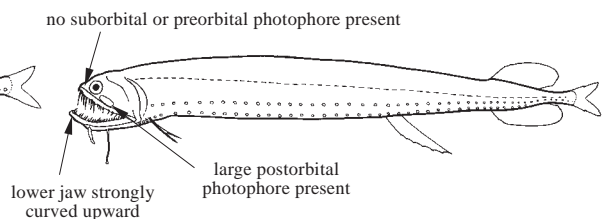


Fig. 5 *Photonectes*

- 5a. Lower jaw strongly curved upward, long and projecting beyond snout (Fig. 5); pectoral fin with 0 to 2 soft rays **Photonectes**
- 5b. Lower jaw length about equal to that of upper, not projecting or strongly curved upward; pectoral fin with 4 to 11 soft rays → **6**

- 6a. Body long and slender, its depth 10 times or more in body length (Fig. 6); 39 or more photophores in PV series **Leptostomias**
- 6b. Body moderately elongate, its depth less than ten times in body length; no more than 30 photophores in PV series → **7**

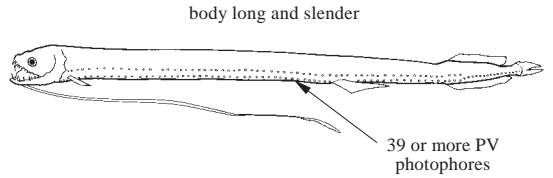


Fig. 6 *Leptostomias*

- 7a. One long pectoral-fin ray, separated from the remaining 3 to 11 rays (Fig. 7) → **8**
- 7b. Pectoral fin without an isolated, elongated ray; rays approximately equal, none separated from rest → **9**

- 8a. Pectoral-fin rays 1 + 10 or 11, end of isolated ray split into filaments (Fig. 7) **Thysanactis**
- 8b. Pectoral-fin rays 1 + 3, end of isolated ray simple, not divided into filaments (Fig. 8) **Echiostoma**

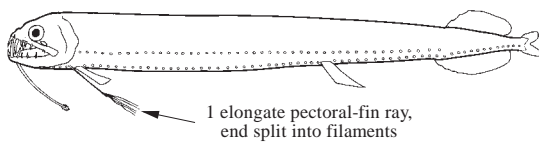


Fig. 7 *Thysanactis*

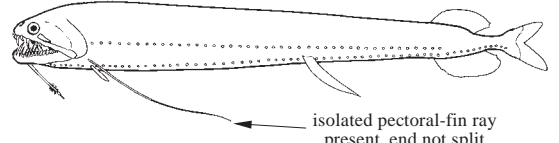


Fig. 8 *Echiostoma*

- 9a. Luminous loop on flank above and behind pectoral fin (Fig. 9); 15 to 17 PV photophores. **Grammatostomias**
- 9b. No luminous loop on flank; 22 to 30 PV photophores → **10**

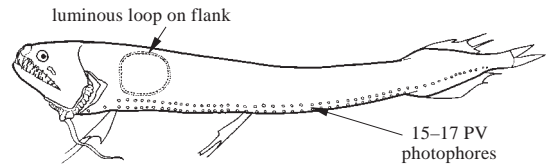


Fig. 9 *Grammatostomias*

- 10a. Pectoral-fin ray tips branched; dorsal adipose fin present; postorbital light organ small, less than 1/3 eye diameter; terminal bulb of barbel swollen and complex, with numerous filaments (Fig. 10) **Chiostomias**
- 10b. Pectoral-fin ray tips unbranched; no dorsal adipose fin (Fig. 11); postorbital light organ large, 1/2 eye diameter or larger; barbel tip usually flattened, without filaments or with a single filamentous appendage **Melanostomias**

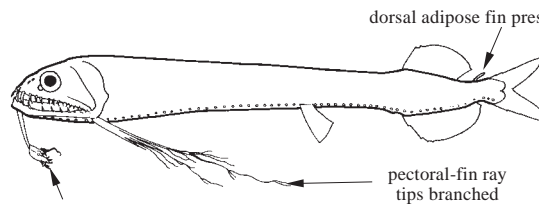


Fig. 10 *Chiostomias*

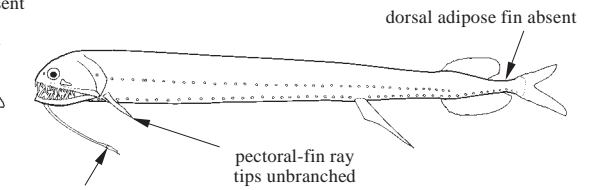


Fig. 11 *Melanostomias*

List of species occurring in the area

- Bathophilus ater* (Brauer, 1902). To 15 cm. S Atlantic, S Pacific; Area S 47.
- Bathophilus brevis* Regan and Trewavas, 1930. To 6 cm. Tropical to temperate N and S Atlantic and central Pacific; Areas S 34, 47.
- Bathophilus digitatus* (Welsh, 1923). To 17 cm. Circumglobal; Areas NW 34, NE 34, SW 34.
- Bathophilus irregularis* Norman, 1930. To 13 cm. Circumglobal subtropical to temperate in southern hemisphere; Areas SW 47, SE 47.
- Bathophilus longipes* Regan and Trewavas, 1930. To 11 cm. Circumglobal; Areas W 31, W 34. Currently considered a synonym of *B. digitatus*.
- Bathophilus longipinnis* (Pappenheim, 1912). To 11 cm. Circumglobal; Areas 31, W 34, SE 47.
- Bathophilus metallicus* (Welsh, 1923). To 14 cm. Subtropical to temperate N Atlantic.
- Bathophilus nigerrimus* Giglioli, 1882. To 12 cm. Tropical to temperate N Atlantic, Mediterranean, Pacific; Areas 34, N 47.
- Bathophilus pawneeii* Parr, 1927. To 12 cm. Tropical to subtropical NW Atlantic, Indian, Pacific; Areas NW 34, S 34, N 47.
- Bathophilus schizochirus* Regan and Trewavas, 1930. To 10 cm. Circumglobal, subtropical; Area NW 47.
- Bathophilus vaillanti* (Zugmayer, 1911). To 18 cm. Atlantic and Pacific; Area 34.
- Chirostomias pliopterus* Regan and Trewavas, 1930. To 23 cm. Subtropical to temperate N Atlantic; Area 34.
- Echiostoma barbatum* Lowe, 1843. To 37 cm. Tropical to temperate circumglobal except E Pacific; Areas 34, 47, not Gulf of Guinea.
- Eustomias achirus* Parin and Pokhil'skaya, 1974. To 17 cm. Subtropical to temperate N Atlantic, SW Pac; Area 34.
- Eustomias acinosus* Regan and Trewavas, 1930. To 19 cm. N Atlantic.
- Eustomias aequatorialis* Clarke, 1998. To 13 cm. Equatorial E Atlantic; Areas S 34, N 47.
- Eustomias arborifer* Parr, 1927. To 25 cm. Tropical to subtropical Atlantic; Area S 34.
- Eustomias bibulbosus* Parr, 1927. To 20 cm. Tropical to temperate N Atlantic.
- Eustomias bigelowi* Welsh, 1923. To 20 cm. Tropical to subtropical Atlantic; Areas NW 47, SW 47.
- Eustomias bimargaritatus* Regan and Trewavas, 1930. To 20 cm. Subtropical N Atlantic; Area W 34.
- Eustomias braueri* Zugmayer, 1911. To 12 cm. Tropical to temperate N Atlantic.
- Eustomias contiguus* Gomon and Gibbs, 1985. To 18 cm. Subtropical N Atlantic.
- Eustomias dendriticus* Regan and Trewavas, 1930. To 15 cm. Circumglobal, equatorial to subtropical; Areas 34, N 47.
- Eustomias enbarbatus* Welsh, 1923. To 21 cm. Circumglobal, tropical to temperate; Areas SE 34, 47, not Gulf of Guinea.
- Eustomias filifer* (Gilchrist, 1906). To 23 cm. Tropical to temperate Atlantic; Areas 34, S 47.
- Eustomias fissibarbis* (Pappenheim, 1912). To 19 cm. Circumglobal, tropical to temperate; Areas N 34, N 47, not Gulf of Guinea.
- Eustomias furcifer* Regan and Trewavas, 1930. To 21 cm. Circumglobal, subtropical to temperate; Area NW 47.
- Eustomias insularum* Clarke, 1998. To 17 cm. Eastern N Atlantic off Cape Verde Islands; Area 34.
- Eustomias intermedius* Clarke, 1998. To 13 cm. Equatorial Atlantic; Area NW 47.
- Eustomias krefftii* Gibbs, Clarke and Gomon, 1983. To 13 cm. Tropical to subtropical Atlantic; Area SW 34.
- Eustomias lanceolatus* Clarke, 1999. To 12 cm. Tropical E Atlantic; Areas W 34, NW 47.
- Eustomias lipochirus* Regan and Trewavas, 1930. To 24 cm. Tropical to temperate Atlantic and Indian oceans; Areas 34, N 47.
- Eustomias longibarba* Parr, 1927. To 19 cm. Circumglobal subtropical to temperate; Areas NW 34, NE 34, SW 34.
- Eustomias macronema* Regan and Trewavas, 1930. To 17 cm. Circumglobal, subtropical to temperate; Area 34.
- Eustomias macrurus* Regan and Trewavas, 1930. To 28 cm. Circumglobal, equatorial to temperate; Areas SW 34, NW 47.

- Eustomias melanonema* Regan and Trewavas, 1930. To 17 cm. E Atlantic endemic; Areas S 34, N 47.
- Eustomias melanostigma* Regan and Trewavas, 1930. To 15 cm. Tropical to subtropical N Atlantic, Indian, W Pacific; Area SW 34
- Eustomias monoclonoides* Clarke, 1999. To 13 cm. Gulf of Guinea; Areas SW 34, NE 47.
- Eustomias monoclonus* Regan and Trewavas, 1930. To 15 cm. Areas W and SE 31, SW 34, NW 51, NW 57, NW 71
- Eustomias obscurus* Vaillant in Filhol, 1884. To 23 cm. Subtropical to temperate Atlantic; Areas 34, 47, not Gulf of Guinea.
- Eustomias parri* Regan and Trewavas, 1930. To 14 cm. Subtropical to temperate N Atlantic.
- Eustomias patulus* Regan and Trewavas, 1930. To 13 cm. Area NW 34.
- Eustomias polyaster* Parr, 1927. To 13 cm. Tropical to subtropical N Atlantic.
- Eustomias satterleei* Beebe, 1933. To 18 cm. Subtropical to temperate Atlantic, Pacific, S Indian oceans.
- Eustomias schmidti* Regan and Trewavas, 1930. To 21 cm. Circumglobal, subtropical to temperate; Areas NW 34, NE 34, SW 34.
- Eustomias simplex* Regan and Trewavas, 1930. To 22 cm. Tropical to temperate Atlantic; Area N 34.
- Eustomias spherulifer* Gibbs, Clarke and Gomon, 1983. To 17 cm. Subtropical S Atlantic; Area NW 47.
- Eustomias tenisoni* Regan and Trewavas, 1930. To 19 cm. Subtropical to temperate Atlantic; Area NW 47.
- Eustomias tetranema* Zugmayer, 1913. To 15 cm. Temperate Atlantic; Area NE 34.
- Eustomias triramis* Regan and Trewavas, 1930. To 11 cm. Temperate N Atlantic; Area SW 34.
- Flagellostomias boureei* (Zugmayer, 1913). To 32 cm. Subtropical to temperate N and S Atlantic; Areas 34, 47.
- Grammatostomias dentatus* Goode and Bean, 1896. To 16 cm. Subtropical to temperate Atlantic, equatorial E Indian ocean; Areas NW 34, SW 34.
- Grammatostomias flagellibarba* Holt and Byrne, 1910. To 27 cm. Tropical to temperate N Atlantic.
- Leptostomias bilobatus* (Koefoed, 1956) To 34 cm. Tropical to temperate Atlantic; Area 34.
- Leptostomias gladiator* (Zugmayer, 1911). To 37 cm. Circumglobal, subtropical to temperate; Areas 34, 47.
- Leptostomias gracilis* Regan and Trewavas, 1930. To 38 cm. Subtropical to temperate Atlantic; Areas 34, N 47, not Gulf of Guinea.
- Leptostomias haplocaulus* Regan and Trewavas, 1930. To 38 cm. Circumglobal, temperate; Area N 34.
- Leptostomias longibarba* Regan and Trewavas, 1930. To 25 cm. Tropical to subtropical N Atlantic; Areas 34, N 47, not Gulf of Guinea.
- Melanostomias bartonbeani* Parr, 1927. To 26 cm. Circumglobal, subtropical to temperate; Areas 34, S 47.
- Melanostomias biseriatus* Regan and Trewavas, 1930. To 25 cm. Circumglobal, tropical to temperate; Area 34.
- Melanostomias macrophotus* Regan and Trewavas, 1930. To 23 cm. Tropical to temperate N Atlantic; Area N 34.
- Melanostomias melanopogon* Regan and Trewavas, 1930. To 24 cm. Temperate N Atlantic; Area NW 34.
- Melanostomias melanops* Brauer, 1902. To 26 cm. Circumglobal, tropical to temperate; Area N 34.
- Melanostomias niger* Gilchrist and von Bonde, 1924. To 26 cm. Southern subtropical convergence zone; Area 47.
- Melanostomias paucilaternatus* Parin and Pokhil'skaya, 1978. To 20 cm. Circumglobal, subtropical to temperate S Atlantic, Indian, Pacific; Areas NW 47, SE 47.
- Melanostomias spilorhynchus* Regan and Trewavas, 1930. To 24 cm. Subtropical to temperate N Atlantic.
- Melanostomias tentaculatus* (Regan and Trewavas, 1930). To 24 cm. Circumglobal, tropical to temperate; Areas 34, N 47.
- Melanostomias valdiviae* Brauer, 1902. To 23 cm. Circumglobal, subtropical to temperate; Area NE 34.
- Odontostomias masticopogon* Norman, 1930. To 20 cm. Eastern Atlantic; endemic in Areas 34, N 47.

- Odontostomias micropogon* Norman, 1930. To 30 cm. Eastern Atlantic; endemic in Areas S 34, N 47.
- Pachystomias microdon* (Günther, 1878). To 22 cm. Circumglobal, tropical to temperate; Areas S 34, N 47.
- Photonectes braueri* (Zugmayer, 1913). To 28 cm. Subtropical to temperate Atlantic, W Indian Ocean and Indo-West Pacific; Areas N 34, 47.
- Photonectes caeruleus* Regan and Trewavas, 1930. To 15 cm. Circumglobal; Area SW 34.
- Photonectes dinema* Regan and Trewavas, 1930. To 25 cm. Subtropical to temperate N Atlantic; Area 34.
- Photonectes leucospilus* Regan and Trewavas, 1930. To 20 cm. Temperate Atlantic; Areas S 34, N 47.
- Photonectes margarita* (Goode and Bean, 1896). To 40 cm. Circumglobal, tropical to temperate Atlantic, Indian, Pacific oceans; Areas N 34, 47.
- Photonectes mirabilis* Parr, 1927. To 16 cm. Subtropical to temperate Atlantic, Indo-West Pacific; Area 34.
- Photonectes parvimanus* Regan and Trewavas, 1930. To 25 cm. Subtropical to temperate Atlantic, Pacific; Area N 34.
- Photonectes phyllopogon* Regan and Trewavas, 1930. To 10 cm. N Atlantic; Area NW 47.
- Thysanactis dentex* Regan and Trewavas, 1930. To 18 cm. Equatorial Atlantic, temperate S Atlantic and Pacific; Areas S 34, N 47.
- Trigonolampa miriceps* Regan and Trewavas, 1930. To 32 cm. Circumglobal, temperate to subarctic, subtropical Convergence Zones; Areas NE 34, SW 34.

References

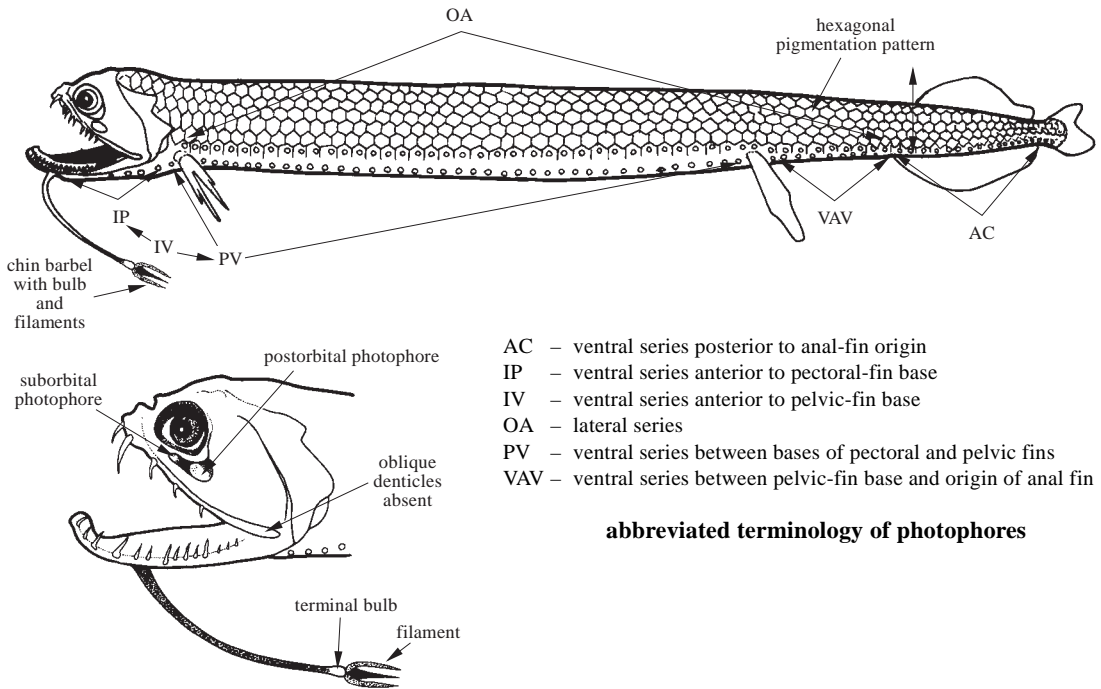
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STOMIIDAE

Scaly dragonfishes

by A.S. Harold, Grice Marine Laboratory, Department of Biology, College of Charleston, Charleston, SC, USA

Diagnostic characters: Maximum size about 43 cm. Body long and slender, covered by gelatinous layer enclosed by membrane. Head small. Mouth large relative to head, with **teeth ranging in size from small to moderately large and fang-like**. Lower jaw curved upward slightly. **Chin barbel prominent**, terminal bulb with filaments present. Branchiostegals 16 to 18. No true gill rakers in adults. **Dorsal fin located just anterior to caudal fin, directly above anal fin**. Dorsal fin with 13 to 23 rays; anal fin with 15 to 25 rays; caudal fin forked or rounded; pectoral fins with 6 to 9 rays; pelvic fins with 4 or 5 rays. Dorsal adipose fin absent. **Body covered with scale-like hexagonal pigmentation pattern**. Two ventrolateral rows of photophores on body; OA 36 to 67 or 137 to 153; IV 41 to 64 or 89 to 99; VAV 5 to 16 or 58 to 67; AC 14 to 22; paired row of photophores on isthmus (IP); 1 or more small photophores associated with hexagonal scale-like areas; suborbital photophore small, inconspicuous, located at anteroventral margin of eye; postorbital photophore prominent, located posteroventrally to eye. **Colour:** iridescent silver, bronze or dark green.



lateral view of head

- AC – ventral series posterior to anal-fin origin
- IP – ventral series anterior to pectoral-fin base
- IV – ventral series anterior to pelvic-fin base
- OA – lateral series
- PV – ventral series between bases of pectoral and pelvic fins
- VAV – ventral series between pelvic-fin base and origin of anal fin

abbreviated terminology of photophores

Habitat, biology, and fisheries: Mainly mesopelagic (to 1 000 m) as adults, with some species bathypelagic, to 2000 m. Migration to near surface at night in some species. Diet consists of other midwater fishes.

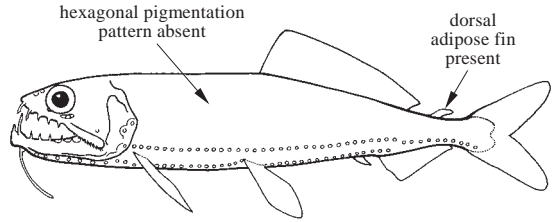
Remarks: *Stomias longibarbatius* was previously placed in a separate genus, *Macrostomias*, due mainly to the relatively high photophore counts in this species. Fink and Fink (1986) analyzed the species in the family phylogenetically and found there to be no grounds for the continued placement of *S. longibarbatius* in a separate genus.

Similar families occurring in the area

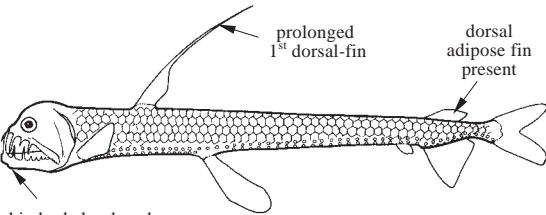
Astronesthidae: dorsal fin near middle of body, origin well ahead of that of anal fin; no hexagonal pigment areas on body.

Chauliodontidae: only other stomiiform family with scale-like hexagonal pigment pattern; dorsal fin anteriorly positioned near head with first ray prolonged.

Idiacanthidae: body highly elongate, eel-like; dorsal fin very long (54 to 74 rays), its origin well anterior to midbody; scale-like hexagonal pigment pattern absent.

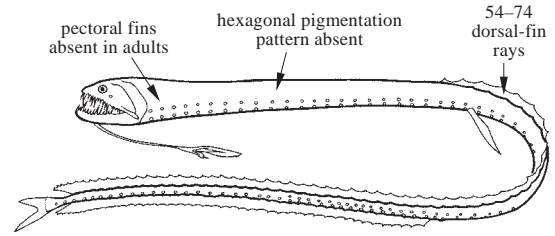


Astronesthidae



chin barbel reduced or absent in adults

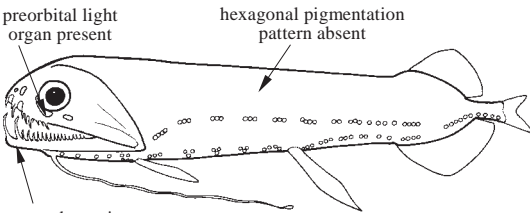
Chauliodontidae



Idiacanthidae

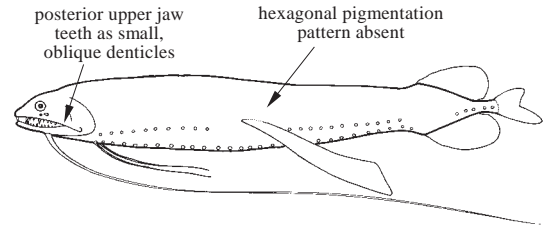
Malacosteidae: no membrane in floor of mouth; preorbital photophore usually present (absent in *Photostomias*); scale-like hexagonal pigment pattern absent.

Melanostomiidae: maxilla with erect teeth anteriorly and smaller, oblique teeth posteriorly; pectoral fins present or absent; hexagonal pigment pattern absent.



no membrane in floor of mouth

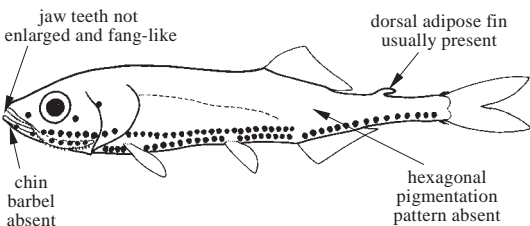
Malacosteidae



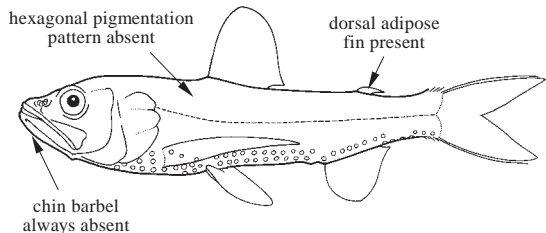
Melanostomiidae

Gonostomatidae, Phosichthyidae and Sternoptychidae: these remaining stomiiform families often with somewhat similar body form and photophore arrangement, but have dorsal fin at midbody, gill rakers as adults and lack the hexagonal pigmentation pattern, chin barbels, and enlarged, fang-like jaw teeth.

Myctophidae and Neoscopelidae: myctophiform families with photophores but with less elongate bodies, no chin barbels, and maxilla toothless and completely excluded from gape by premaxilla. Ventral photophores usually more widely spaced and not arranged in such regular rows as in Stomiidae.



Phosichthyidae



Myctophidae

List of species occurring in the area

- Stomias affinis* Günther, 1887. To 20 cm. Atlantic and Indo-West Pacific, equatorial to warm temperate; Areas S 34, N 47.
- Stomias boa boa* (Risso, 1810). To 32 cm. Subtropical to temperate, circumglobal in southern hemisphere, and N Atlantic and Mediterranean; Areas 34, S 47.
- Stomias brevibarbatu*s Ege, 1918. To 20 cm. Subtropical to temperate N Atlantic; Area N 34.
- Stomias lampropeltis* Gibbs, 1969. To 30 cm. Equatorial to tropical E Atlantic; endemic in Areas 34, 47.
- Stomias longibarbatu*s (Brauer, 1902). To 43 cm. Circumglobal, equatorial to subtropical; Areas 34, N 47.

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New Index

- A**
- ASTRONESTHIDAE** 1797
- Araiophos* 1792
- Argyripnus* 1792-1793
- Argyrolepecus* 1792
- Aristostomias* 1806
- ASTRONESTHIDAE** 1784, 1789, 1793, 1798, 1802, 1805-1806, 1810, 1817
- ASTRONESTHINAE** 1797
- B**
- Bathophilus* 1809
- Black dragonfishes 1804
- Bonapartia* 1789, 1793
- Bristlemouths 1783
- C**
- CHAULIODONTIDAE** 1801
- CHAULIODONTIDAE** 1784, 1789, 1793, 1797, 1805, 1807, 1810, 1817
- Chirostomias* 1809
- Cyclothone* 1783, 1789, 1793
- D**
- Danaphos* 1792
- Diplophos* 1783, 1789, 1793
- G**
- GONOSTOMATIDAE** 1783
- Gonostoma* 1783, 1789, 1793
- GONOSTOMATIDAE** 1789, 1793, 1798, 1802, 1807, 1810, 1817
- Gonostomatids 1785
- H**
- Hatchetfishes 1792
- I**
- IDIACANTHIDAE** 1804
- Ichthyococcus* 1788
- IDIACANTHIDAE** 1784, 1789, 1793, 1798, 1802, 1807, 1810, 1817
- IDIACANTHINAE** 1804
- L**
- Lightfishes 1788
- Lighthousefishes 1788
- Loosejaws 1806
- M**
- MALACOSTEIDAE** 1806
- MELANOSTOMIIDAE** 1809
- Macrostomias* 1816
- MALACOSTEIDAE** 1784, 1789, 1793, 1798, 1802, 1805, 1810, 1817
- MALACOSTEINAE** 1806
- Malacosteus* 1784, 1789, 1793
- Manducus* 1789
- Margrethia* 1783, 1789, 1793
- Melanostomiid 1810
- MELANOSTOMIIDAE** 1784, 1789, 1793, 1798, 1802, 1805, 1807, 1817
- MELANOSTOMIINAE** 1810
- MYCTOPHIDAE** 1784, 1789, 1793, 1798, 1802, 1811, 1817
- N**
- NEOSCOPELIDAE** 1784, 1789, 1793, 1798, 1802, 1811, 1817
- P**
- PHOSICHTHYIDAE** 1788
- PHOTICHTHYIDAE** 1788
- Pachystomias* 1809-1810
- PHOSICHTHYIDAE** 1783-1784, 1793, 1798, 1802, 1807, 1810, 1817
- PHOTICHTHYIDAE** 1783
- Photostomias* . 1784, 1789, 1793, 1802, 1810, 1817
- Pollichthys* 1788
- Polyipnus* 1792-1793
- Polymetme* 1784, 1788-1789, 1793
- R**
- Rhadinesthes* 1797
- S**
- STERNOPTYCHIDAE** 1792
- STOMIIDAE** 1816
- STOMIIFORMES** 1783
- Scaleless black dragonfishes 1809
- Scaly dragonfishes 1816
- Sigmops* 1783
- Snaggletooths 1797
- Sonoda* 1792-1793
- STERNOPTYCHIDAE** 1783-1784, 1789, 1798, 1802, 1807, 1810, 1817
- Sternoptyx* 1792

Stomias longibarbatus 1816
STOMIIDAE 1784, 1789, 1793, 1797-1798, 1801, 1804, 1806-1807, 1810
STOMIINAE 1801

T

Triplophos 1783, 1789

V

Viperfishes 1801

W

Woodsia 1788

Woodsia meyerwaardeni 1788

Y

Yarella 1784, 1788-1789, 1793

L

longibarbatus, Stomias 1816

M

meyerwaardeni, Woodsia 1788

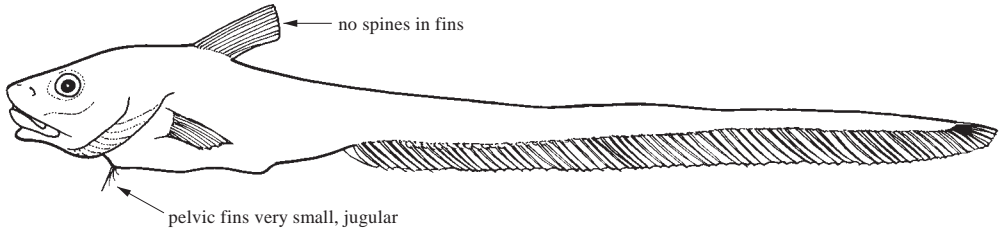
Order ATELEOPODIFORMES

ATELEOPODIDAE

Jellynose fishes

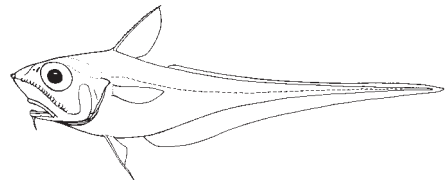
by J.A. Moore, Florida Atlantic University, Jupiter, FL, USA

Diagnostic characters: Moderate to elongate fishes (to 2 m total length) with soft, flabby body; short trunk; post-anal body compressed and tapering, very elongate (greater than half standard length) in *Ijimaia*. Head moderate-sized. Eye small to moderate. Snout rounded, very soft and gelatinous. Mouth subterminal and protrusible. Teeth villiform, absent or present in broad band on maxilla and premaxilla, absent on vomer and palatine. **No fin spines; short-based single dorsal fin just behind pectoral, with 9 to 13 rays; anal fin elongate in both genera with 69 to 80 rays, anal united with caudal with combined total of 84 to 92 rays;** pectoral fins with 11 to 14 rays; **pelvic fins thoracic or jugular, adults with 4 to 10 rays visible, first ray long and conspicuous,** in one genus, *Ijimaia*, subsequent rays minute and surrounded by fleshy skin. Body naked, isolated scales present imbedded in skin around lateral line, lateral line obscure externally. Considerable ontogenetic changes in morphometrics and pelvic structure, young with 6 to 10 pelvic rays, first longer than the rest. **Colour:** body generally dark purplish brown, skin at angle of mouth pale to white; dorsal, anal, caudal, and pectoral fins dark brown to black, pelvic fins brown or white.



Habitat, biology, and fisheries: Uncommon benthic or benthopelagic fishes usually taken in trawls between 200 and 800 m. Diet of fishes and benthic invertebrates, especially ophiuroid echinoderms and decapod crustaceans. Of no commercial importance.

Remarks: Currently about 12 species in four genera. Family in need of revision. Most recent review of family is by Smith (1986).



Macrouridae

Similar families occurring in the area

Macrouridae: chin barbel usually present; often spinous rays in first dorsal fin; long low second dorsal fin; scales cover most parts of body and head.

Key to species of Ateleopodidae occurring in the area

- 1a. Post-anal body less than half standard length; dorsal-fin rays 11 to 13; pelvic fin with 3 free rays and 6 or 7 rays connected by membrane *Guentherus altivela*
- 1b. Post-anal body very elongate, greater than half standard length; dorsal-fin rays 9 or 10; pelvic fin in adults with 1 free ray and 3 minute rays covered by skin *Ijimaia loppei*

List of species occurring in the area

Ijimaia loppei Roule, 1922. To 2 m TL. Tropical-subtropical Atlantic. Areas 31, 34, 47.

Guentherus altivela Osório, 1917. To 2 m TL. Tropical-subtropical E Atlantic, also tropical and Pacific. Areas SE 27, 34, 47, also Area 77.

Reference

Smith, M.M. 1986. Family Ateleopodidae. In M.M. Smith & P.C. Heemstra, eds. *Smiths' sea fishes*. Johannesburg, South Africa, Macmillan, pp. 404–406.

New Index

A**ATELEPODIDAE** 1819

ATELEPODIFORMES..... 1819

I*Ijimaia* 1819**J**

Jellynose fishes 1819

M**MACROURIDAE** 1819

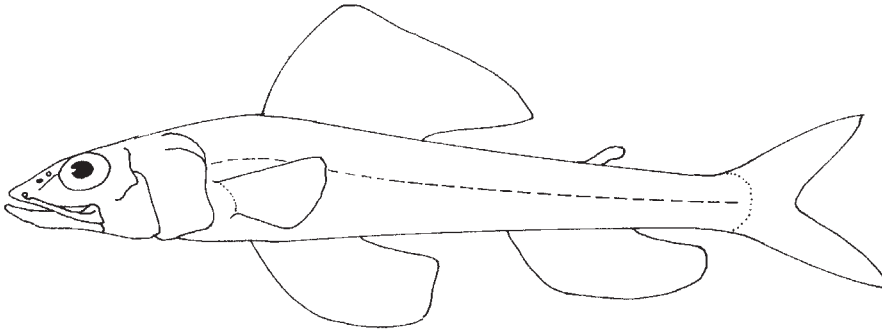
Order AULOPIFORMES

AULOPIDAE

Flagfins

by B.A. Thompson (+), Louisiana State University, Baton Rouge, LA 70803, USA and
M. Gorman, Museum Victoria, Victoria, Australia

Diagnostic characters (Eastern Atlantic only): Medium-sized (28 to 40 cm) aulopiform fishes, elongate body, oval in cross-section. Head about 30% standard length. Snout to eye ratio 0.9 to 1.6. Mouth large, extends to near of eye; jaws and tongue with many small, sharp teeth, no enlarged fangs. Snout to eye ratio 0.9 to 1.6. **Maxilla expanded posteriorly with 2 supramaxillae.** Gill rakers normal, elongate. **Origin of dorsal fin located on anterior one-third of body;** dorsal fin with more rays than anal fin; small adipose fin located above midpoint of anal fin; **ratio of dorsal-fin base to distance from dorsal fin to adipose fin 0.73 to 0.99, usually about 0.8;** pectoral-fin insertion just below lateral line on midbody and anterior to both dorsal- and pelvic-fin insertion; pelvic-fin insertion about even with dorsal-fin insertion; **pelvic fin longer than pectoral fin with outer 4 rays modified with thickened epidermis;** dorsal-fin rays 14 to 16, anal-fin rays 11 to 13, **pectoral-fin rays 13,** pelvic-fin rays 9, fourth ray always longest; all fins lack spines; caudal fin deeply forked. Scales on head and body spinoid, cycloid on breast and belly; complete lateral line that extends 2 pored scales onto base of caudal fin; lateral-line scales 48 to 53; **fulcral scales (small modified bony scutes) at anterior of caudal fin.** Pyloric caeca absent. **Colour:** males with brown, orange, and yellow markings on fins; body with several saddles and lateral blotches.



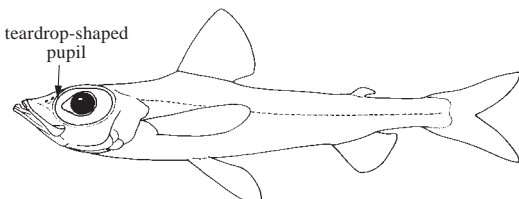
Habitat, biology, and fisheries: Flagfins are uncommon benthic fishes of the continental shelf between 50 and 1 000 m depth. They are predators on small fish and shrimp. Separate sexes; sexual dimorphism in body and fin colour, also shape and size of dorsal and anal fin. Few details are known of their biology. No directed fishery.

Remarks: Thompson (1998) recognized 10 species in 2 genera (*Aulopus* and *Hime*), but ongoing studies show this arrangement will need to be modified.

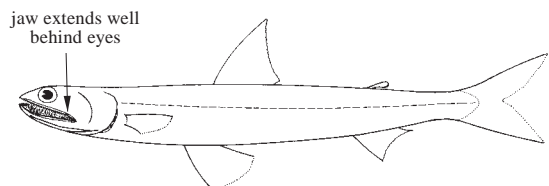
Similar families occurring in the area

Chlorophthalmidae: eye with teardrop-shaped pupil; jaws not reaching middle of eye; lower jaw with bony tip excluded from gape; only 1 supramaxilla present; dorsal fin inserted before pelvic-fin insertion.

Synodontidae: jaws extending well beyond eyes; gill rakers reduced to gill teeth or spines.



Chlorophthalmidae





Synodontidae

Key to the species of Aulopidae occurring in the area

- 1a.** Adult males lacking elongate filament on any dorsal rays; eye diameter/interorbit ratio 1.9 to 2.4 (mean 2.1); snout usually about equal to horizontal eye diameter (snout/eye ratio 0.9 to 1.1); maximum size about 28 cm standard length ***Aulopus cadenati***
- 1b.** Adult males with elongate filament on third/fourth dorsal rays; eye diameter/interorbit ratio 1.2 to 1.9 (mean 1.5); snout usually longer than horizontal eye diameter (snout/eye ratio 1.0 to 1.6); maximum size 40 cm standard length ***Aulopus filamentosus***

List of species occurring in the area

The symbol  is given when species accounts are included.

 *Aulopus cadenati* Poll, 1953.

 *Aulopus filamentosus* (Bloch, 1792).

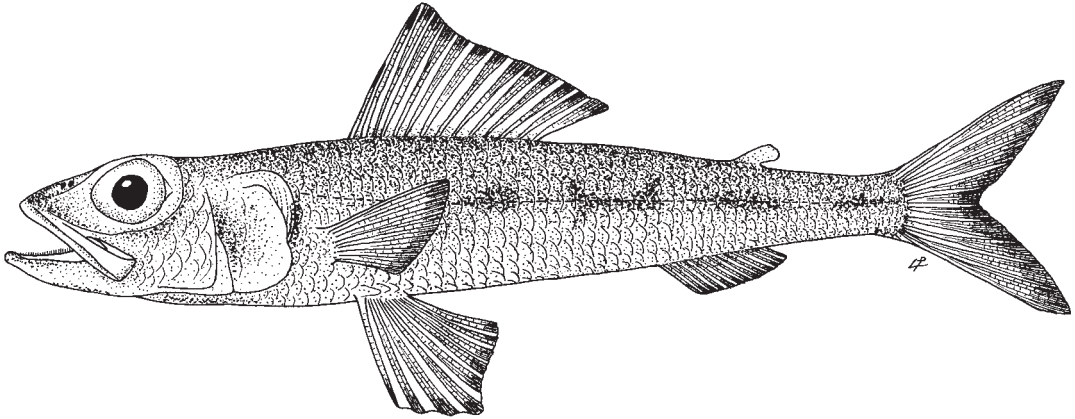
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Aulopus cadenati Poll, 1953

Frequent synonyms / misidentifications: None / None.

FAO names: En – Guinean flagfin; Fr – Limbert guineen; Sp – Lagarto real de Guinea.



Diagnostic characters: Body elongate, oval in cross-section. **Eye diameter/interorbit ratio 1.8 to 2.4 (mean 2.1); snout usually about equal to horizontal eye diameter (snout/eye ratio 0.9 to 1.1).** **Mouth large, extending to near rear of eye; maxilla expanded posteriorly with 2 supramaxillae; origin of dorsal fin located on anterior 1/3 of body;** dorsal rays 14 or 15; anal rays 11 or 12; pectoral rays 13. Pored lateral-line scales 49 to 51; predorsal scales 12 to 15. Total gill rakers 13 or 14. Vertebrae 49 to 51. Both sexes lack elongate dorsal fin filament, but males with some elongation to rays 3 to 5; dorsal-fin height up to 30% standard length in males and 20% standard length in females. **Colour:** males lack black pigment at tips of dorsal-fin rays, females with black pigment at tips of anterior dorsal-fin rays.

Size: Maximum size to about 28 cm standard length; more common to about 20 cm.

Habitat, biology, and fisheries: Common benthic species on continental shelf from about 100 to 200 m depth. Little known about habitat or life history.

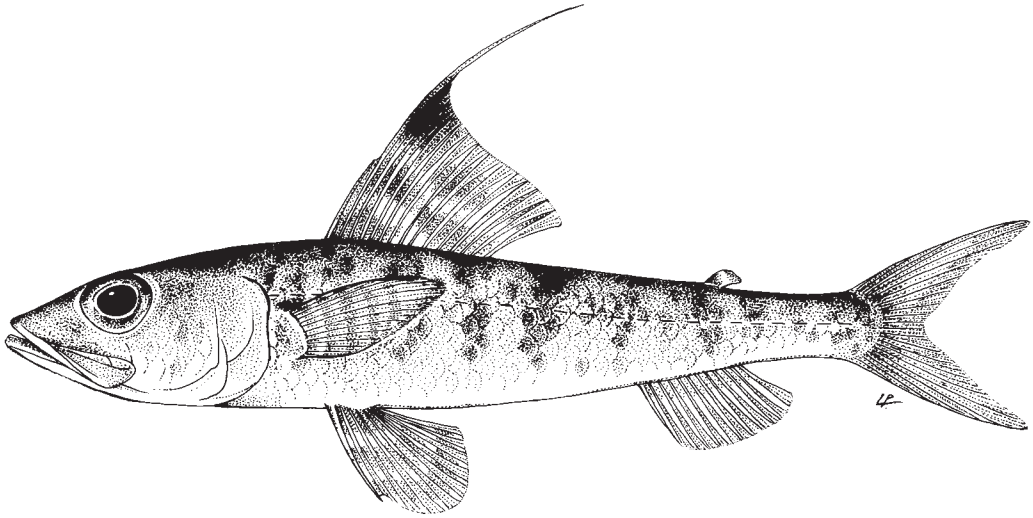
Distribution: Off western Africa from about 12°N (southern Senegal) to about 13°S (central Angola).



Aulopus filamentosus Bloch, 1792

Frequent synonyms / misidentifications: None / None.

FAO names: **En** – Royal flagfin (AFS: Yellowfin aulopus); **Fr** – Limbert royal; **Sp** – Lagarto real.



Diagnostic characters: Body elongate, oval in cross-section; **mouth large, extending to near rear of eye; maxilla expanded posteriorly with 2 supramaxillae; dorsal fin located on anterior 1/3 of body.** Dorsal rays 14 to 16; anal rays 11 or 12; pectoral rays 13; pelvic rays 9. Pored lateral-line scales 49 to 53; predorsal scales 12 to 15. Total gill rakers 12 to 14. Vertebrae 49 to 52. **Eye diameter/interorbit ratio 1.2 to 1.9 (mean 1.5); snout usually longer than horizontal eye diameter (snout/eye ratio 1.0 to 1.6).** Adult males with elongate dorsal fin filament, dorsal height up to 46% standard length; females lacking filament, dorsal fin height up to 21% standard length. **Colour:** females with black at tips of anterior dorsal rays.

Size: Maximum size to about 40 cm standard length; common to 35 cm.

Habitat, biology, and fisheries: Relatively uncommon benthic species on shelf from about 50 to 1 000 m depth. Little known about habitat or life history.

Distribution: Eastern Atlantic Ocean - Madeira, Canary Islands, Cape Verde Islands; northwards to coast of Portugal; on northwest coast of Africa from Morocco, Mauritania, Senegal, Guinea-Bissau and southward to Gulf of Guinea; also known from Azores and Mediterranean Sea.

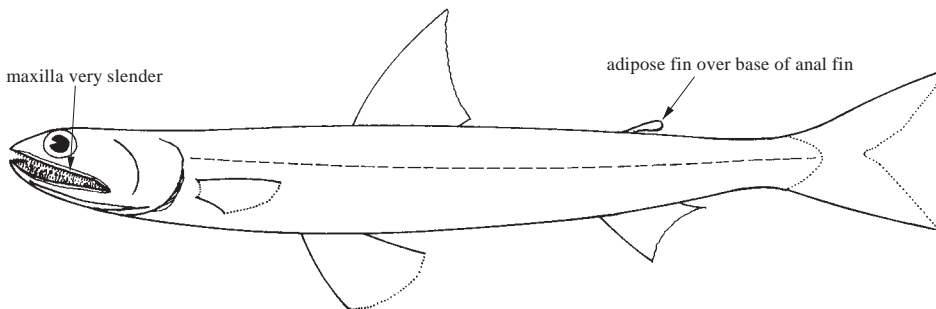


SYNODONTIDAE

Lizardfishes

by B.C. Russell, Museum and Art Gallery of the Northern Territory, Darwin, Australia

Diagnostic characters: Small to medium-sized (to 45 cm) fishes with **elongate cylindrical body**. Head of some compressed, others depressed; bony surfaces on top of head, little to very rugose. Eye of moderate size or small; laterally directed. **Adipose eyelid on anterior and posterior margins of eye**. Mouth large, gape tending to be oblique. Upper **jaw** not protractile, its entire length bordered by premaxillary, its length more than half length of head and **extending well past posterior margin of orbit** in adult specimens; **maxilla reduced (very slender and closely adherent to premaxilla in *Saurida*, *Synodus* and *Trachinocephalus*); 2 small supramaxillae present (*Saurida*) or absent (*Synodus* and *Trachinocephalus*)**. Lower jaw with or without a fleshy knob at its tip. Teeth of moderate size, depressible; no distinct canines; **teeth on palatines (present in a single band in *Synodus* and *Trachinocephalus*, or 2 bands in *Saurida*) and on tongue. Vomer present (*Saurida*) or absent (*Synodus*, *Trachinocephalus*)**. Gill openings large; gill membranes free from isthmus; 4 gill arches, extending far forward into mouth, well in advance of the angle of gape. Opercular flap with free edge formed by both opercle and subopercle. Gill rakers rudimentary or minute and spine-like. **Branchiostegals 12 (*Trachinocephalus*), 13 (*Saurida*), or 15 to 18 (*Synodus*)**. **Head and body with cycloid scales. Scales present on both procurent and primary caudal-fin soft rays (*Saurida*), present only on procurent rays (*Trachinocephalus*), or absent (*Synodus*)**. Fins with articulated soft rays except a few anterior secondary caudal-fin rays, none greatly prolonged. **Dorsal fin about midway on back**, posterior to pelvic-fin insertion; the first 2 rays always unbranched, the others usually branched, the last ray always branched to its base. **Adipose fin over base of anal fin**. **Anal fin posterior to end of dorsal fin**; the first 2 rays always unbranched, the other rays branched or unbranched, the last ray always branched to its base. Caudal fin forked, with 19 principle rays, 17 branched rays. Pectoral fins not reaching to or extending beyond origin of pelvic fins; the first and last rays always unbranched, the other rays usually branched. **Pelvic fins with 8 (*Synodus*, *Trachinocephalus*) or 9 rays (*Saurida*)**, fins close together and inserted abdominally, posterior to pectoral-fin origin and anterior to dorsal-fin origin; the first and last rays unbranched, all other rays branched; **inner rays of pelvic fins subequal or slightly longer than outer rays (*Saurida*) or distinctly longer than outermost rays (*Synodus*, *Trachinocephalus*)**. Anus located just anterior to anal-fin origin. **Colour:** variable, but often brown, reddish, or silvery, with red, yellow, or blue markings; peritoneum either pale with 5 to 11 black spots on each side of midventral line, or black.

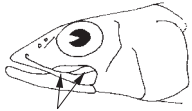


Habitat, biology, and fisheries: Marine, bottom-living fishes found on coral and rock, or mud and sand bottoms in coastal, estuarine, and offshore shelf waters. Most species occur in shallow water, but there are records to depths as great as 545 m. Voracious predators, feed mainly on other small fishes and crustaceans. Spawning and larval development is reported for *Synodus*, with release of gametes occurring in midwater up to 4 m above the substrate. Eggs are small to medium-sized (0.8 to 1.1 mm). Larvae are distinctive in possessing paired spots or patches of dark pigment in the lining of the peritoneum and along the midventral line of the anal fin and caudal peduncle. The spots persist internally in adults and are an aid to identification. In the eastern central Atlantic, lizardfishes are taken in offshore waters as a bycatch of trawl fisheries, and in coastal areas with traps and fixed nets. Their flesh is reportedly of good quality and flavour, though bony; they are eaten fresh or dried salted or are processed into fishmeal.

Similar families occurring in the area

Aulopidae: mouth moderate, upper jaw reaching rear end of eye; 2 supramaxillary bones; adipose fin present; pectoral fins with 12 or 13 rays, the uppermost rays usually longest; procurrent and principle rays of caudal fin without scales; branchiostegal rays 15 or 16; gill rakers normal; well-developed bony fulcral scale in front of caudal fin.

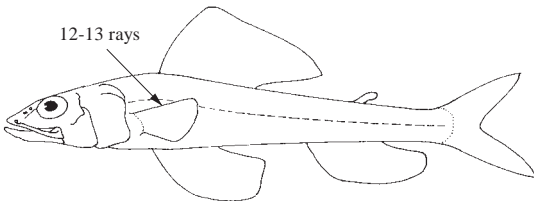
Bathysauridae: head very depressed; eyes set well back from snout; dorsal-fin base about equal to head length; pectoral fins with 15 rays, central ray or rays prolonged; lateral-line scales enlarged; procurrent and principle rays of caudal fin with a row of scales; branchiostegal rays about 12; teeth present on vomer; gill rakers reduced to patches of spines.



2 supramaxillary

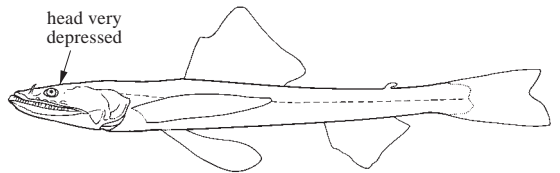


head very depressed



12-13 rays

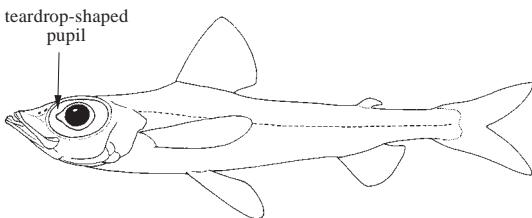
Aulopidae



Bathysauridae

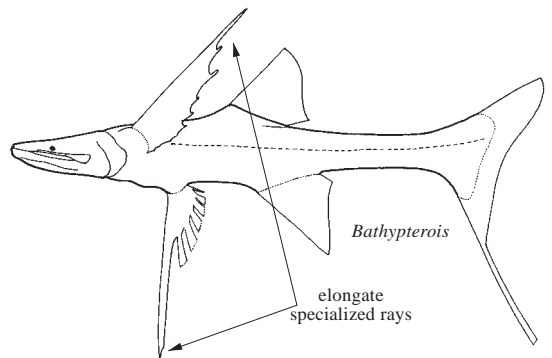
Chlorophthalmidae: eyes large, with teardrop-shaped pupil, tapetum of eye brilliant green in freshly caught specimens; mouth moderate, upper jaw not extending behind midpoint of eye; tip of lower jaw excluded from gape; adipose fin present; pectoral fins with 15 to 19 rays, uppermost rays usually longest; gill rakers normal.

Ipnopidae: eyes always specialized, either minute (*Bathymicrops*, *Bathypterois*, *Bathytyphlops*), or flat, directed dorsally, and lensless (*Ipnopis*); mouth large, the upper jaw extending far behind eye; dorsal fin large, placed over or before middle of body, inserted before pelvic-fin insertion, with 8 to 16 rays; adipose fin present or absent; anal fin inserted under or well behind level of dorsal fin, with 7 to 19 rays; pelvic fins in anterior half of body, often elongate; caudal fin and paired fins with elongate specialized rays in *Bathypterois*; gill rakers normal, lath-like, or reduced to low rugose knobs.



teardrop-shaped pupil

Chlorophthalmidae

*Bathypterois*

elongate specialized rays

Ipnopidae

Key to the species of Synodontidae occurring in the area

- 1a. Pelvic-fin rays 9, the inner rays subequal or slightly longer than outer rays (Fig. 1b) ***Saurida parri***
- 1b. Pelvic-fin rays 8, the inner rays distinctly longer than outermost rays (Fig. 1a) → 2

- 2a. Anal-fin rays 15 to 17; length of anal-fin base longer than dorsal-fin base (Fig. 2a); scales present on procurrent caudal-fin rays (Fig. 3a) ***Trachinocephalus myops***
- 2b. Anal-fin rays 8 to 11; length of anal-fin base shorter than dorsal-fin base (Fig. 2b); no scales on procurrent caudal- fin rays (Fig. 3b) → 3

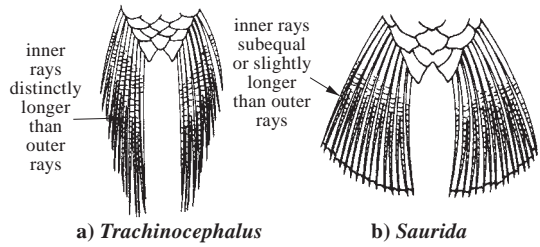


Fig. 1 pelvic fins

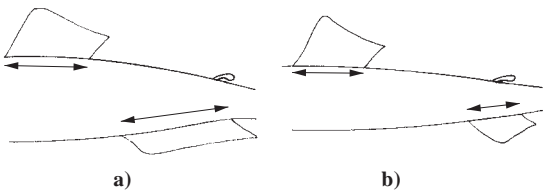


Fig. 2 lateral view of body

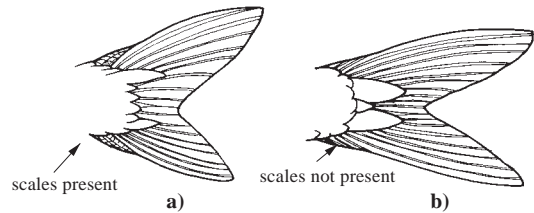


Fig. 3 caudal fin

- 3a. Three rows of complete scales between lateral line and base of dorsal fin (Fig. 4a). ***Synodus saurus***
- 3b. Four to six rows of complete scales between lateral line and base of dorsal fin (Fig. 4b) ***Synodus synodus***

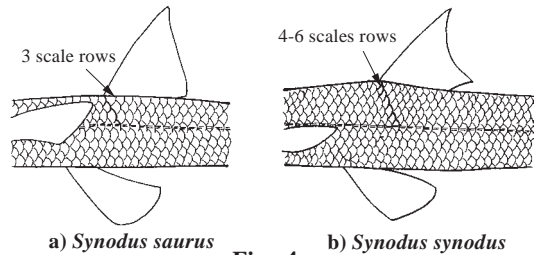


Fig. 4

List of species occurring in the area

The symbol is given when species accounts are included.

- Saurida parri* Norman, 1935.
- Synodus saurus* (Linnaeus, 1758).
- Synodus synodus* (Linnaeus, 1758).
- Trachinocephalus myops* (Forster, 1801).

References

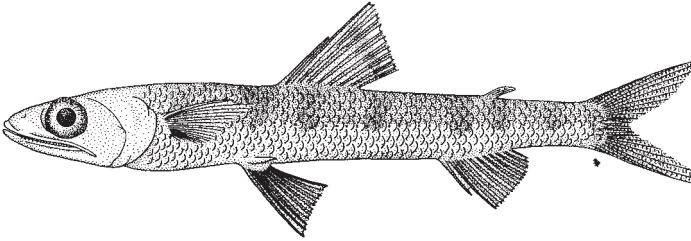
Anderson, W.W., Gehringer, J.W. & Berry, F.H. 1966. Family Synodontidae. In G.W. Mead, H.B. Bigelow, C.M. Breder, D.M. Cohen, D. Merriman, Y.H. Olsen, W.C. Schroeder, L.P. Schultz & J.Tee-Van, eds. Fishes of the Western North Atlantic. *Memoirs of the Sears Foundation for Marine Research*, 1(5): 30–102.

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Saurida parri Norman, 1935

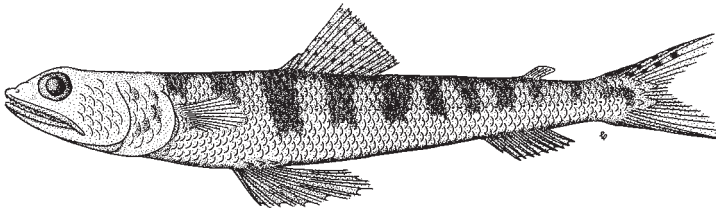
En – Parr's lizardfish; **Fr** – Anoli Parr; **Sp** – Lagarto Parr.

Maximum size to 10 cm standard length; commonly between 5 and 8 cm. Inhabits bottom areas of the outer continental shelf in depths of 18 to 410 m. Of no importance to fisheries. Widespread but patchy in the tropical eastern Atlantic from Mauritania to Angola, including Ascension Island. This species has been recorded by some authors as *Saurida brasiliensis*, a western Atlantic species, but recent work shows the 2 species are genetically distinct.

***Synodus saurus*** (Linnaeus, 1758)

En – Atlantic lizardfish (AFS: Bluestripe lizardfish); **Fr** – Anoli saury; **Sp** – Lagarto saury.

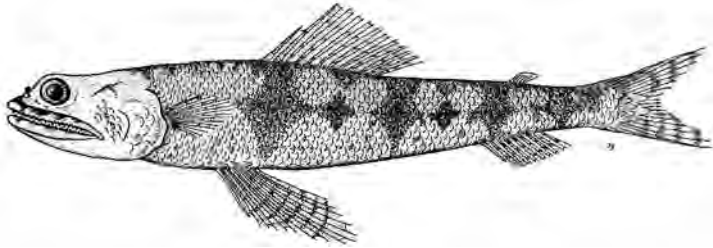
Maximum size about 40 cm standard length; commonly to about 12 cm. Inhabits shallow bottom areas usually in depths less than 20 m, but recorded as deep as 400 m. Of no importance to fisheries. Occurs from Gibraltar southwards along the coast of West Africa, including the Azores, Canary Islands, and Cape Verde Islands. Also in the Mediterranean Sea. In the western Atlantic recorded only from the Bahamas and the Leeward islands, West Indies (records from Bermuda are not substantiated).



***Synodus synodus* (Linnaeus, 1758)**

En – Redbarred lizardfish (AFS: Red lizardfish); **Fr** – Anoli commun; **Sp** – Lagarto capitán.

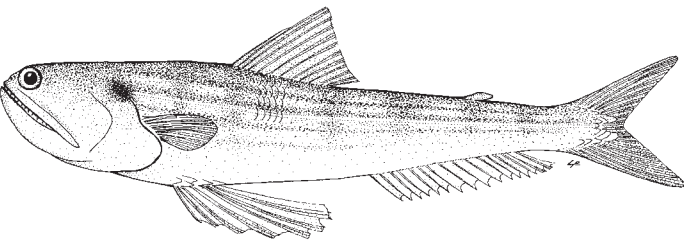
Maximum size about 30 cm standard length; commonly 15 cm. Inhabits mainly inshore bottoms and shallower areas of the continental shelf down to about 90 m depth. Of little importance to fisheries. Recorded in the area from Senegal to northern Angola; also from Madeira, the Canary Islands, Cape Verde Islands, Ascension Island and St Helena. Recent studies show populations of this species in the eastern Atlantic are genetically different from those of the western Atlantic.



***Trachinocephalus myops* (Forster, 1801)**

En – Snakefish; **Fr** – Anoli serpent; **Sp** – Lagarto ñato.

Maximum size about 35 cm standard length. Inhabits inshore and offshore bottom areas in depths down to about 365 m, but more commonly found in midshelf areas in depths between 25 and 90 m. Of little importance to fisheries. Pantropical, with the exception of the eastern Pacific. In the area recorded from St Helena Island, Ascension Island, Cape Verde Islands, and the African coast between lat. 20°N and 20°S. In the western Atlantic occurs as far north as Cape Cod, but more commonly southward from North Carolina to equatorial Brazil, including Bermuda, the Bahamas, and the Gulf of Mexico.

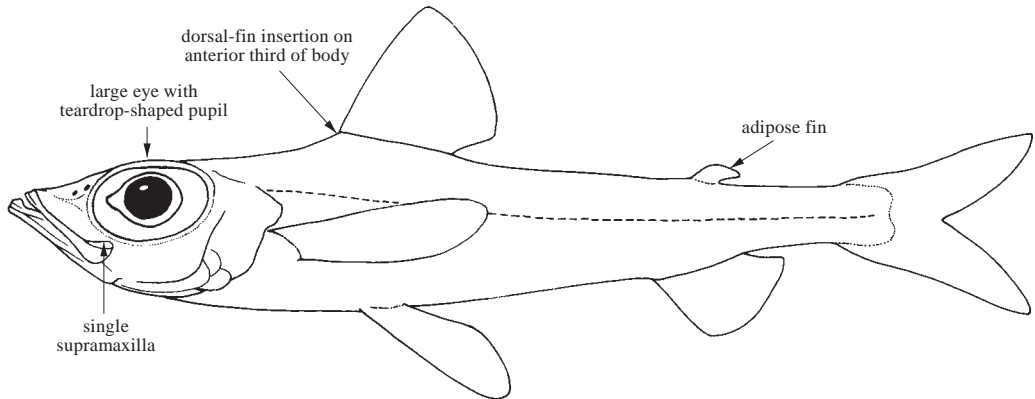


CHLOROPHTHALMIDAE

Greeneyes

by B.C. Russell, Museum and Art Gallery of the Northern Territory, Darwin, Australia (after Thompson 2002)

Diagnostic characters: Small (20 to 23 cm), slender aulopiform fishes, nearly oval in cross section. Head about 30% standard length; **large eye with horizontal teardrop-shaped pupil and distinctive lensless space anteriorly**; snout moderately long, somewhat depressed; lower jaw protrudes beyond upper jaw and ends in small symphyseal knob; **maxilla is slightly expanded posteriorly, with a single supramaxilla, and reaches anterior pupil**; **dorsal-fin insertion on anterior third of body**; dorsal fin with more rays than anal fin; dorsal-fin rays 10 or 11, anal-fin rays 7 to 9; **adipose fin over middle of anal fin**; pectoral fin inserted below midflank anterior to both dorsal and pelvic fins, longer than pelvic fin, pectoral-fin rays 15 to 17; pelvic fins subthoracic, pelvic-fin rays 8 or 9; all fins lack spines. **Anus located closer to pelvic fins than to anal fin**; lateral line complete; scales either ctenoid or spinoid. **Colour:** body light brown to greenish sometimes with blotches; eye green in live specimens.



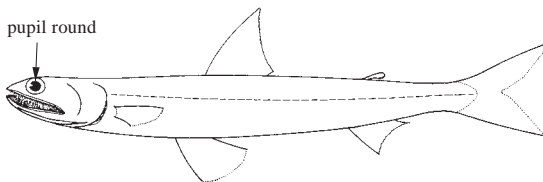
Habitat, biology, and fisheries: Family benthic, from 50 to 1 000 m, usually below 200 m. Feeds on fish and crustaceans. All are thought to be hermaphroditic. No fishery.

Remarks: Sulak (1977) included the nominal families Bathypteroidae and Ipnopidae as a subfamily, Ipnopinae, within the Chlorophthalmidae. There is debate on limits and relationships within this family (Baldwin and Johnson, 1996). Sato and Nakabo (2002) removed 48 species, placing them in family Paraulopidae and placed *Bathysauropsis* in a monotypic family. A review of world literature suggests there are 2 genera and approximately 25 species.

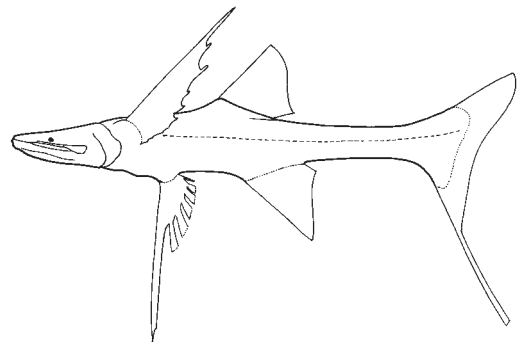
Similar families occurring in the area

Ipnopidae: upper jaw extending far behind eye, except *Ipnops* with modified eyes; dorsal fin inserted over or behind pelvic fins.

Synodontidae: pupil round; upper jaw extending far beyond eye; anus close to anal-fin origin.

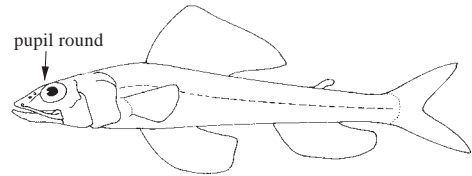


Synodontidae



Ipnopidae

Aulopidae: pupil round; lower jaw without bony or fleshy tip included in gape; 2 supramaxillae; anus about midway between pelvic and anal-fin origins.



Aulopidae

Key to the species of Chlorophthalmidae occurring in the area

- 1a. Eye comparatively large, diameter less than 1.25 times in snout; anus close to base of inner pelvic-fin rays (Fig. 1), separated by 2 or 3 scales; vomerine teeth all small
 *Chlorophthalmus agassizi*
- 1b. Eye comparative small, diameter greater than 1.25 times in snout; anus well behind base of inner pelvic-fin rays (Fig. 2), separated by 8 to 10 scales; vomer with several large fang-like teeth
 *Parasudis fraserbrunneri*

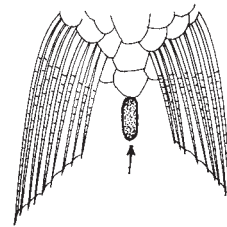


Fig. 1 *Chlorophthalmus*

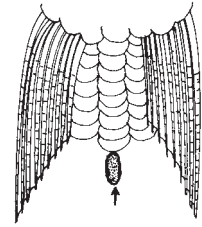


Fig. 2 *Parasudis*

List of species occurring in the area

Chlorophthalmus agassizi Bonaparte, 1840. To about 23 cm. Widespread in tropical to warm-temperate Atlantic; in the area from the northern boundary to at least 19°S, including the Canary and Cape Verde Islands.

Parasudis fraserbrunneri (Poll, 1953). To about 25 cm. Known only from the tropical eastern Atlantic, from about 21°N to 7°S.

References

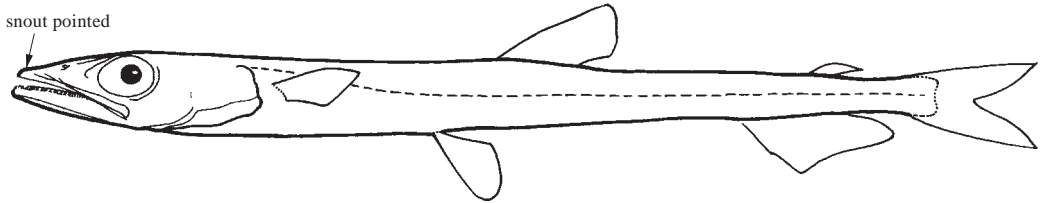
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NOTOSUDIDAE

Waryfishes

by B.C. Russell, Museum and Art Gallery of the Northern Territory, Darwin, Australia (after Thompson, 2002)

Diagnostic characters: Small to moderately large (10 to 50 cm), slender, elongate aulopiform fishes. Head variable in length; nontubular eye large, placed laterally on head; **snout long, sharply pointed, and somewhat depressed; jaw extends close to rear of eye; jaw teeth small, no enlarged fangs.** Dorsal fin midway on body, soft dorsal-fin rays 10 to 13; adipose fin above anal fin; anal fin far back on body, with more fin rays than dorsal fin, soft anal-fin rays 17 to 21; pectoral fins at or above midline of sides, longer than pelvic fin, soft pectoral-fin rays 10 to 15; pelvic fins anterior to dorsal fin insertion, soft pelvic-fin rays 9. **Body and head covered with large, deciduous, cycloid scales;** photophores absent; lateral line complete; lateral-line scales 46 to 64. **Colour:** brown to black, head and opercle often black, some with silver on body.



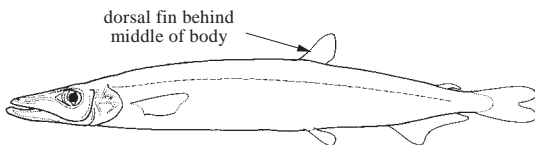
Habitat, biology, and fisheries: Found in tropical and temperate oceans, worldwide. Usually epi- to upper-bathypelagic, some species more demersal. Larvae are meso- to epipelagic. They feed on zooplankton, small fishes, and crustaceans. With maturity, gill rakers and teeth are lost. All species thought to be synchronous hermaphrodites. No fishery.

Remarks: Formerly placed in family Scopelosauridae. Bertelsen *et al.* (1976) recognized 19 species in 3 genera.

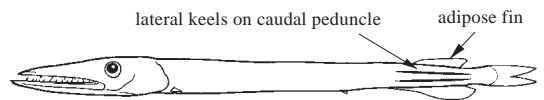
Similar families occurring in the area

Paralepididae: dorsal fin behind midbody; teeth slender canines; anal-fin rays 20 to 50; pectoral fin set below lateral line.

Anotopteridae: dorsal fin absent; lateral keels on caudal peduncle.

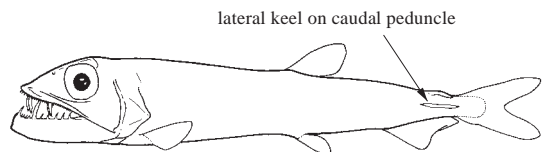


Paralepididae



Anotopteridae

Omosudidae: massive lower jaw; lateral keel on caudal peduncle; pectoral fins low on body; dorsal fin slightly behind middle of body.



Omosudidae

Key to the genera of Notosudidae occurring in the area

- 1a. Pelvic-fin below or just in front of dorsal-fin origin; posterior infraorbital bones simple half-tubes (Fig. 1a) **Ahliesaurus**
- 1b. Pelvic-fin distinctly in front of dorsal-fin origin; posterior infraorbital bones with posterior expansions (Fig. 1b) → 2

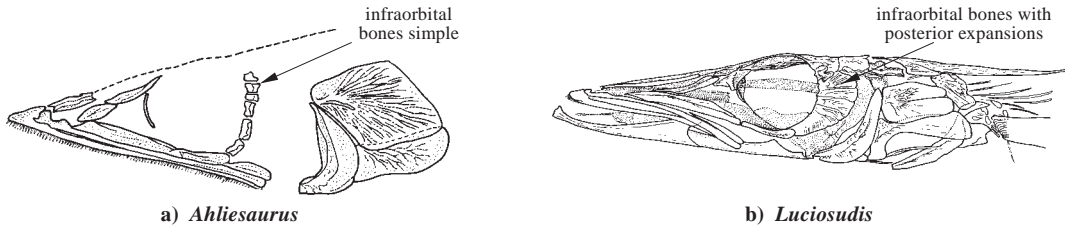


Fig. 1 infraorbital bones

- 2a. Lower part of first gill arch with 22 rakers or less **Scopelosaurus**
- 2b. Lower part of first gill arch with 27 to 30 rakers **Luciosudis**

List of species occurring in the area

- Ahliesaurus berryi* Bertelsen, Krefft, and Marshall, 1976. to 30 cm. Subtropical and tropical Atlantic, Indian, and C Pacific oceans; widespread in the area in depths greater than 1 000 m.
- Luciosudis normani* Fraser-Brunner, 1931. To 21 cm. Circumglobal in temperate and subtropical oceans; in the area, known only from a single questionable record of a specimen off Angola (11°5'S, 3°20'E).
- Scopelosaurus argenteus* (Maul, 1954). To 24 cm. Temperate and tropical Atlantic above equator; in the area, mainly over slope regions off NW Africa.
- Scopelosaurus lepidus* (Krefft and Maul, 1955). To 38 cm. N to tropical Atlantic; in the area, in slope regions especially in the upwelling area off W Africa, southward to about 10°S.
- Scopelosaurus meadi* Bertelsen, Krefft, and Marshall, 1976. To 11 cm. Subtropical and tropical W Atlantic, W Indian, and W Pacific oceans; in the area, known from a single specimen, at 19°16'S, 1°48'W, at 328 m depth, and from off Angola.
- Scopelosaurus smithii* Bean, 1925. To 25 cm. Worldwide in warm-temperate to tropical waters; in the area, known from a single juvenile taken at about 20°N, 30°W and from off Angola.

References

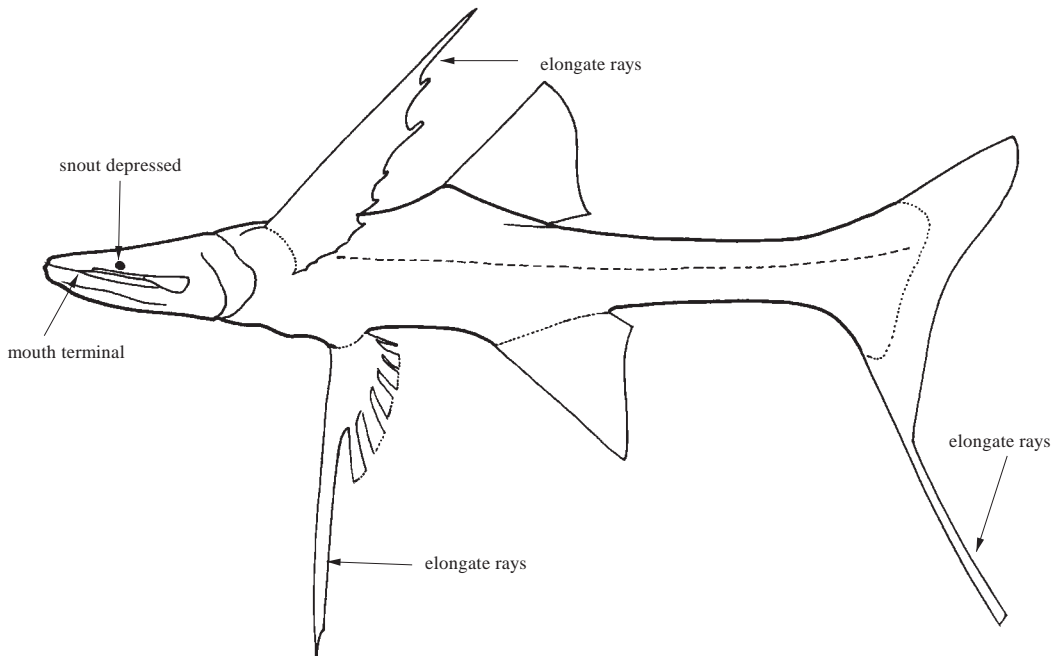
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IPNOPIDAE

Tripod fishes

by B.C. Russell, Museum and Art Gallery of the Northern Territory, Darwin, Australia (after Thompson 2002)

Diagnostic characters: Small (13 to 40 cm), slender aulopiform fishes; body oval in cross-section, but snout is depressed, sometimes spatulate; mouth terminal, maxilla expanded posteriorly and extended far beyond eye, with a single supramaxilla; eye variously modified and reduced, often very small or vestigial, sometimes covered by skin and scales; broad, concave interorbit. Dorsal fin located on anterior third to half of body; adipose fin, when present, located posterior to anal-fin base; caudal fin forked, usually with lower lobe longer than upper lobe and may have elongate rays; pectoral fin variously modified, often with elongate rays; pelvic fin subthoracic, anterior to dorsal-fin insertion and may possess modified elongate rays anteriorly; all fins lack spines; dorsal-fin rays 9 to 15, anal-fin rays 8 to 17, pectoral-fin rays 12 to 21, pelvic-fin rays 8 or 9. Body and head scales deciduously cycloid; lateral line complete. Lateral-line scales 48 to 70. Anus midway between origins of pelvic and anal fins. **Colour:** variable, many species black or black with white markings, other species pale or white.

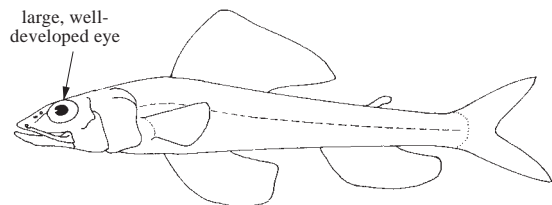


Habitat, biology, and fisheries: Found worldwide in tropical to temperate oceans, often very deep (500 to 6 000 m). Although poorly documented, reported to be benthic predators on small fishes, squids, and crustaceans. All species are thought to be synchronous hermaphrodites. No fishery.

Remarks: Twenty-eight species in 5 genera are recognized. Many species are poorly known, intra- and interspecific variation not well documented.

Similar families occurring in the area

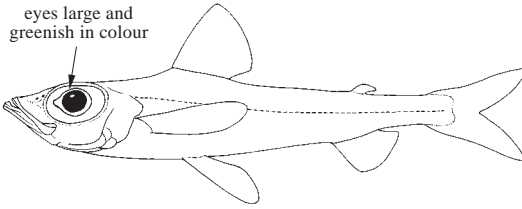
Aulopidae: 2 supramaxilla present; large well-developed eyes; dorsal-fin and pelvic-fin origin about even; many body scales spinoid; jaw extends only to posterior margin of eye.



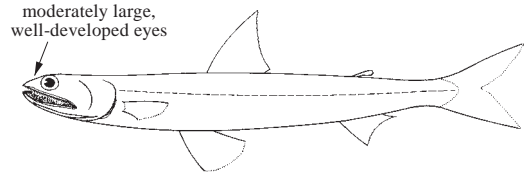
Aulopidae

Chlorophthalmidae: eyes large and greenish in colour with teardrop-shaped pupil; jaw at maximum extends to midpoint of eye; fins never with elongated rays; anus close to pelvic-fin origin.

Synodontidae: maxilla reduced; fins never with elongated rays; usually with moderately large, well-developed eyes; anus close to anal-fin origin.



Chlorophthalmidae



Synodontidae

Key to the genera of Ipnopidae occurring in the area (modified after Merrett and Nielsen 1987)

- 1a. Dorsally directed eyes covered by thin, bony membrane, appearing as large plates ***Ipnops***
- 1b. Laterally placed eyes not covered by thin bony membrane → **2**
- 2a. Eyes placed near corners of gape, scale pockets barely evident ***Discoverichthys***
- 2b. Eyes placed above midlength of jaws, scale pockets very distinct → **3**
- 3a. Pectoral, ventral, and caudal fins with stiffened produced rays, total gill rakers on anterior arch 34 to 49 ***Bathypterois***
- 3b. No fins with stiffened produced rays, total gill rakers on anterior arch 12 to 21 → **4**
- 4a. Ventral fins well in advance of dorsal fin, anterior gill arch with 10 to 18 long rakers . . . ***Bathymicrops***
- 4b. Ventral fins just anterior to dorsal fin, anterior gill arch with a single long raker . . . ***Bathytyphlops***

List of species occurring in the area

- Bathymicrops brevianalis* Nielsen, 1966. To 13 cm. Atlantic and Indo-West Pacific; in the area, at lat. 31°N.
- Bathymicrops regis* Hjort and Koefoed, 1912. To 13 cm. Atlantic and Indo-West Pacific; in the area, off NW Africa and east of the mid-Atlantic Ridge between lat. 30°N and equator.
- Bathypterois atricolor* Alcock, 1896. To 25 cm. Tropical E Atlantic, circumglobal except W Atlantic in temperate and tropical oceans; in the area, off W Africa between Liberia and Nigeria.
- Bathypterois dubius* Vaillant, 1888. To 25 cm. Warm-temperate to tropical Atlantic and Mediterranean Sea; in the area, off NW Africa from Sierra Leone northward.
- Bathypterois grallator* (Goode and Bean, 1886). To 40 cm. Warm-temperate Atlantic and Mediterranean Sea, Indian, and W Pacific oceans; in the area, off Cape Blanc, Gulf of Guinea, on mid-Atlantic Ridge, off Equatorial Africa.
- Bathypterois longipes* Günther, 1878. To 27 cm. Widespread in Atlantic and central and eastern Pacific; in the area, S of Cape Verde Islands, off Cape Blanc and off SW Africa.
- Bathypterois phenax* Parr, 1928. To 20 cm. Warm-temperate to tropical Atlantic; in the area off Sierra Leone and Liberia.
- Bathypterois quadrifilis* Günther, 1878. To 20 cm. Warm-temperate to tropical Atlantic; in the area, from the Gulf of Guinea.
- Bathypterois viridensis* (Roule, 1916). To 25 cm. Warm-temperate to tropical Atlantic; in the area, off W Africa, Cape Verde Islands and off Liberia.

- Bathytyphlops marionae* Mead, 1958. To 35 cm. Tropical Atlantic and W Indian oceans; in the area, off W Africa at lat. 9°N.
- Bathytyphlops sewelli* (Norman, 1939). To 32 cm. Temperate and tropical Atlantic and W Indian oceans; in the area, off W Africa between Cape Verde Islands and Nigeria.
- Discoverichthys praecox* Merrett and Nielsen 1987. To 15 cm. Warm-temperate E Atlantic; in the area, at lat. 31°N.
- Ipnops agassizii* Garman, 1899. To 15 cm. Tropical and warm-temperate Atlantic, Indian and Pacific oceans; in the area, on eastern side of mid-Atlantic Ridge between 5-6°N and off SW Africa at lat. 22°S.
- Ipnops murrayi* Günther, 1878. To 17 cm. Warm-temperate and tropical Atlantic; in the area, at lat. 31°N.

References

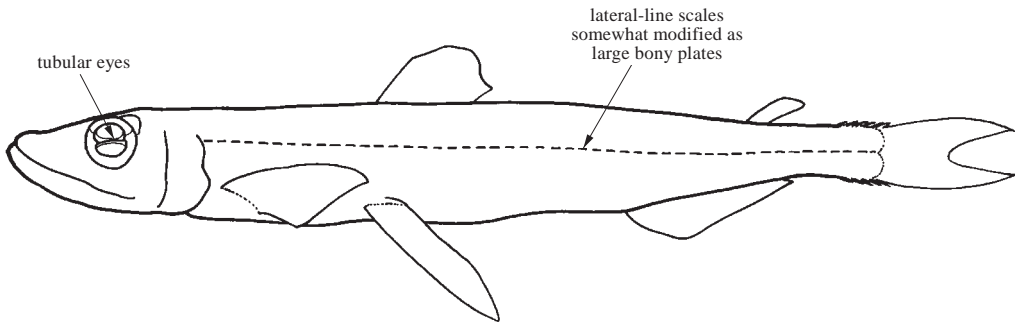
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SCOPELARCHIDAE

Pearleyes

by B.C. Russell, Museum and Art Gallery of the Northern Territory, Darwin, Australia (after Thompson 2002)

Diagnostic characters: Small (5 to 16 cm), somewhat elongate, slender, and slightly compressed aulopiform fishes. Head about 25% standard length, snout variable in shape and length; interorbit narrow; **tubular eyes often directed dorsally**; **mouth terminal with lanceolate teeth in lower jaw and hooked teeth on tongue**; jaw extends past rear margin of eye; supramaxilla present in some species; **gill rakers modified into bony plates**. Dorsal fin inserts slightly anterior to midbody, soft dorsal-fin rays 6 to 9; adipose fin above rear part of anal fin; anal fin with more rays than dorsal fin, soft anal-fin rays 18 to 29; caudal fin moderately forked; pectoral fins located on lower side of body anterior to both dorsal fin and pelvic fins and can be either shorter or longer than pelvic fins, soft pectoral-fin rays 18 to 28; pelvic fins located under dorsal fin, soft pelvic-fin rays 9 or 10; no modified or elongate fin rays; no spines in any fins; **body and part of head covered with cycloid scales**; **lateral-line scales somewhat modified as large bony plates with a large pore partially covered by tympanum**; swimbladder absent; several species have luminous tissue; lateral-line scales 40 to 59. **Colour:** brown, brassy to black, some iridescence, some species with dark band at or above and below lateral line.



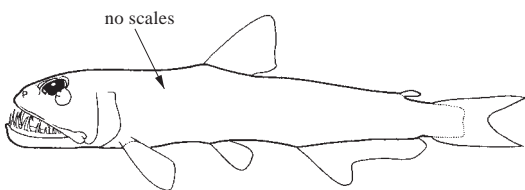
Habitat, biology, and fisheries: Found in tropical oceans, worldwide; meso- and bathypelagic at 500 to 1 000 m. Predators on a variety of pelagic fishes. The family considered to be synchronous hermaphrodites. No fishery.

Remarks: Johnson (1974a) recognized 17 species in 4 genera.

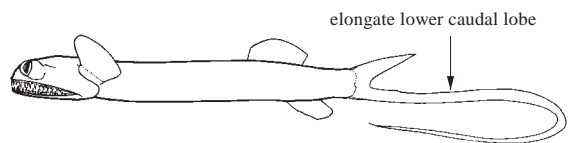
Similar families occurring in the area

Evermannellidae: tongue toothless; no body or lateral-line scales; dorsal fin with 10 to 13 rays.

Giganturidae: tongue toothless; elongate lower caudal lobe; scales and lateral line absent; pelvic fins absent in adults; pectoral fins high on body.



Evermannellidae



Giganturidae

Key to species (adults only) of Scopelarchidae occurring in area (modified from Johnson, 1974a)

- 1a. Equal or subequal pigment stripes above and below lateral line extending forward from caudal peduncle; pectoral fin larger than pelvic fin; pectoral fin with 18 to 22 soft rays; no distinct concentration of pigment on upper caudal-fin lobe **Scopelarchus**
- 1b. No distinct pigment stripes above and below lateral line extending forward from caudal peduncle; pectoral fin less than or equal to pelvic fin length; pectoral fin with 20 to 28 soft rays; distinct concentration of pigment on upper caudal-fin lobe → 4
- 2a. Pectoral fin unpigmented, anal-fin rays usually 25 **Scopelarchus guentheri**
- 2b. Pectoral fin pigmented, anal-fin rays usually 25 → 3
- 3a. Anal-fin rays 21 or more (usually 22); lateral-line scales 45 or more (usually 46) **Scopelarchus analis**
- 3b. Anal-fin rays 22 or fewer (usually 21); lateral-line scales 44 or fewer . . . **Scopelarchus michaelsarsi**
- 4a. Pelvic-fin insertion under or posterior to dorsal-fin insertion **Scopelarchoides danae**
- 4b. Pelvic-fin insertion distinctly anterior to dorsal-fin insertion → 5
- 5a. Pectoral fin with 25 to 28 rays; pectoral fin less than pelvic fin in length; lateral-line scales 55 to 59 **Benthalbella infans**
- 5b. Pectoral fin with 21 to 26 rays; pectoral fin equal to pelvic fin in length; lateral-line scales 47 to 53 **Rosenblattichthys hubbsi**

List of species occurring in the area

Benthalbella infans Zugmayer, 1911. To 15 cm. Warm-temperate to tropical oceans worldwide; widespread in area, mainly between 30°N and 15°N; unknown from the Gulf of Guinea.

Rosenblattichthys hubbsi Johnson, 1974. To 16 cm. Subtropical and tropical oceans worldwide; in area, known from only 3 collections between 24°N and 2.5°S.

Scopelarchoides danae Johnson, 1974. To 13 cm. Tropical oceans worldwide. In the area, from equatorial East Atlantic.

Scopelarchus analis (Brauer, 1902). To 13 cm. Warm-temperate to tropical oceans worldwide; widespread in area.

Scopelarchus guentheri Alcock, 1896. To 13 cm. Subtropical and tropical oceans worldwide; widespread in area, with records from about 7°N to 23°S, but unknown from the Gulf of Guinea.

Scopelarchus michaelsarsi Koefoed, 1955. To 11 cm. Subtropical and tropical oceans worldwide; widespread south of equator, off São Tomé and Congo.

References

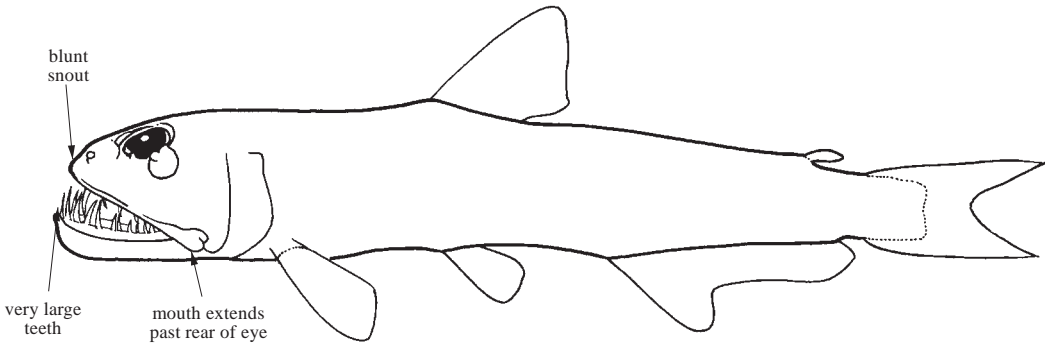
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EVERMANNELLIDAE

Sabertooth fishes

by B.C. Russell, Museum and Art Gallery of the Northern Territory, Darwin, Australia (after Thompson 2002)

Diagnostic characters: Small (13 to 20 cm), somewhat, compressed aulopiform fishes. **Short head with short, blunt snout; eye may be tubular or nontubular** and varies in size; **mouth large, extending past rear of eye; upper jaw with single supramaxilla; very large teeth**, some barbed at tip. No spines or modified rays in any fins, soft dorsal-fin rays 11 to 13; adipose fin above posterior anal fin; anal fin with more rays than dorsal fin, anterior rays longest, soft anal-fin rays 26 to 37; caudal fin deeply forked; pectoral fins very low on body, short distance anterior to pelvic fins, pectoral-fin rays 11 to 13, pectoral fins longer than pelvic fins; pelvic-fin rays 9; luminous tissues in several species. Normal scales lacking on head and body. **Colour:** variable, pale grey-white, brown, to brown-black.



Habitat, biology, and fisheries: Sabertooth fishes are found worldwide in warm-temperate to tropical oceans. Adults generally occupy the upper 800 to 1 000 m. They are predators on small fishes and squid. Family is reported to be synchronous hermaphrodites. No fishery.

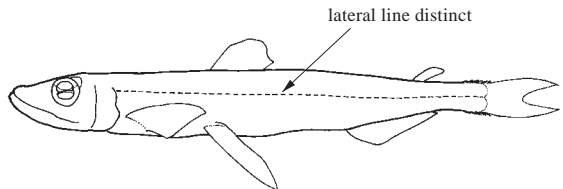
Remarks: Johnson (1982) recognized 6 species in 3 genera.

Similar families occurring in the area

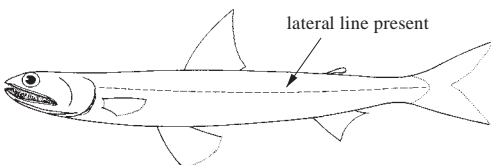
Scopelarchidae: large teeth on tongue; body scales present; lateral line distinct and made of large pored scales.

Synodontidae: no large fangs in jaws; body always scaled; lateral line present.

Omosudidae: lateral keel on caudal peduncle; massive lower jaw, somewhat truncated; dorsal fin behind midpoint of body.



Scopelarchidae



Synodontidae



Omosudidae

Key to the genera of Evermannellidae occurring in the area

- 1a.** Eyes normal and lateral in position, not tubular; aperture in adipose eyelid less than lens diameter ***Odontostomops***
- 1b.** Eyes tubular or semi-tubular, directed at least somewhat dorsally; aperture in adipose eyelid greater than lens diameter → **2**
- 2a.** Eyes semi-tubular, directed dorsolaterally; aperture in adipose eyelid slightly larger than lens diameter; jaw teeth without barbed tips ***Coccorella***
- 2b.** Eyes tubular, directed dorsally; aperture in adipose eyelid greatly exceeds lens diameter; at least some jaw teeth with barbed tips ***Evermannella***

List of species occurring in the area

- Coccorella atlantica* (Parr, 1928). To 20 cm. Worldwide in warm-temperate to tropical oceans; antitropical distribution within the area, from 20-30°N and south of 8°S.
- Evermannella balbo* (Risso, 1820). To 17 cm. Worldwide in warm-temperate to tropical oceans; in the area, from about 30°N to 5°S.
- Evermannella melanoderma*. Parr, 1928. (All previous records of *Evermannella indica* from the Atlantic are now known to be *E. melanoderma*). To 14 cm. Eastern Atlantic; widespread throughout the area, with numerous records between 30°N and 5°S.
- Odontostomops normalops* (Parr, 1928). To 14 cm. Worldwide in warm-temperate to tropical oceans; widespread throughout the area, with numerous records between about 5°N and 5°S of the equator.

References

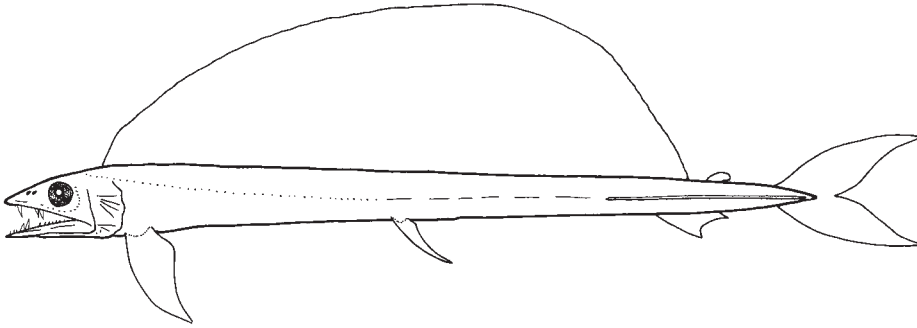
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ALEPISAUROIDAE

Lancetfishes

by B.C. Russell, Museum and Art Gallery of the Northern Territory, Darwin, Australia (after Gibbs 1981)

Diagnostic characters: Long (to 2 m), slender fishes (young stages are relatively much shorter than adults, their length increasing relative to body depths as they grow), their bodies compressed, the caudal region being slightly depressed **with a lateral adipose keel on each side**. Head compressed and triangular; teeth in jaws fairly small, in a single row, **but those on palatine bones (roof of mouth), erect and dagger-like, easily visible when mouth is open**; gill bars with spines on their leading edge. No spines in fins; **dorsal fin almost as long as body and very high sail-like; an adipose dorsal fin present; pectoral fins set very low on body**; pelvic fins far behind the pectorals; caudal fin forked. Scales absent. **Colour:** dark metallic bluish to black above; sides paler, with rather small spots and iridescent reflections; fins dark blue to black.

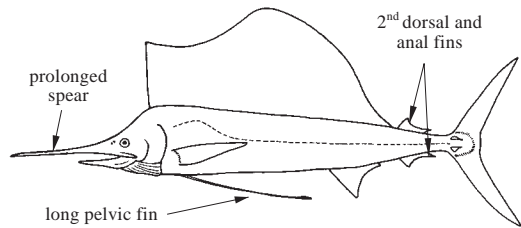


Habitat, biology, and fisheries: Alepisaurids are found from about 40 m from the surface to below 1 000 m in temperate to tropical waters of world oceans with few cold-water records. They are predators known to eat cephalopods, crustaceans, and fishes. They are hermaphroditic. Commonly caught on long-line gear used in the tuna and billfish fisheries but with no fishery interest probably due to their soft, flabby flesh.

Similar families occurring in the area

The conspicuous sail-like dorsal fin distinguishes the Alepisauridae from all other aulopiform fishes.

Istiophoridae (particularly *Istiophorus albicans*): superficially similar to the Alepisauridae because of the long and high dorsal fin; but distinguished by prolonged spear-like upper jaw, presence of a second dorsal and anal fin and long narrow pelvic fins inserted below the pectoral-fin base.



Istiophorus albicans

Key to the species of Alepisauridae occurring in the area

- 1a. Dorsal fin low in front, forming a curve that is highest near the middle, without free rays; head short (12 to 17% of standard length); snout short (less than one-third of head length) ***Alepisaurus brevirostris***
- 1b. Dorsal fin high in front, with several free rays; head long (17% or more of standard length); snout long (one-third to one-half of head length) ***Alepisaurus ferox***

List of species occurring in the area

Alepisaurus brevirostris Gibbs, 1960. To 1 m TL. Tropical and warm-temperate Atlantic, Pacific, and Indian oceans; in the area, recorded from off the coast of W Africa between about 5–12°N, and in the SE Atlantic south of St Helena.

Alepisaurus ferox Lowe, 1833. To 2 m TL. Temperate and warm-temperate Atlantic, Pacific, and Indian oceans; in the area recorded from off the Canary Islands, Cape Verde Islands and St Helena.

References

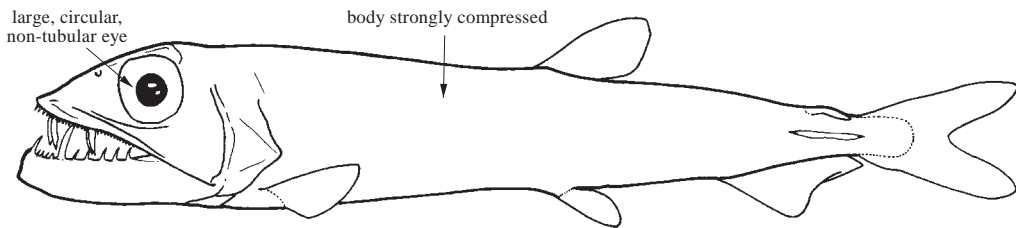
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OMOSUDIDAE

Hammerjaws

by B.C. Russell, Museum and Art Gallery of the Northern Territory, Darwin, Australia (after Thompson 2002)

Diagnostic characters: Small aulopiform fishes (to 25 cm); moderately elongate and **strongly compressed**. Head large; **large, circular, nontubular eye placed laterally on head**; mouth very large, extending posterior to back of eye; **massive lower jaw**, somewhat truncated; **greatly enlarged teeth** on both dentaries and palatines. No spines present in any fins. Dorsal fin just posterior to midbody with short base and fewer soft rays than anal fin, dorsal-fin soft rays 9 to 11; small adipose fin over middle of anal fin; anal-fin soft rays 13 or 14; caudal fin deeply forked; pectoral fin low on body, pectoral-fin soft rays 11 to 13; pelvic fins about midway between pectoral fins and anal fin; scales absent, pelvic-fin soft rays 8; **midlateral keel below adipose fin**; swimbladder absent. **Colour:** iridescent silver body, darker dorsally, black peritoneum visible.



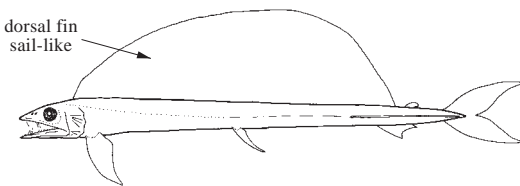
Habitat, biology, and fisheries: Worldwide in tropical and warm-temperate oceans, reported from 700 to 1 650 m. Predators on small fishes and squids, often consuming prey larger than themselves. They are reported to be synchronous hermaphrodites. No fishery.

Remarks: Monotypic. Included within family Alepisauridae by Baldwin and Johnson (1996).

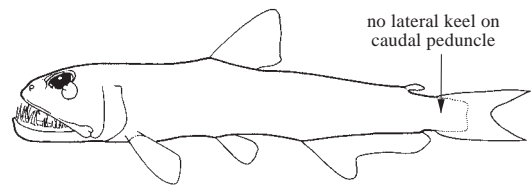
Similar families occurring in the area

Alepisauridae: dorsal fin large, sail-like.

Evermannellidae: no lateral keel on caudal peduncle; dorsal fin slightly anterior to middle of body; teeth present on tongue; anal fin long with 26 to 37 rays.



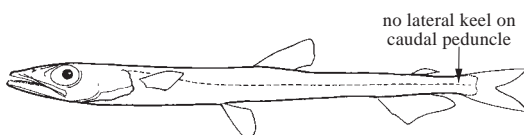
Alepisauridae



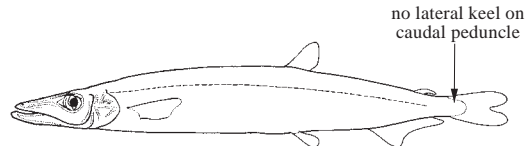
Evermannellidae

Notosudidae: no lateral keel on caudal peduncle; no fangs in jaws; scales present; lower jaw not deep.

Paralepididae: no lateral keel on caudal peduncle; adults with lateral line; jaws shorter, not extending past eye; anal fin long with 20 to 50 rays.



Notosudidae



Paralepididae

List of species occurring in the area

Omosudis lowii Günther 1887. To 25 cm. Worldwide in tropical and warm-temperate oceans; Ghana to São Tomé, but probably more widespread in the area.

References

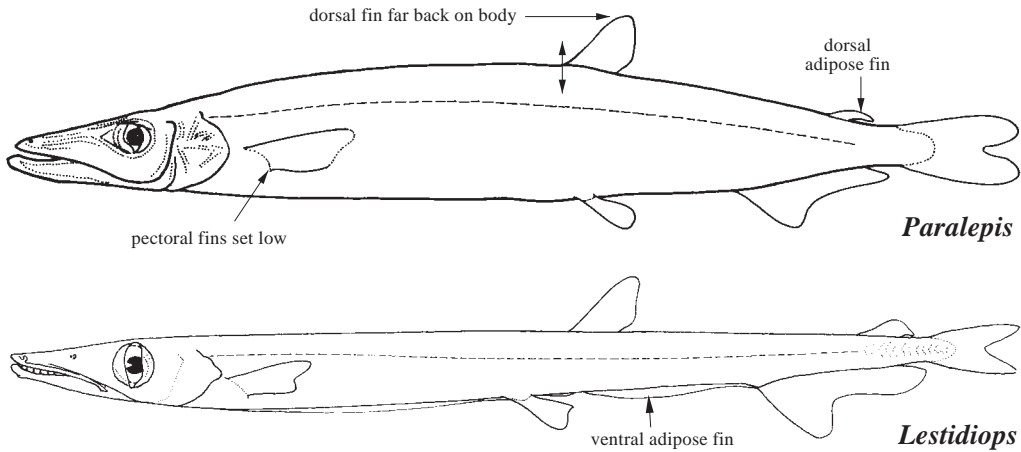
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PARALEPIDIDAE

Barracudinas

by B.C. Russell, Museum and Art Gallery of the Northern Territory, Darwin, Australia (after Post, 1981)

Diagnostic characters: Small to medium-sized (6 to 53 cm), very elongate and slender aulopiform fishes; cross section of body oval or compressed. Eye medium to large, nontubular, located on side of head; **snout very long and pointed with terminal mouth**, but lower jaw may project as fleshy process; mouth extends to front of eye or under middle of eye; teeth small; **alternately fixed and depressible fang-like teeth on lower jaw and roof of mouth**; single small supramaxilla on dorsal edge of maxilla. **Gill rakers reduced to small multiple spines set on bony plates** (sometimes lost with growth). Dorsal-fin origin midpoint of body either above pelvic fins or over space between pelvic fins and anal fin; dorsal fin with 8 to 13 soft rays. Dorsal adipose fin over rear part of anal fin and, in addition, several species possess a ventral adipose fin. Anal fin with 20 to 42 soft rays. Caudal fin deeply forked. Pectoral fins set low on body and slightly longer than or same length as pelvic fins, rarely pelvic fins are longer than pectoral fins; pectoral fin with 10 to 17 soft rays; pelvic fins with 8 or 9 soft rays. No elongate or modified fin rays. Specialized lateral-line scales covered with tympanum; usually scales only on body, but few species possess other body scales; 51 to 92 lateral-line scales when present. Swimbladder absent. **Colour:** iridescent silver, some species with spotted or blotched body pattern.



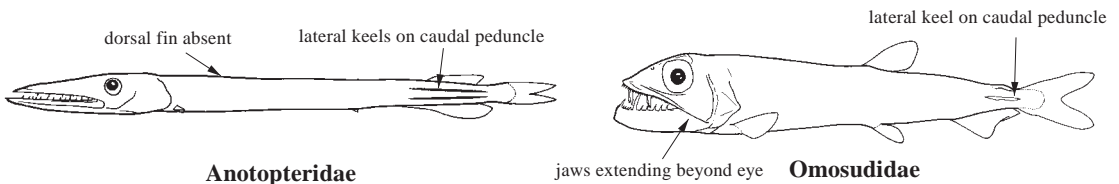
Habitat, biology, and fisheries: Found from polar regions to tropics worldwide, but most common and diverse in tropics. Generally meso- to bathypelagic, to depths of about 800 m. Feed on small fishes. Some species have separate sexes, others are synchronous hermaphrodites. No fishery.

Remarks: There remains some disagreement concerning the number of valid species and generic placement of members of this family, perhaps 12 genera and 50 to 55 species.

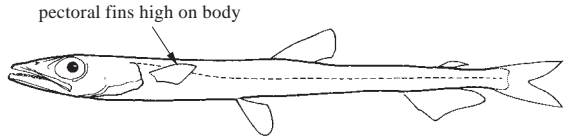
Similar families occurring in the area

Anotopteridae: dorsal fin absent; lateral keels on caudal peduncle; no gill rakers; anal fin with 14 to 16 soft rays.

Omosudidae: jaws extending beyond eye; lateral keel on caudal peduncle; massive lower jaw; palatines with large fangs.

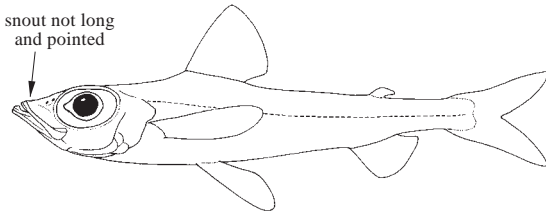


Notosudidae: gill rakers normal, not in the form of teeth or spines; pectoral fins fully lateral in position, set higher on body than in Paralepididae; anal fin moderately short, with 16 to 21 rays; branchiostegal rays 4 to 6 (8 in Paralepididae).

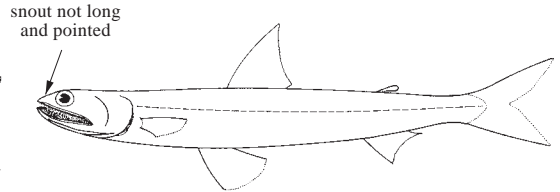


Notosudidae

Chlorophthalmidae and Synodontidae: snout not long and pointed; anal fin short, with less than 18 rays.



Chlorophthalmidae



Synodontidae

Key to genera of Paralepididae occurring in the area (modified after Post 1981)

1a. Pectoral fins elongate, longest fin ray distinctly longer than anal-fin base (Fig. 1); large fixed mandibular teeth with serrate edges (Fig. 3a) . . . *Sudis*

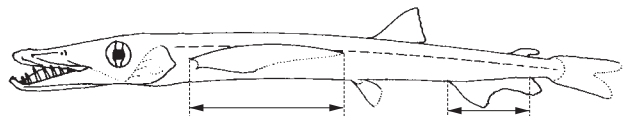


Fig. 1 *Sudis*

1b. Pectoral fins short, longest fin ray shorter than anal-fin base (Fig. 2); large fixed or flexible mandibular teeth with smooth edges (Fig. 3b) → 2



Fig. 2 *Lestidiops*

2a. Origin of pelvic fins well in front of a vertical from first dorsal-fin ray (by at least one length of dorsal-fin base) (Fig. 2) → 3

2b. Origin of pelvic fins only slightly in front of a vertical from first dorsal-fin ray (less than one length of dorsal-fin base), or behind this vertical (Fig. 7a) → 7

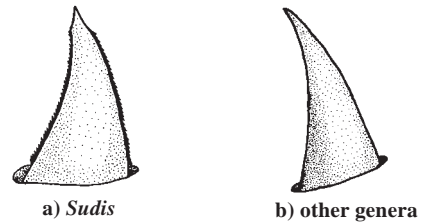


Fig. 3 mandibular teeth

3a. Two parallel ventral bands of luminous tissue on belly between pelvic fins and isthmus (Fig. 4a); a prominent black spot immediately before eye (Fig. 4b) *Lestrolepis*

3b. No luminous organ on belly, no black spot before eye. → 4

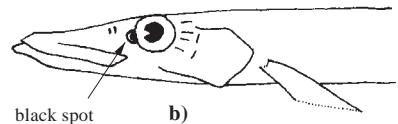
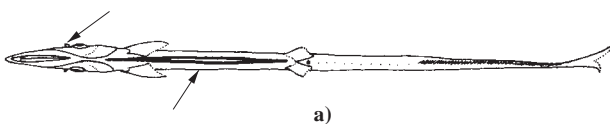


Fig. 4 *Lestrolepis*

- 4a. Ventral adipose fin present between vent and anal fin (Fig. 5) . . . → 5
- 4b. No ventral adipose fin; lateral-line scales (at least in anterior part of trunk) marked by black spots if specimen not completely dark (Fig. 6) **Macroparalepis** (in part)

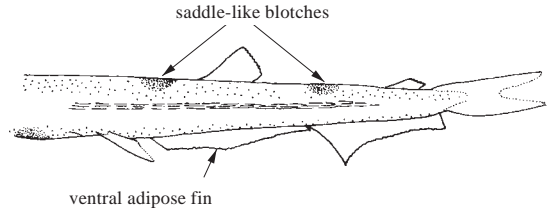


Fig. 5

- 5a. Thirty-two or less anal-fin rays **Lestidiops** (in part)
- 5b. Thirty-five or more anal-fin rays → 6

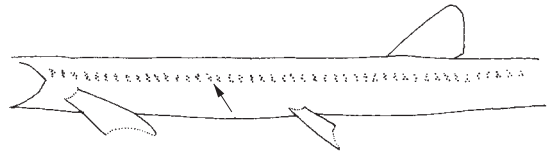
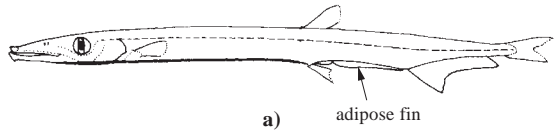


Fig. 6

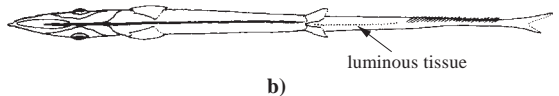
- 6a. Colour deep black **Dolichosudis**
- 6b. Colour light, some with saddle-like blotches (Fig. 5). **Stemonosudis**

- 7a. Ventral adipose fin present between vent and anal fin (Fig. 7a) . . . → 8
- 7b. No ventral adipose fin between vent and anal fin → 10



a) adipose fin

- 8a. One band of luminous tissue on ventral midline from between pelvic fins to isthmus between opercles (Fig. 7b). **Lestidium**
- 8b. No band of luminous tissue on ventral midline. → 9



b) luminous tissue

- 9a. Pelvic fins heavily pigmented, some species with dorsal saddle-like blotches (as in Fig. 5) **Uncisudis**
- 9b. Pelvic fins slightly pigmented, no dorsal saddle-like blotch **Lestidiops** (in part)

- 10a. Body naked, except for lateral-line scales; either entirely black or dark dorsally and light ventrally; in the latter case, lateral line scales marked by black spots at least in anterior part of trunk (as in Fig. 6); gill rakers tooth-like on bony bases (Fig. 8) **Macroparalepis** (in part)
- 10b. Body scaled, but scales very delicate and easily shed; gill rakers needle-like on bony bases (Figs 9 and 10) → 11

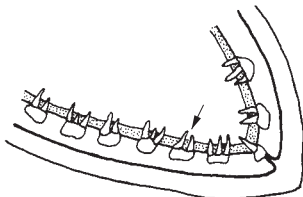


Fig. 8 *Macroparalepis* (gill arch)

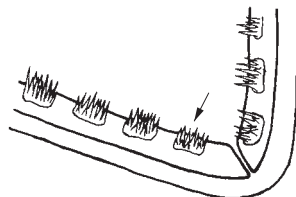


Fig. 9 *Arctozenus* (gill arch)

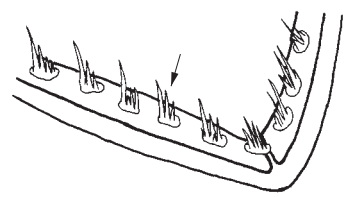


Fig. 10 *Paralepis* (gill arch)

11a. Pelvic fin origins behind a vertical from midpoint of dorsal-fin base (Fig. 11); gill rakers forming numerous rows of short needle-like filaments (Fig. 9); more than 28 rays in anal fin **Arctozenus**

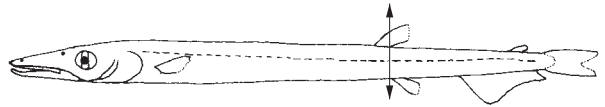


Fig. 11 *Arctozenus*

11b. Pelvic-fin origins slightly before or behind a vertical from first dorsal ray (Fig. 12); gill rakers on first arch formed by 3 to 10 slender, flexible needle-like filaments (Fig. 10); less than 26 rays in anal fin → **12**

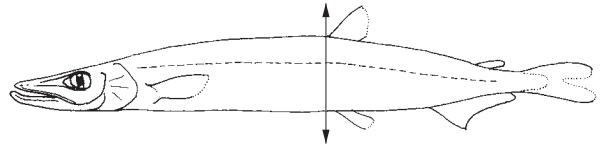


Fig. 12 *Paralepis*

12a. Body scales overlying lateral line unpierced by holes of lateral line; in adults and subadults, 4 to 6 horizontal rows of scales covering each anterior lateral-line section **Magnisudis**

12b. Body scales overlying lateral line pierced by 1 or 2 longitudinal series of distinct holes; in all growth stages with scales developed, 2 horizontal rows of scales covering each anterior lateral-line section **Paralepis**

List of species occurring in the area

- Arctozenus risso* (Bonaparte, 1840). To 31 cm. All oceans from Arctic to Antarctic; in the area, from Cape Verde Islands southwards, including the Gulf of Guinea.
- Dolichosudis fuliginosa* Post, 1969. To 40 cm. Tropical Atlantic, NE and W Pacific; in the area, from the Gulf of Guinea.
- Lestidiops affinis* (Ege, 1930). To 11 cm. Warm-temperate to tropical Atlantic; widespread in the area.
- Lestidiops cadenati* (Maul, 1962). To more than 8 cm. Tropical E Atlantic, from Senegal to Angola.
- Lestidiops distans* (Ege, 1953). To 21 cm. Tropical E Atlantic, from off Cape Verde Islands, Gulf of Guinea and off Angola.
- Lestidiops jayakari pseudosphyaenoides* (Ege, 1918). To 10 cm. Warm-temperate to tropical Atlantic and Mediterranean; only in the most northern parts of the area, off Morocco.
- Lestidiops similis* (Ege, 1933). To 6 cm. Temperate and tropical Atlantic; in the area, from Cape Verde Islands to Angola.
- Lestidiops sphyrenoides* (Risso, 1820). To 17 cm. Tropical and warm-temperate Atlantic and Mediterranean; in the area, between Morocco and Gabon, including the Canary Islands and Cape Verde Islands.
- Lestidium atlanticum* Borodin, 1928. To 21 cm. Temperate to tropical worldwide.
- Lestrolepis intermedia* (Poey, 1868). To 22 cm. Warm-temperate to tropical worldwide; in the area, from Cape Verde Islands to Angola.
- Macroparalepis affinis* Ege, 1933. To 53 cm. Temperate N and S Atlantic, also S Pacific; in the area, from Cape Verde Islands northwards, and off St Helena.
- Macroparalepis brevis* Ege, 1933. To 15 cm. Temperate N and S Atlantic; in the area, antitropical from about 10°N and S of equator.
- Macroparalepis nigra* (Maul, 1965). To 48 cm. Temperate Atlantic; in the area, only north of the Canary Islands.
- Magnisudis atlantica* (Krøyer, 1868). To 48 cm. Widespread in Atlantic and Pacific oceans; widespread in the area.

- Paralepis brevirostris* (Parr, 1928). To 25 cm. Temperate to tropical Atlantic; in the area, only from south of the Canary Islands.
- Paralepis coregonoides* Risso, 1820. To 29 cm. N Atlantic and Mediterranean; in the area, from the Canary Islands northwards, also about 650 miles NE of Ascension Island.
- Paralepis elongata* (Brauer, 1906). To 20 cm. Warm-temperate to tropical Atlantic, Indian, and Pacific oceans; in the area known from about 30°N to 20°S.
- Stemonosudis gracilis* (Ege, 1933). To 11 cm. Subtropical to tropical worldwide; in the area known only from east of mid-Atlantic Ridge near the equator.
- Stemonosudis intermedia* (Ege, 1933). To 17 cm. Tropical Atlantic and Caribbean Sea; in the area off Canary Islands.
- Stemonosudis siliquiventer* Post, 1970. To 18 cm. Tropical Atlantic; in the area, east of mid-Atlantic ridge north and south of equator.
- Sudis atrox* Rofen, 1963. To more than 9 cm. Temperate to tropical Atlantic and Pacific; in area, known from only one locality, near the equator at long. 25°W.
- Sudis hyalina* Rafinesque, 1810. To 42 cm. Temperate to tropical Atlantic and Mediterranean Sea; widespread in the area.
- Uncisudis longirostra* Maul, 1956. To 16 cm. Tropical Atlantic; in the area, off NW Africa.
- Uncisudis quadrimaculata* (Post, 1969). To 11 cm. Warm-temperate to tropical Atlantic; in the area, off Western Sahara and Dakar, Senegal.

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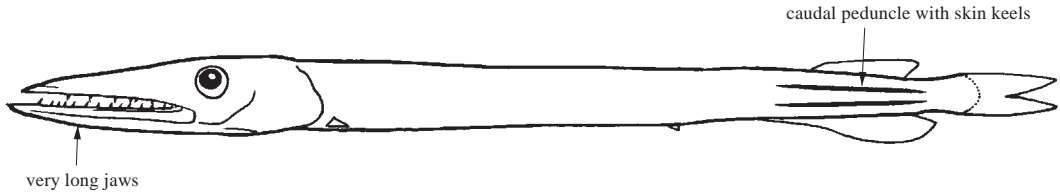
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ANOTOPTERIDAE

Daggertooths

by B.C. Russell, Museum and Art Gallery of the Northern Territory, Darwin, Australia (after Thompson 2002)

Diagnostic characters: Large aulopiform fishes (to about 1 m), elongate, compressed anteriorly. **Head about one-quarter body length with very long jaws about one-half to three-quarters head length;** upper jaw shorter than lower jaw; gill rakers absent. **Dorsal fin absent**, dorsal adipose fin located above anal fin; anal-fin soft rays 12 to 15; pectoral fins low on body; pelvic fins posterior to midlength of body; pectoral-fin soft rays 13 to 15, pelvic-fin soft rays 7 to 10. Scales absent except for lateral line; **caudal peduncle with skin keels**. **Colour:** younger fish are silver turning black with maturity.



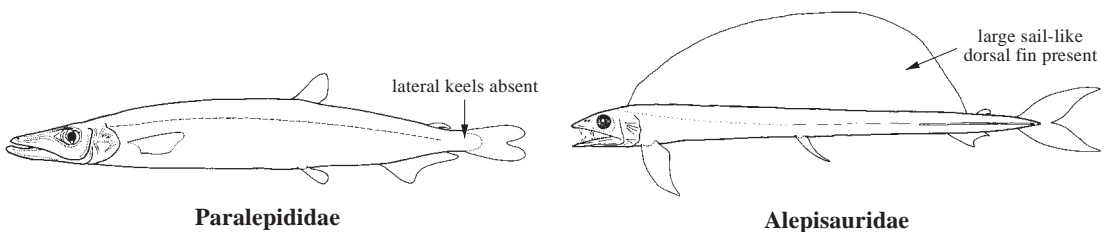
Habitat, biology, and fisheries: Found in the epipelagic and upper mesopelagic waters of the world's oceans north and south of about latitude 20°. Piscivorous predators with distensible body wall and large stomachs. There is reduction in tooth number with growth. Thought to be synchronous hermaphrodites with semelparous reproduction. As gonads mature, stomach and intestines atrophy. No fishery.

Remarks: Included within the family Paralepididae by Baldwin and Johnson (1996). Kukuev (1998) recognized 3 species in the family.

Similar families occurring in the area

Paralepididae: dorsal fin present; lateral keels on caudal peduncle absent; anal fin with 20 or more rays.

Alepisauridae: large, sail-like dorsal fin present; jaws extending beyond eye.



List of species occurring in the area

Anotopterus pharao Zugmayer, 1911. To 1 m TL. Temperate North Atlantic; in the area, from about 36°N to Cape Verde Islands.

References

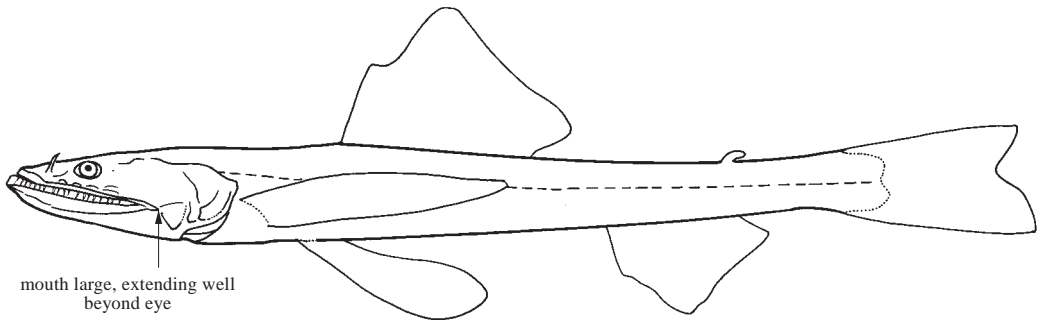
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BATHYSAURIDAE

Deepsea lizardfishes

by B.C. Russell, Museum and Art Gallery of the Northern Territory, Darwin, Australia

Diagnostic characters: Large (to 78 cm) aulopiform fishes. Head moderately depressed; eyes small; mouth very large, upper jaw extending well beyond eye; dorsal-fin base about equal to head length, inserted just behind pelvic-fin insertion, with 15 to 18 soft rays; dorsal adipose fin present or absent; anal fin posterior, with 11 to 14 soft rays; pectoral fin with 15 to 17 soft rays, central rays of pectoral fin usually prolonged; pelvic fin with 8 soft rays, inner rays slightly shorter than outer rays; anus midway between pelvic and anal-fin origins; procurrent and principle caudal-fin rays with a row of scales; branchiostegal rays 8 to 13; sharp, needle-like teeth present in jaws, vomers, pharyngeals and tongue; gill rakers reduced to patches of spines on the arches. **Colour:** whitish, grey, or brown.



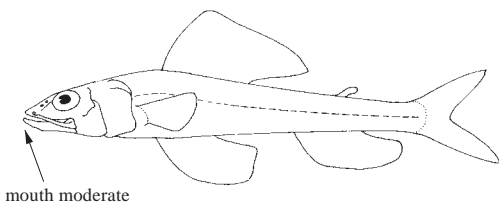
Habitat, biology, and fisheries: Benthic deep-sea fishes of slope and abyss at depths below 1 000 m. Predominantly piscivorous, feeding on demersal and bathypelagic fishes, and occasional large benthic or nektonic crustacea. Synchronous hermaphrodites; post-larvae are pelagic. Typical deep sea fishes of no commercial importance.

Remarks: A single genus with 2 species, circumglobal in tropical and temperate latitudes (65°N to 40°S). Included in the Synodontidae by Sulak (1990), but retained in the family Bathysauridae by Baldwin and Johnson (1996).

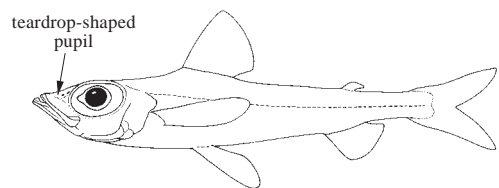
Similar families occurring in the area

Aulopidae: mouth moderate, upper jaw usually not reaching rear end of eye; dorsal adipose fin present; pectoral fin with 11 to 14 soft rays, uppermost rays usually longest; pelvic fin with 9 soft rays; procurrent and principle rays of caudal fin without scales; branchiostegal rays about 16; gill rakers normal; well-developed bony fulcral scale in front of caudal fin.

Chlorophthalmidae: eye large, with teardrop-shaped pupil, tapetum of eye brilliant green in freshly caught specimens; mouth moderate, upper jaw not extending behind midpoint of eye; anus close to pelvic-fin base; anal fin with 7 to 11 soft rays; gill rakers normal.



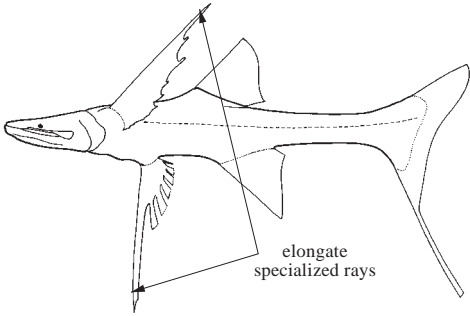
Aulopidae



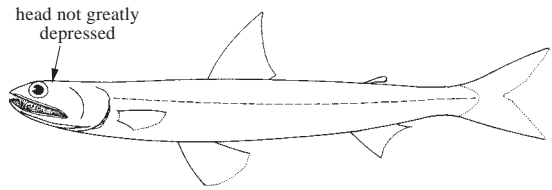
Chlorophthalmidae

Ipnopidae: eye always specialized, either minute (*Bathymicrops*, *Bathypterois*, *Bathytyphlops*), large (*Bathysauropsis*), or flat, directed dorsally, and lensless (*Ipnops*); mouth large, upper jaw extending far behind eye, except in *Ipnops*; dorsal fin large, placed over or before middle of body, inserted before pelvic-fin insertion, with 8 to 16 soft rays; anal fin under to far behind dorsal fin, with 7 to 19 soft rays; pelvic fin in anterior half of body, often elongate, with 7 to 9 soft rays; caudal fin and paired fins with elongate specialized rays in *Bathypterois*; gill rakers normal, or reduced to low rugose knobs.

Synodontidae: head lizard-like, not greatly depressed; anus close to anal-fin origin; dorsal fin with short base, 9 to 11 rays.



Ipnopidae



Synodontidae

Key to species of Bathysauridae occurring in the area

- 1a. Adipose fin absent; lateral line extending onto caudal fin; base of dorsal fin about as long as distance between nostril and origin of dorsal fin; central pectoral rays branched ***Bathysaurus ferox***
- 1b. Adipose fin present; lateral line not extending onto caudal fin; base of dorsal fin much shorter than distance between nostril and origin of dorsal fin; central pectoral rays not branched ***Bathysaurus mollis***

List of species occurring in the area

Bathysaurus ferox Günther, 1878. To 64 cm SL. Widespread temperate and tropical seas; in the area, off NW Africa from about 30–10°N.

Bathysaurus mollis Günther, 1878. To 78 cm SL. Circumglobal temperate and tropical except E Pacific; in the area, from about 30°N to equator.

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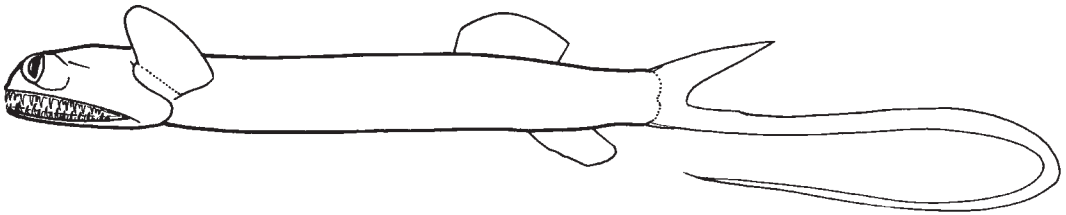
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GIGANTURIDAE

Telescope fishes

by B.C. Russell, Museum and Art Gallery of the Northern Territory, Darwin, Australia (after Thompson 2002)

Diagnostic characters: Small (18 to 20 cm) aulopiform fishes with elongate, slender bodies. Snout very short; **tubular eyes**, directed anteriorly, placed far forward on head; **very large mouth extending to middle of pectoral-fin base**; many long, recurved, and depressible teeth. All fin rays unsegmented; dorsal fin with more rays than anal fin; caudal fin deeply forked, lower rays greatly elongated; **pectoral-fin base high on body**; **adults lack many structures (adipose fin, pelvic girdle and fin, branchiostegal rays, gill rakers, and most gill arches) present in younger stages**; scaleless; swimbladder absent; dorsal fin with 16 to 19 rays, anal fin with 8 to 14 rays, pectoral fin with 30 to 42 rays. **Colour:** fresh specimens silver, fading to brown and black.



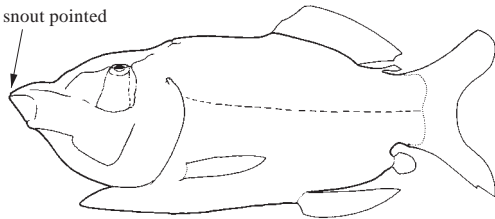
Habitat, biology, and fisheries: Worldwide in tropical and temperate oceans. Usually taken from mesopelagic and bathypelagic depths. They undergo a remarkable transformation from larvae to adults. Predators on pelagic fishes, often consuming prey larger than themselves. Family reported as synchronous hermaphrodites. No fishery.

Remarks: Johnson and Bertelsen (1991) recognized 2 species in a single genus. Young stages formerly considered as belonging to the genus *Rosaura*.

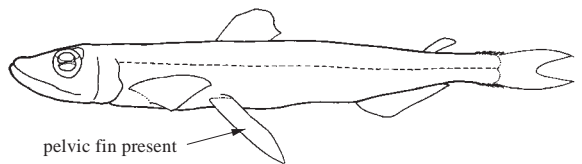
Similar families occurring in the area

Opisthoproctidae: also has tubular eyes, but body more robust; snout pointed; lower caudal-fin lobe not elongate; pelvic fins present in adults; lateral line present; body with scales; adipose fin present.

Scopelarchidae: also has tubular eyes, but large teeth present on tongue; pelvic fins present in adults, lower caudal-fin lobe not elongate; lateral line present; body with scales; adipose fin present.



Opisthoproctidae



Scopelarchidae

Key to species of Giganturidae occurring in the area

- 1a. Pectoral-fin rays 30 to 33; anal-fin rays 8 to 10; least depth of caudal peduncle more than 8% in standard length ***Gigantura chuni***
- 1b. Pectoral-fin rays 36 to 42; anal-fin rays 11 to 14; least depth of caudal peduncle less than 4% in standard length ***Gigantura indica***

List of species occurring in the area

- Gigantura chuni* Brauer, 1901 (previously also recorded as *G. vorax* Regan, 1925). To 16 cm SL. Widespread in tropical and subtropical waters worldwide; in the area, from about 20°N to 10°S, including the Gulf of Guinea.
- Gigantura indica* Brauer, 1901. To 20 cm SL. Widespread in tropical and subtropical waters worldwide; in the area, from off the Cape Verde Islands to about 20°S.

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New Index

A

ALEPISAUURIDAE	1840
ANOPTERIDAE	1849
AULOPIDAE	1820
AULOPIFORMES	1820
ALEPISAUURIDAE	1842,1849
Anoli Parr	1827
Anoli commun	1828
Anoli saury	1827
Anoli serpent	1828
ANOPTERIDAE	1831,1844
Atlantic lizardfish	1827
AULOPIDAE	1825,1830,1833,1851
<i>Aulopus</i>	1820
<i>Aulopus cadenati</i>	1822
<i>Aulopus filamentosus</i>	1823

B

BATHYSAURIDAE	1851
Barracudinas	1844
<i>Bathymicrops</i>	1825,1852
BATHYPTERIDAE	1829
<i>Bathypterois</i>	1825,1852
BATHYSAURIDAE	1825
<i>Bathysauropsis</i>	1829,1852
<i>Bathytyphlops</i>	1825,1852
Bluestripe lizardfish	1827

C

CHLOROPHTHALMIDAE	1829
CHLOROPHTHALMIDAE	1825,1834,1845,1851
CHLOROPHTHALMIDAE	1820

D

Daggertooths	1849
Deepsea lizardfishes	1851

E

EVERMANNELLIDAE	1838
EVERMANNELLIDAE	1836,1842

F

Flagfins	1820
--------------------	------

G

GIGANTURIDAE	1853
-------------------------------	------

GIGANTURIDAE	1836
-------------------------------	------

Greeneyes	1829
Guinean flagfin	1822

H

Hammerjaws	1842
<i>Hime</i>	1820

I

IPNOPIDAE	1833
IPNOPIDAE	1825,1829,1852
IPNOPINAE	1829
<i>Ipnops</i>	1825,1852
<i>Ipnops</i>	1829
ISTIOPHORIDAE	1840
<i>Istiophorus albicans</i>	1840

L

Lagarto Parr	1827
Lagarto capitán	1828
Lagarto real	1823
Lagarto real de Guinea	1822
Lagarto saury	1827
Lagarto ñato	1828
Lancetfishes	1840
Limbert guineen	1822
Limbert royal	1823
Lizardfishes	1824

N

NOTOSUDIDAE	1831
NOTOSUDIDAE	1842,1845

O

OMOSUDIDAE	1842
OMOSUDIDAE	1831,1838,1844
OPISTHOPROCTIDAE	1853

P

PARALEPIDIDAE	1844
PARALEPIDIDAE	1831,1842,1849
PARAULOPIDAE	1829
Parr's lizardfish	1827
Pearleyes	1836

R

Red lizardfish	1828
Redbarred lizardfish	1828

Rosaura 1853
 Royal flagfin 1823

S

SCOPELARCHIDAE 1836
SYNODONTIDAE 1824
 Sabertooth fishes 1838
Saurida 1824
Saurida brasiliensis 1827
Saurida parri 1827
SCOPELARCHIDAE 1838,1853
SCOPELOSAURIDAE 1831
 Snakefish 1828
SYNODONTIDAE 1820,1829,1834,1838,1851-1852
Synodus 1824
Synodus saurus 1827
Synodus synodus 1828

T

Telescope fishes 1853
Trachinocephalus 1824
Trachinocephalus myops 1828
 Tripod fishes 1833

W

Waryfishes 1831

Y

Yellowfin aulopus 1823

A

albicans, Istiophorus 1840

B

brasiliensis, Saurida 1827

C

cadenati, Aulopus 1822

F

filamentosus, Aulopus 1823

M

myops, Trachinocephalus 1828

P

parri, Saurida 1827

S

saurus, Synodus 1827

synodus, Synodus 1828

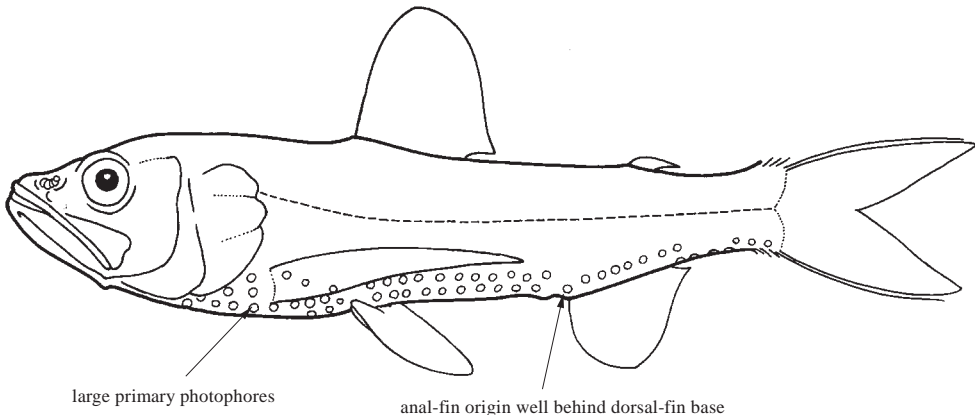
Order MYCTOPHIFORMES

NEOSCOPELIDAE

Blackchins

by P.A. Hulley, Iziko Museums, Cape Town, RSA and J.R. Paxton, Australian Museum, Sydney NSW, Australia

Diagnostic characters: Small fishes, to 30 cm (all lengths in this account standard lengths), slender to oblong, compressed, largest of some robust. Eye small (*Scopelengys*) to large (*Neoscopelus*); **eye diameter equal to or much less than snout length**; eye lateral. Mouth large to very large, **jaws extending almost to or far beyond posterior margin of eye**; maxilla toothless and completely excluded from gape by premaxilla; **supramaxilla present as slender, elongate element**. Premaxilla, dentary, vomer and palatine with small, closely-set teeth (inner row of jaw teeth may be enlarged); vomerine teeth in 1 or 2 patches; teeth present or absent on mesopterygoid. Branchiostegal rays 8 or 9. Gill rakers 8 to 16, well developed and lath-like. Fins without spines, rudimentary, paired splints sometimes present at origin of median fins, and unpaired splints before first pectoral and pelvic rays. Dorsal fin single, its origin over or slightly forward of outer pelvic-fin base, with 11 to 13 soft rays; **anal-fin origin more than 1 eye diameter behind dorsal-fin base**; anal fin with 10 to 14 soft rays; caudal fin usually with 19 principal rays; pectoral fins long, reaching beyond dorsal-fin base, with 15 to 19 rays; pelvic-fin origin well behind pectoral-fin origin, under or slightly behind dorsal-fin origin; pelvic fins with 8 rays; 1 dorsal adipose fin. Scales large, cycloid, deciduous. **Large primary photophores absent (*Scopelengys*), or present (*Neoscopelus*) on body in horizontal rows, including medioventral row anterior to pelvic fin, and on tongue; no other luminous tissue on fin bases, caudal peduncle or head.** Total vertebrae 29 to 32. **Colour:** blackish in *Scopelengys*, scales iridescent bronze green with heavy black margins when fresh; reddish silver in *Neoscopelus*.



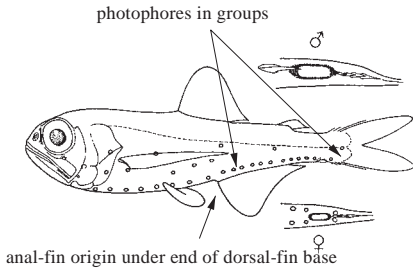
Habitat, biology, and fisheries: Meso- and bathypelagic (*Scopelengys*) or benthopelagic (*Neoscopelus*) slope from 250 m to 800 m. Feeding modes unknown. Uncommon deepsea fishes of no commercial importance.

Remarks: Three genera (monotypic *Solivomer* restricted to the Pacific) with 7 species throughout the world ocean in tropical and subtropical latitudes. The family was reviewed by Nafpaktitis (1977), where differences between the Pacific and Indo-Atlantic populations of *Neoscopelus microchir* were described.

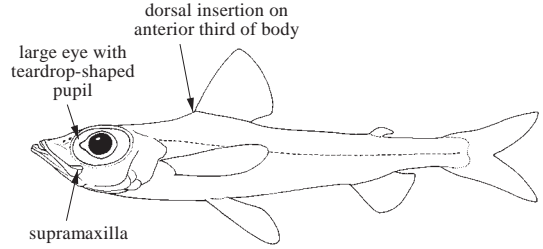
Similar families occurring in the area

Myctophidae: body photophores present in distinct groups on side of body, not in horizontal rows (absent in 1 species, *Taaningichthys paurolychnus*, with luminous organs on caudal peduncle); no medioventral row of primary photophores anterior to pelvic fin; eye diameter much longer than snout length (except species of *Lampanyctus*); origin of anal fin under or close behind dorsal fin.

Chlorophthalmidae: end of jaw not reaching vertical through middle of eye; eye length more than snout length; photophores absent.

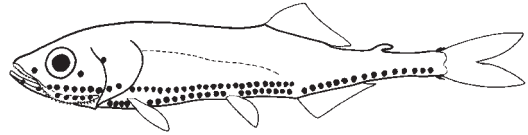


Myctophidae



Chlorophthalmidae

Gonostomatidae, Phosichthyidae, Sternoptychidae: some elongate genera similar, with horizontal rows of photophores; no medioventral row of primary photophores anterior to pelvic fin; posterior maxilla with teeth, not totally excluded from gape by premaxilla.



Phosichthyidae

Key to the species of Neoscopelidae occurring in the area

- 1a. Photophores absent on body; eye small, much more than 1 diameter in snout; upper jaw extending at least 1 eye diameter beyond vertical through posterior margin of orbit ***Scopelengys tristis***
- 1b. Photophores present on body; eye large, about 1 diameter in snout; upper jaw not reaching, or extending much less than 1 eye diameter beyond, vertical through posterior margin of orbit → 2
- 2a. Upper series of photophores behind pelvic-fin base (LO series) 12 to 14, not extending to origin of anal fin (Fig. 1a); total gill rakers usually 11. ***Neoscopelus macrolepidotus***
- 2b. Photophore series LO 20 to 22, extending to about end of anal-fin base (Fig. 1b); total gill rakers usually 14. ***Neoscopelus n. sp.***

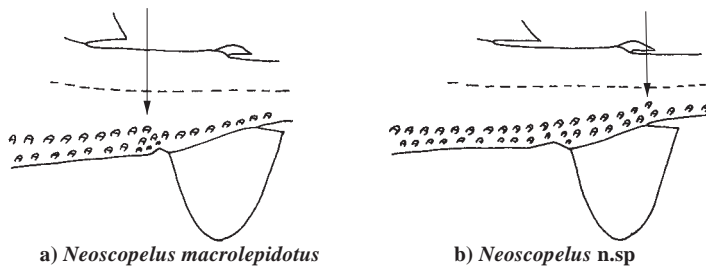





Fig. 1

List of species occurring in the area

The symbol  is given where species accounts are included.

 *Neoscopelus macrolepidotus* Johnson, 1863.

 *Neoscopelus* n. sp.

 *Scopelengys tristis* Alcock, 1890.

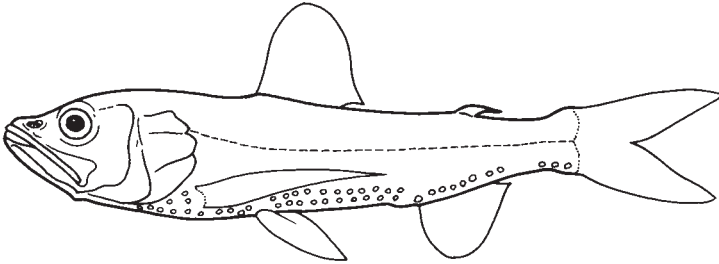
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***Neoscopelus macrolepidotus* Johnson, 1863**

En – Largescaled blackchin.

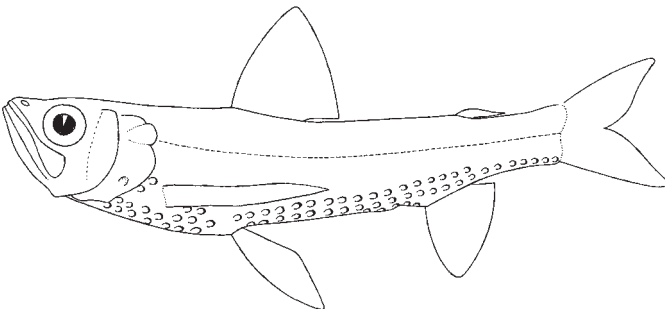
Maximum size to 250 mm; sexually mature from 150 mm. Benthopelagic over continental and island slopes at 300 to 800 m. No evidence of vertical migration. In area from Morocco to Western Sahara and off Namibia. Also from western Atlantic off Suriname, Nicaragua, and southern Brazil; Indian Ocean off Natal, South Africa and western and southern Australia; Pacific off eastern Australia, New Zealand, Japan, Hawaii, and Canada.



***Neoscopelus* n. sp.**

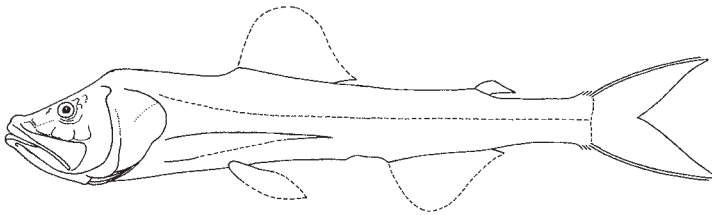
En – Smallscaled blackchin.

Maximum size to 300 mm; sexually mature from about 120 mm. Benthopelagic over continental and island slopes at 250 to 700 m. No evidence of vertical migration. In area from Morocco to Western Sahara. Also in western Atlantic from Straits of Florida to off Virgin Islands; Indian Ocean from Arabian Sea to about 28°S, one record off Natal, South Africa and off northwestern Australia. The Indo-Atlantic specimens represent a new species that requires a new name. It is distinct from true *N. microchir* Matsubara, 1943, a species restricted to the western Pacific Ocean and Western Australia.



Scopelengys tristis* Alcock, 1890*En** – Sombre blackchin.

Maximum size to 200 mm; sexually mature from about 150 mm. Oceanic bathypelagic, with adults usually below 1 000 m and juveniles at 500 to 800 m. No evidence of vertical migration; size stratification with depth. In area from off Morocco to 10°S. Also from western Atlantic off Venezuela and Guiana; eastern South Atlantic south of 23°S off Namibia; western Indian Ocean between 06°N and 34°S and probably off Somalia; western Pacific off Japan, Philippines and Indonesia; and eastern Pacific from off southern California to Chile.

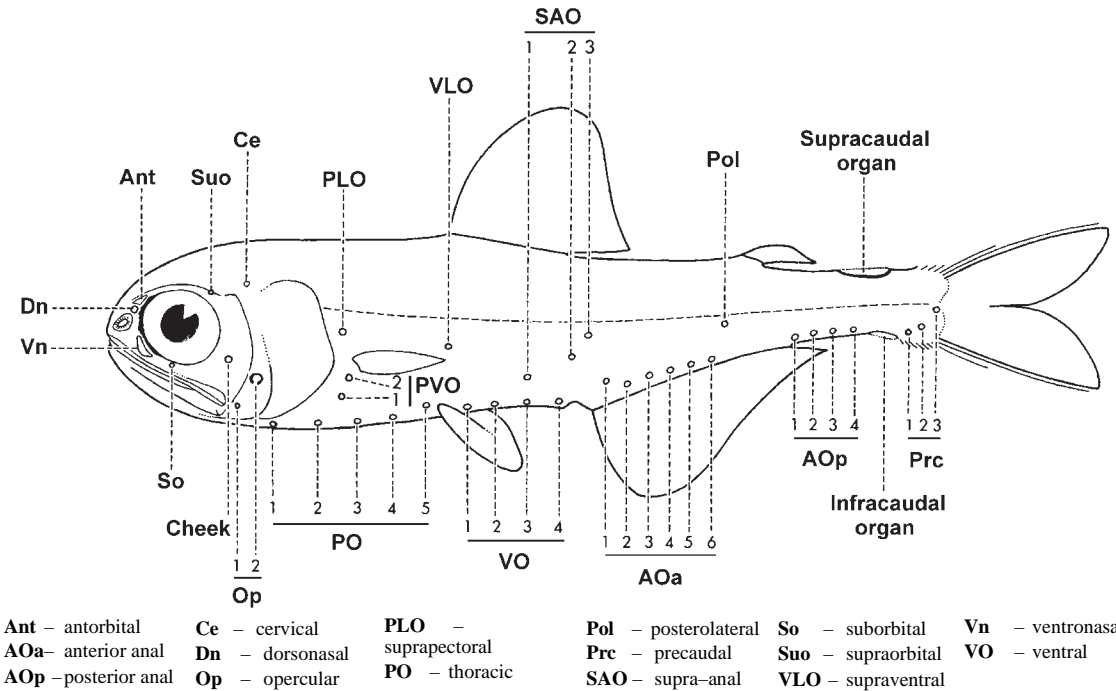


MYCTOPHIDAE

Lanternfishes

by P.A. Hulley, Iziko Museums, Cape Town, South Africa and J.R. Paxton, Australian Museum, Sydney, Australia

D **Diagnostic characters:** Small fishes, from 20 to 280 mm (all lengths in this account standard lengths), but most adults in area less than 120 mm. Body slender to oblong (deep-bodied in *Electrona risso* and *Myctophum selenops*); head and body compressed. Head rounded. Eye large to very large, **eye diameter longer to much longer than snout length**; lateral (semi-telescopic in *Protomyctophum (Hierops)*). Mouth large to very large, **jaws extending to or far beyond posterior margin of eye**; mouth usually terminal (subterminal in *Centrobranchus*, *Gonichthys* and *Loweina*); maxilla toothless and completely excluded from gape by premaxilla; **supramaxilla absent or present as small, scale-like, L-shaped element**. Premaxilla and dentary with numerous small teeth in closely-set bands (single row in *Diogenichthys*, *Gonichthys*, *Centrobranchus*), those of inner rows sometimes enlarged, those posterior sometimes enlarged and strongly hooked forward. Teeth present on roof of mouth: each side of vomer usually with a patch of small teeth; those on palatine either small and closely-set in a narrow band, or enlarged in 1 or 2 rows; mesopterygoid with a patch of small, closely-set or enlarged, widely-spaced teeth. Branchiostegal rays 6 to 12. Gill rakers well developed, lath-like (except reduced to small tooth patches in *Centrobranchus*). Fins without spines; rudimentary, paired splints sometimes present at origin of median fins and unpaired splints before first pectoral-fin and pelvic-fin rays. One dorsal fin with 9 to 26 soft rays; **anal-fin origin under or behind middle of dorsal fin to slightly (less than one eye diameter) behind dorsal fin**; anal fin with 11 to 27 soft rays; caudal fin with 19 principal rays; pectoral fin rudimentary to very long, with 0 to 22 rays; pelvic-fin origin well behind pectoral-fin origin; pelvic fin usually with 8 rays (6 in *Notolychnus*, 7 or 8 in *Gonichthys*); 1 dorsal adipose fin. Lateral line well or poorly developed (absent in *Notolychnus* and some *Taaningichthys*). Scales cycloid or rarely spinose, firm in shallow-water species, easily lost in deep-water species. **All species luminous; large, primary photophores present (except *Taaningichthys paurolychnus*, obscure in *Scopelopsis*), arranged in distinct groups on head and body, no photophores around tongue margin, no medioventral row of primary photophores anterior to pelvic fin; small, secondary photophores on head, body, and median fins in some species; luminous tissue of various shapes and sizes on head, scales, caudal peduncle, and/or at bases of various fins in most species.** Total vertebrae 27 to 46. **Colour:** mainly brown or black in deep-water species, silvery in shallow-water species; some with metallic green or blue scales.



General distribution and terminology of the luminous organs (photophores)

Habitat, biology, and fisheries: Mostly mesopelagic (400 to 1000 m), few bathypelagic or benthopelagic; most species undertake vertical migration to upper 200 m at night, with some reaching surface waters. Feeding mode as opportunistic carnivores on crustaceans and small fishes, and rarely pelagic molluscs (*Centrbranchus*). Prey items of squids, larger fishes (including commercial species), sea birds, and marine mammals. Very common oceanic fishes, making up greatest biomass in mesopelagic zone. Few species of some economic importance in particular areas (*Gymnoscopelus* and *Electrona* in the Southern Ocean, *Lampanyctodes* in South Africa, and *Benthosema* in gulfs of Arabia and Oman) for fishmeal, oil, and silage, representing a potentially important fishery resource. Research required to determine if lanternfishes can be utilized in eastern central Atlantic.

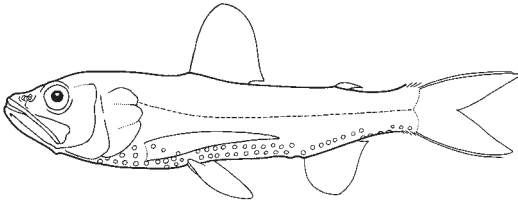
Remarks: Thirty-three genera and at least 250 species worldwide; 24 genera and 96 species recorded from or potentially occurring in area. Worldwide in all oceans and most seas from Arctic to Antarctic.

Similar families occurring in the area

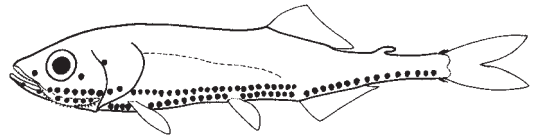
Separated from most other families in the area by presence of photophores and dorsal adipose fin. Several families have those characters, but can be distinguished by the following:

Neoscopelidae: anal-fin origin more than 2 eye diameters behind end of dorsal fin; body photophores absent (*Scopelengys*) or present (*Neoscopelus*) in horizontal rows, not broken into smaller distinct groups, with photophores in medioventral row anterior to pelvic fin and around tongue margin.

Gonostomatidae, Phosichthyidae, Sternoptychidae, some Stomiiformes (*Astronesthidae*, *Chauliodus*, *Chirostomias*, all with chin barbel): posterior portion of maxilla bearing teeth, not totally excluded from gape by premaxilla; body photophores in ventral, horizontal rows, not broken into smaller, distinct groups; no enlarged luminous organs on caudal peduncle.



Neoscopelidae



Phosichthyidae

Key to the genera and monotypic and singleton species of Myctophidae occurring or potentially occurring in the area

Remarks on key characters: Identification based primarily on arrangement of various photophore groups named in figure. Photophores often damaged in nets, but remnants usually identifiable with microscope. Gill-raker counts include only moveable elements, not small anterior knobs.

- 1a. Photophores absent; caudal peduncle with well-developed supracaudal and infracaudal luminous organs, bordered by heavy black pigment (Fig. 1) *Taaningichthys* (in part)
- 1b. Photophores always present; caudal peduncle with supracaudal and/or infracaudal organs, supracaudal and/or infracaudal luminous scales, sometimes coalesced, or without caudal organs and luminous scales → 2

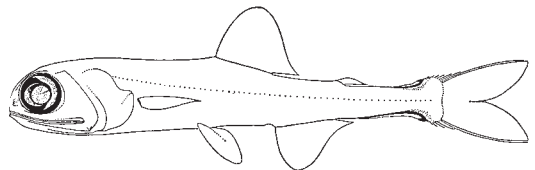


Fig. 1 *Taaningichthys paurolychnus*

- 2a. Minute secondary photophores on head and body, under each scale pocket and on fin membranes; primary photophores indistinct (Fig. 2) ***Scopelopsis multipunctatus***
- 2b. Secondary photophores absent, or if present, clearly distinguishable from larger primary photophores → 3
- 3a. VLO, SAO₃ and Pol₂ close to dorsal contour of body; 2 Prc, with Prc₂ well above horizontal septum (Fig. 3) ***Notolychnus valdiviae***
- 3b. VLO, SAO₃ and uppermost Pol below or only slightly above lateral line, well below dorsal contour of body; 2 or more Prc, with Prc₂ never above lateral line → 4

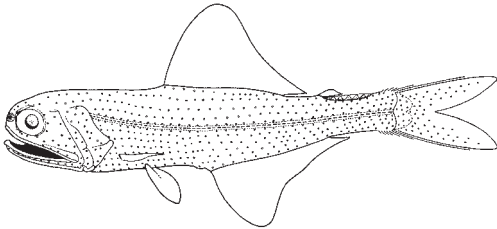


Fig. 2 *Scopelopsis multipunctatus*

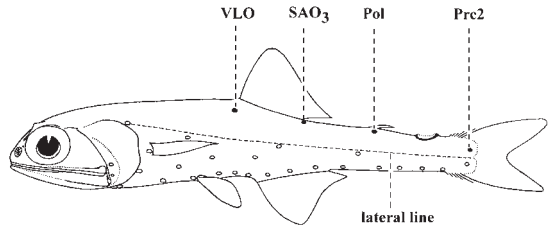


Fig. 3 *Notolychnus valdiviae*

- 4a. Two Prc, always separate from AO (Fig. 4a) → 5
- 4b. More than 2 Prc, sometimes continuous with AO (Fig. 4b) → 14

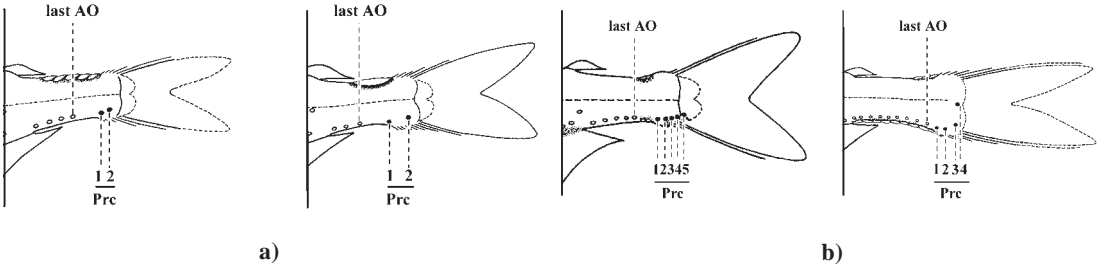


Fig. 4

- 5a. PLO from less than its diameter above to well below level of upper end of pectoral-fin base (Fig. 5a) → 6
- 5b. PLO more than its diameter above level of upper end of pectoral-fin base (Fig. 5b) → 10

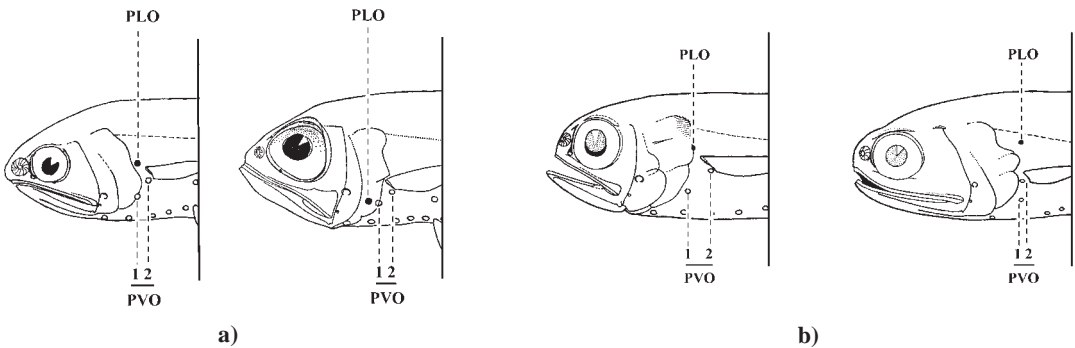


Fig. 5

- 6a. Mouth subterminal; snout conical and more or less protruding; PLO at or slightly above level of upper end of pectoral-fin base; AO series divided into AOa and AOp; Pol present; caudal peduncle markedly slender, its depth at least 2.5 or more times in its length (Fig. 6a) → 7
- 6b. Mouth terminal; snout not protruding; PLO well below level of upper end of pectoral-fin base; AO series continuous; Pol absent; caudal peduncle not markedly slender, its depth less than 2.5 times in its length (Fig. 6b) → 9

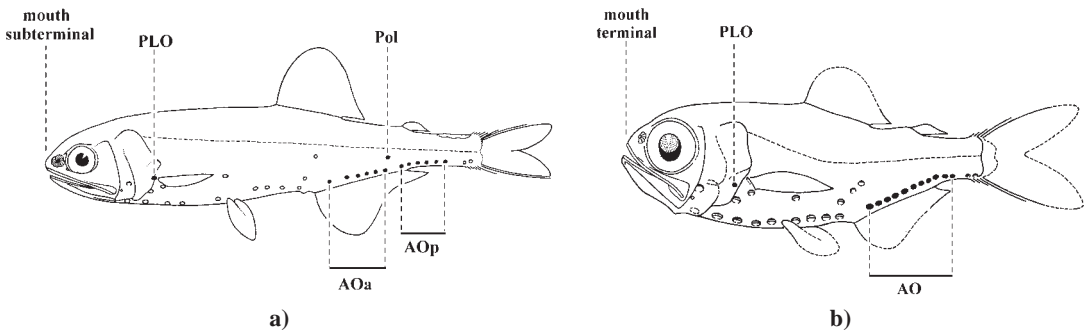


Fig. 6

- 7a. Gill rakers absent, reduced to spiny knobs *Centrobranchus nigroocellatus*
- 7b. Gill rakers present → 8
- 8a. Origin of anal fin under middle of dorsal-fin base; none or only one AOp above anal-fin base; caudal peduncle depth about 2.5 times in its length *Loweina*
- 8b. Origin of anal fin on or slightly in advance of vertical through base of last dorsal ray; 5 to 7 AOp above anal-fin base; caudal peduncle depth 3.5 or more in its length . . . *Gonichthys cocco*

- 9a. PLO in front of and slightly higher than PVO₁; PLO, PVO₁ and PVO₂ on somewhat angulate line; interorbital width less than expanded posterior end of maxilla; eyes semi-telescopic (Fig. 7a) *Protomyctophum arcticum*
- 9b. PLO almost directly above PVO₁; PLO, PVO₁ and PVO₂ forming a triangle; interorbital width greater than expanded posterior end of maxilla; eyes normal (Fig. 7b) . . . *Electrona risso*

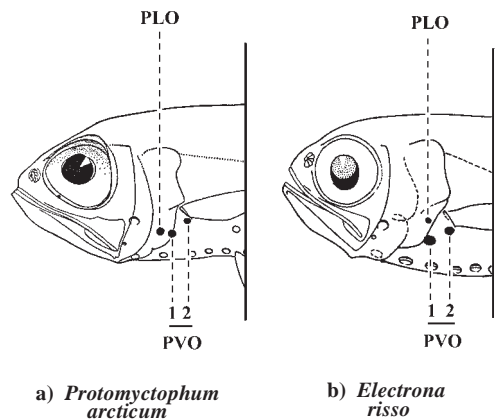


Fig. 7

- 10a. VO₂ elevated; PVO series horizontal, with PVO₁ not more than its diameter below level of PVO₂ (Fig. 8a) → 11
- 10b. VO series level; PVO series on an inclined line, with PVO₁ more than its diameter below level of PVO₂ (Fig. 8b) → 12

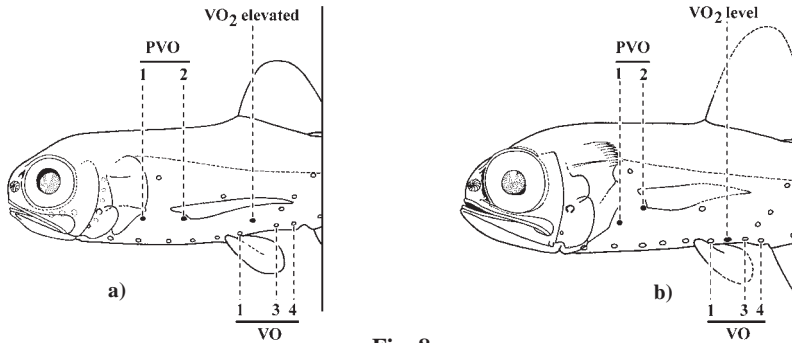


Fig. 8

- 11a. Prc series horizontal, or with Prc₂ only very slightly raised, more than 2 times its diameter below lateral line; outer, posterior teeth in both jaws broad-based and hooked (Fig. 9a) *Diogenichthys atlanticus*
- 11b. Prc₂ much higher than Prc₁, at or less than its diameter below lateral line; outer, posterior teeth in both jaws small and conical (Fig. 9b) *Benthoosema*

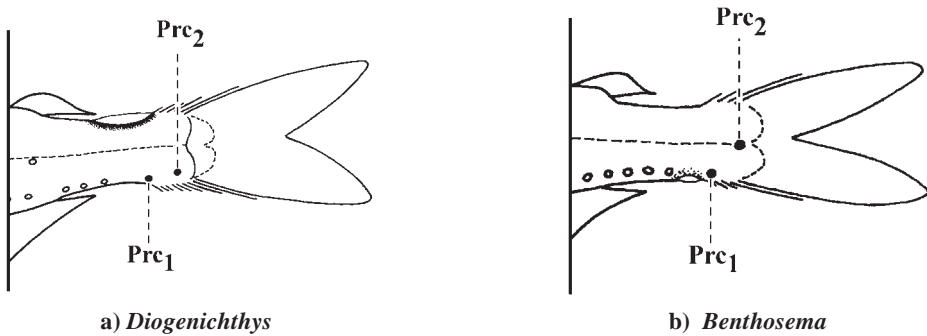


Fig. 9

- 12a. Two Pol (Fig. 10a) *Hygophum*
- 12b. One Pol (Fig. 10b) → 13

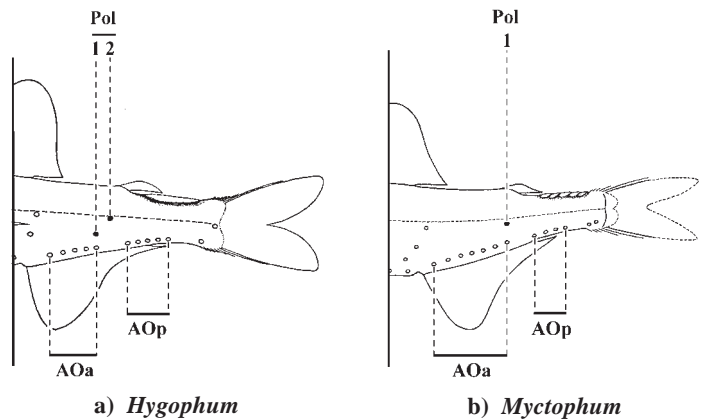


Fig. 10

- 13a. SAO series strongly angulate, with SAO₁ in advance of (seldom directly over) VO₃ (Fig. 11a) ***Symbolophorus***
- 13b. SAO series in straight or slightly angulate line, with SAO₁ behind vertical through VO₃ (Fig. 11b) ***Myctophum***

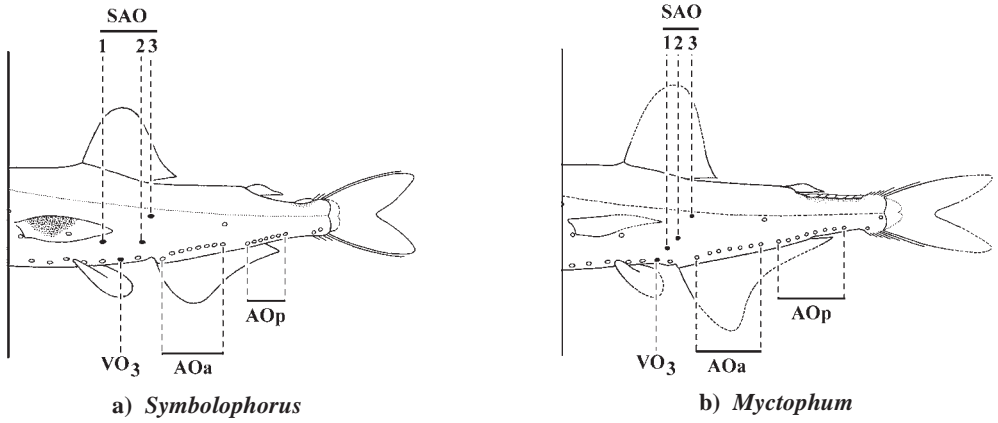


Fig. 11

- 14a. PO₁, PVO₁ and PVO₂ in straight ascending line; VO₁, VO₂ and VO₃ in straight ascending line (Fig. 12) → 15
- 14b. PO₁, PVO₁ and PVO₂ not in straight ascending line; VO₁, VO₂ and VO₃ not in straight ascending line → 16
- 15a. Dn and Vn present on head; supracaudal and infracaudal luminous organs absent in both sexes; luminous scale usually near PLO (Fig. 13a) ***Diaphus***
- 15b. Dn present on head, Vn absent; supracaudal (males) and infracaudal (female) luminous organs well developed; no luminous scale near PLO (Fig. 13b) ***Lobianchia***

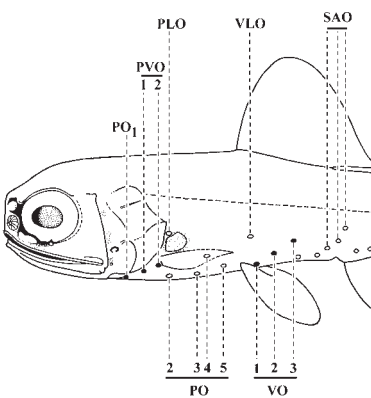
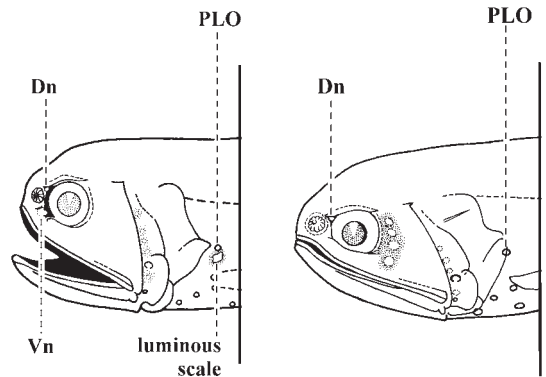


Fig. 12 *Diaphus*



a) *Diaphus*

b) *Lobianchia*

Fig. 13

- 16a.** PVO subhorizontal; PO₃ and PO₅ elevated; 5 Prc (Fig. 14a) *Lampanyctodes hectoris*
16b. PVO vertical; PO series level or PO₄ elevated; 3 or 4 Prc (Fig. 14b) → 17

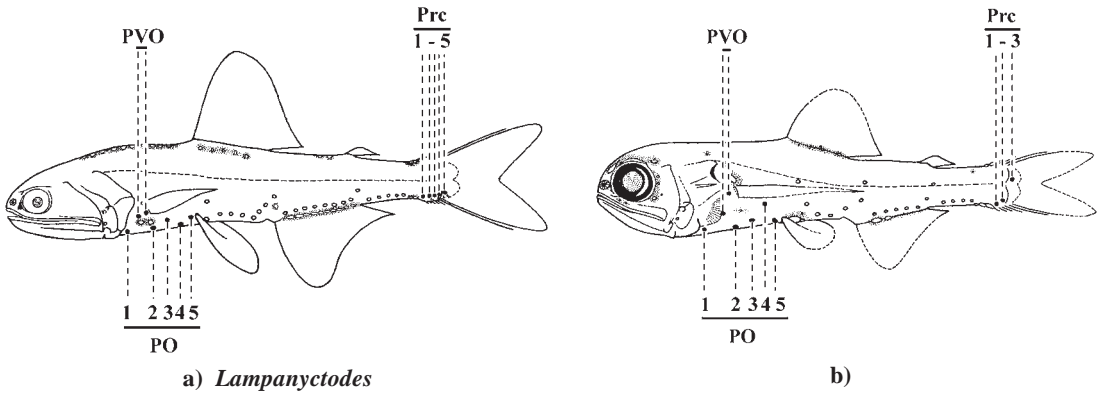


Fig. 14

- 17a.** Dn absent; PVO₂ at or below upper end of pectoral-fin base; 1 or 2 Pol, never horizontal (Fig. 15a) → 18
17b. Dn present; PVO₂ well above upper end of pectoral-fin base; 2 or 3 Pol, at least 2 horizontal (Fig. 15b, c) → 24

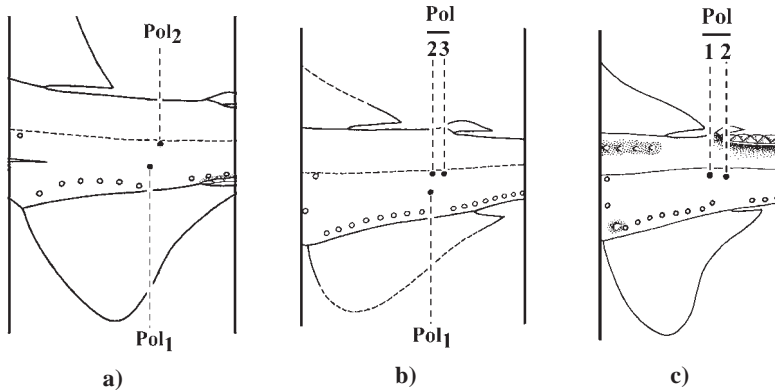


Fig. 15

- 18a.** Supracaudal and infracaudal luminous organs large, singular and usually bordered (not in small – medium specimens of *Lampadena anomala*) by heavy black pigment (Fig. 16a) → 19
18b. Supracaudal and infracaudal luminous organs a series of overlapping scale-like structures, not bordered by heavy black pigment (Fig. 16b) → 20

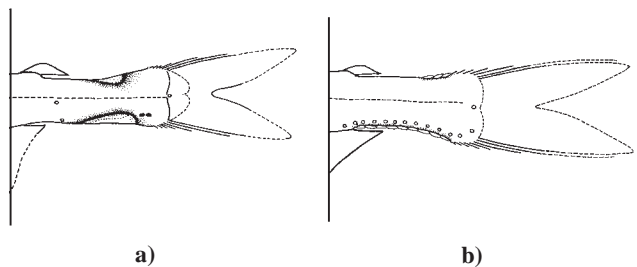


Fig. 16

- 19a. Origin of dorsal fin behind vertical through outer base of pelvic fin; large crescent of whitish tissue on rear half of iris; 1 SAO (Fig. 17a) ***Taaningichthys***
- 19b. Origin of dorsal fin on or somewhat in advance of vertical through outer base of pelvic fin; no large crescent of whitish tissue on rear half of iris (*Lampadena chavesi* with whitish crescent on dorsal half of iris); 3 SAO (Fig. 17b) ***Lampadena***

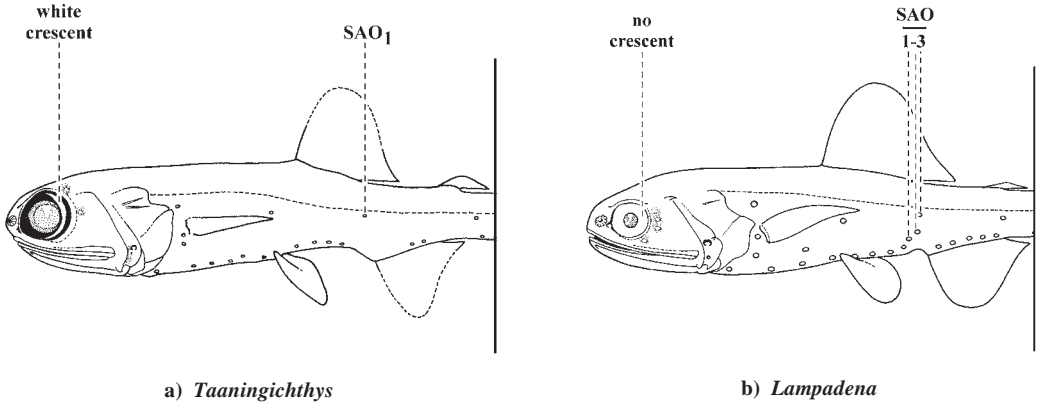


Fig. 17

- 20a. PO₄ not elevated; luminous scale-like structures between bases of pelvic fins or midventrally between pelvic-fin bases and anus (Fig. 18a) . ***Ceratoscopelus***
- 20b. PO₄ highly elevated; no luminous scale-like structures between bases of pelvic fins and anus (Fig. 18b) → 21

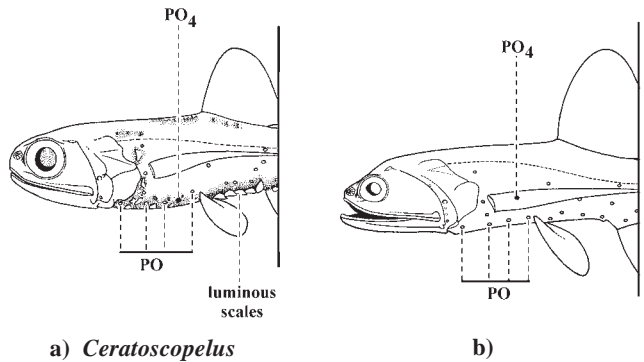


Fig. 18

- 21a. Luminous tissue (other than photophores) restricted to dorsal and ventral surface of caudal peduncle and sometimes at base of adipose fin; 4 VO → 22
- 21b. Patches of luminous tissue over bases of dorsal and anal fins and on other portions of body; 5 VO → 23
- 22a. Pectoral fin rudimentary or short, seldom reaching PO₄ (Note: *Lampanyctus macdonaldi* has short pectoral fins, but has a total of 21 or more gill rakers; all species of *Nannobranchium* have 21 or less gill rakers); musculature weak, body usually soft and flaccid; otolith solid and square, without prominent notch or rostrum ***Nannobranchium***
- 22b. Pectoral fins long, reaching at least to SAO₁; musculature strong, body firm; otolith with prominent notch and rostrum ***Lampanyctus***

- 23a. Prc 3 (2 + 1); crescent of whitish tissue on posterior half of iris; posterodorsal margin of operculum sharply pointed and rear margin markedly concave (Fig. 14b & 19a) ***Bolinichthys***
- 23b. Prc 4; no crescent of whitish tissue on posterior half of iris; posterodorsal margin of operculum broadly rounded, rear margin only slightly concave (Fig. 19b) ***Lepidophanes***

- 24a. Secondary photophores present on head and body; 3 to 7 primary cheek photophores (Fig. 20); 3 Pol, forming right angle (Fig. 15b) ***Lampichthys procerus***
- 24b. No secondary photophores on head and body; no cheek photophores; 2 Pol in horizontal line (Fig. 15c) ***Notoscopelus***

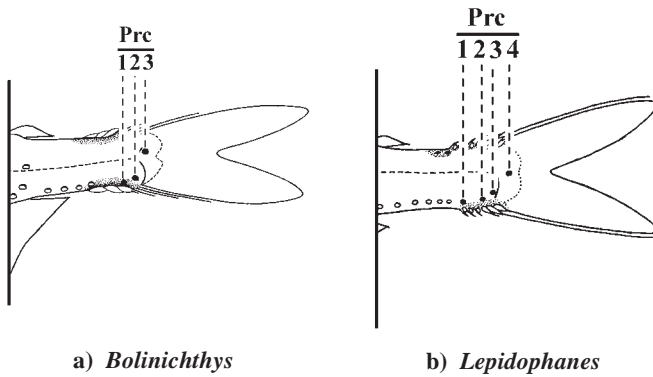


Fig. 19

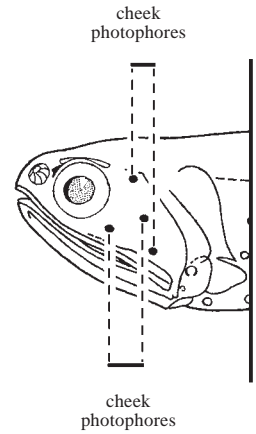


Fig. 20 *Lampichthys*

Key to the species of *Benthoosema* occurring in the area

- 1a. So absent; gill rakers 5 (6) + 1 + 12 (11–13), total 18 (17–20); SAO in straight or nearly straight line; VLO on or slightly below line through PLO to SAO₁ ***B. glaciale***
- 1b. So present; gill rakers 3 + 1 + 10 (9, rarely 11), total 14 (13, rarely 15); SAO distinctly angulate; VLO notably above line through PLO to SAO₁ ***B. suborbitale***

Key to the species of *Bolinichthys* occurring in the area

- 1a. VLO 3 to 5 photophore diameters below lateral line; luminous scale at pelvic-fin base absent; small postocular photophores absent → **2**
- 1b. VLO at or less than one photophore diameter below lateral line; luminous scale at pelvic-fin base present; small postocular photophores present → **3**

- 2a. Gill rakers 6 (7) + 1 + 13 (12–14), total 20 (19–22); last AOa highly elevated; Vn below anterior margin of orbit ***B. supralateralis***
- 2b. Gill rakers 5 (6) + 1 + 11 (10–12), total 17 (16–18); last AOa not elevated, but may be raised; Vn below anterior margin of pupil ***B. distofax***

- 3a. Preopercle with strongly developed, anteriorly recurved spine at posteroventral margin; luminous scale at PVO₁ present; luminous scales at dorsal-fin base present ***B. photothorax***
- 3b. Preopercle with only small protuberance at posteroventral margin; luminous scale at PVO₁ absent; luminous scales at dorsal fin-base absent ***B. indicus***

Key to the species of *Ceratoscopelus* occurring in the area

- 1a. Supraorbital spine present; no median series of luminous scale-like structures between inner pelvic-fin bases and anus; total gill rakers 19 (18–21, rarely 17 or 22); tips of caudal-fin rays pigmented ***C. maderensis***
- 1b. Supraorbital spine absent; a median series of luminous scale-like structures between inner pelvic-fin bases and anus present; total gill rakers 14 (13–15, rarely 16); tips of caudal-fin rays not pigmented ***C. warmingii***

Key to the species of *Diaphus* occurring in the area

- 1a. Supraorbital luminous organ (Suo) present, bordered by black tissue and extending posteriorly to about centre of lens or beyond ***D. adenomus***
- 1b. Supraorbital luminous organ (Suo) absent → 2
- 2a. So present, completely separated from Vn, or connected to Vn by a strand of dark tissue → 3
- 2b. So absent → 11
- 3a. Dn very small, inconspicuous, directed laterally, shallowly embedded, and almost completely fused with much larger and upwardly spreading Vn; eye diameter more than 2 in upper-jaw length; upper jaw extending about 1 eye diameter behind vertical through posterior border of orbit ***D. vanhoeffeni***
- 3b. Dn well defined, round, equal in size to or somewhat smaller than nasal rosette, directed forward, and set in deep, cup-shaped recess above nasal rosette; eye diameter 2 or less in upper-jaw length; upper jaw extending about one-half eye diameter behind vertical through posterior border of orbit → 4
- 4a. So behind vertical through posterior margin of pupil; Vn very long, longer than horizontal diameter of pupil, occupying anteroventral and most of ventral orbital margin; luminous scale at PLO absent ***D. brachycephalus***
- 4b. So in advance of vertical through posterior margin of pupil; Vn elongate, but shorter than horizontal diameter of pupil, or small, rounded, about equal in size to So; luminous scale at PLO present (sometimes poorly defined or rubbed off) → 5
- 5a. Vn round, its size about equal to or slightly smaller than So; distance between Vn and So 3 or 4 times So diameter; body photophores large, those of AO series about one-half photophore diameter apart ***D. anderseni***
- 5b. Vn horizontally elongate, its size more than 2 times So; distance between Vn and So less than 3 times So diameter; body photophores of moderate size, those of AO series more than one-half photophore diameter apart → 6

- 6a. AOp more or less continuous with Prc, distance between Prc₁ and Prc₃ longer than AOp and Prc₁ interspace; caudal-peduncle length longer than dorsal-fin base ***D. subtilis***
- 6b. AOp well separated from Prc, distance between Prc₁ and Prc₃ equal to or usually shorter than AOp and Prc₁ interspace; caudal-peduncle length equal to or slightly shorter than dorsal-fin base → 7
- 7a. AOa₁ elevated or raised, with straight line through centres of AOa₂ and AOa₁ passing above centre of SAO₂ → 8
- 7b. AOa₁ level or only slightly raised, with straight line through centres of AOa₂ and AOa₁ passing below ventral margin of SAO₂ → 9
- 8a. Gill rakers 7–8 + 1 + 14–15 (rarely 13 or 16), total 22 to 24 (rarely 21 or 25); PLO scale large, its maximum length more than 2 times PLO diameter; posterodorsal margin of opercle broadly rounded and posteriorly truncate ***D. rafinesquii***
- 8b. Gill rakers 5 (rarely 4 or 6) + 1 + 11 or 12 (rarely 13), total 17 or 18 (16, rarely 19); PLO scale small, its maximum length about equal to PLO diameter; opercle with straight or nearly straight horizontal dorsal margin, and pronounced, posteriorly directed and pointed lobe, due to concavity in posterodorsal opercular margin ***D. mollis***
- 9a. SAO₃ about equidistant from lateral line and anal-fin base; PLO scale small, its length about twice diameter of PLO; caudal-peduncle depth 8 or less times in standard length ***D. holti***
- 9b. SAO₃ much nearer lateral line than anal-fin base; PLO scale large, about 3 to 6 times diameter of PLO; caudal-peduncle depth more than 8 times in standard length → 10
- 10a. Gill rakers 7 or 8 (9) + 1 + 15 or 16 (14–17, rarely 18), total 24 or 25 (22–26, rarely 27 or 28); PLO scale mottled; fresh specimens metallic green ***D. hudsoni***
- 10b. Gill rakers 5 (rarely 4 or 6) + 1 + 11 (12, rarely 10 or 13), total 17 (18, rarely 16, 19 or 20); PLO scale striated posteroventrally; fresh specimens metallic blue ***D. meadi***
- 11a. Dn small, shallowly embedded and directed laterally; Vn equally small, completely separated from Dn and located at ventral margin of orbit, or somewhat larger and located at anteroventral margin of orbit and connected with Dn by narrow streak of luminous tissue between eye and nasal apparatus → 12
- 11b. Dn ranging in size from smaller than body photophore to much larger than nasal rosette, in more or less deep recess and directed forward; Vn may be (a) restricted to ventral aspect of orbit, (b) restricted to anteroventral aspect of orbit, (c) extending dorsally to reach Dn; or (d) spread over most or entire area of snout → 14
- 12a. Vn small, about half size of general body photophore, completely separated from Dn, and located at ventral orbital margin on or slightly in advance of vertical through anterior margin of pupil; SAO noticeably angulate; AOa₁ not elevated ***D. dumerilii***
- 12b. Vn somewhat larger than Dn and connected with it by thin streak of luminous tissue extending between eye and nasal apparatus; SAO not or only slightly angulate; AOa₁ abruptly elevated → 13

- 13a.** Total gill rakers 15 or less; PLO nearer upper pectoral-fin base than lateral line; SAO₁ and Pol 1 to 1.5 photophore diameters below lateral line ***D. problematicus***
- 13b.** Total gill rakers 16 or more; PLO nearer lateral line than upper pectoral-fin base; SAO₁ and Pol in contact with lateral line ***D. garmani***
- 14a.** Vn widely separated from Dn, not extending dorsally beyond upper margin of nasal apparatus, confined to ventral or anteroventral aspect of orbit, but some connected to Dn by strand of dark tissue along anterior margin of orbit → **15**
- 14b.** Vn extending dorsally between anterior margin of orbit and nasal apparatus, in contact or confluent with Dn → **19**
- 15a.** SAO₁ above level of VO₅; upper jaw extending less than one eye diameter behind vertical through posterior margin of orbit → **16**
- 15b.** SAO₁ on same level with VO₅; upper jaw extending more than one eye diameter behind vertical through posterior margin of orbit → **17**
- 16a.** Body photophores of moderate size, those of AOp series separated by spaces larger than one-half AOp diameter; VLO midway between lateral line and pelvic-fin base, or somewhat higher; gill rakers 6 or 7 (8) + 1 + 13 or 14 (12), total 20 to 22 (19–23) ***D. taaningi***
- 16b.** Body photophores large, those of AOp series separated by spaces equal to one-half AOp diameter, or less, relatively smaller in specimens >80 mm; VLO nearer to pelvic-fin base than to lateral line; gill rakers 5 (rarely 6) + 1 + 12 (rarely 11 or 13), total 18 (19, rarely 17) ***D. bertelseni***
- 17a.** Vn very long, extending along most of ventral border of eye, its dorsal margin with small, round bud-like projections ***D. luetkeni***
- 17b.** Vn round or oval, located on ventral margin of eye about under center of pupil, or extending from this region as posterior wedge, without bud-like projections, but with tiny luminous spots in black pigment on orbital margin between Vn and nasal rosette → **18**
- 18a.** Gill rakers 8 (9) + 1 + 15 (16), total 24 (25–26) ***D. termophilus***
- 18b.** Gill rakers 5 (4) + 1 + 10 (11), total 16 (15–17) ***D. diadematus***
- 19a.** Dn round, smaller than nasal rosette, set in deep, pigment-lined recess above nasal apparatus; anterior end of supraorbital ridge produced into forwardly directed strong spine (often broken) ***D. splendidus***
- 19b.** Dn equal in size or larger than nasal rosette, round or rectangular, often reaching median ethmoid crest; anterior end of supraorbital ridge not produced into spine-like process → **20**
- 20a.** Head length about equal to head depth, or less than 1.1 times as long as deep → **21**
- 20b.** Head more than 1.2 times as long as deep → **22**
- 21a.** Vn extending along ventral margin of orbit to or somewhat behind vertical through centre of pupil, and somewhat expanded posteriorly; PLO nearer lateral line than pectoral-fin base; VLO nearer lateral line than pelvic-fin base; last 2 AOa photophores not elevated or raised ***D. metopoclampus***
- 21b.** Vn extending only to anterior margin of pupil; PLO about midway between lateral line and pectoral-fin base; VLO about midway between lateral line and pelvic-fin base; last 2 AOa photophores elevated ***D. ostenfeldi***

- 22a. SAO₁ and Pol more than 3 photophore diameters below lateral line ***D. effulgens***
 22b. SAO₁ and Pol in contact with, or 1 photophore diameter or less below lateral line → 23
- 23a. Total gill rakers 26 or more (very rarely 25) ***D. perspicillatus***
 23b. Total gill rakers 20 or less (rarely 21) → 24
- 24a. Dn about size of nasal rosette, extending dorsally to about level of dorsal margin of orbit; body photophores normal; inner series of teeth on dentary large and sharp; Ant present ***D. fragilis***
 24b. Dn very large, about one-half eye diameter, extending dorsally well above level of dorsal margin of orbit and in adults reaching median ethmoid crest; body photophores noticeably small; dentary with inner series of densely set, small teeth; Ant absent . . . ***D. lucidus***

Key to the species of *Hygophum* occurring in the area

- 1a. Prc₂ midway between lateral line and ventral contour of body ***H. benoitii***
 1b. Prc₂ at lateral line or less than one photophore diameter below lateral line → 2
- 2a. VLO at lateral line; SAO₁ in front of or above VO₂ ***H. hygomii***
 2b. VLO about midway between lateral line and outer base of pelvic fin; SAO₁ behind VO₂ → 3
- 3a. Twenty-two to 24 anal-fin rays; caudal peduncle distinctly longer than dorsal-fin base; Pol₁ equidistant between last AOa and Pol₂ ***H. reinhardtii***
 3b. Eighteen to 20 anal-fin rays; caudal peduncle length subequal to dorsal-fin base; Pol₁ often over last AOa and noticeably closer to last AOa than Pol₂ → 4
- 4a. SAO₁ on, touching, or behind vertical through VO₃, well below line uniting lower edges of VLO and SAO₂; line through SAO₃ to SAO₂ passing posterior to VO₄; VLO closer to lateral line than to pelvic-fin base; pectoral-fin rays not reaching vertical through AOa₁ ***H. taaningii***
 4b. SAO₁ in front of vertical through VO₃, on line uniting lower edges of VLO and SAO₂; line through SAO₃ to SAO₂ passing through or slightly before VO₄; VLO midway between lateral line and pelvic-fin base; pectoral-fin rays extending beyond vertical through AOa₁ ***H. macrochir***

Key to the species of *Lampadena* occurring in the area

- 1a. PO₄ highly elevated and anteriorly displaced to vertical through PO₃ ***L. luminosa***
 1b. All PO approximately level → 2
- 2a. VO plus SAO 5 or 6; 3 or 4 AOa; supracaudal and infracaudal organs weakly developed with moderate amount of black border, flat in cross section; body soft . . . ***L. anomala***
 2b. VO plus SAO 7 to 9; 5 to 7 AOa; supracaudal and infracaudal organs well developed with heavy black border, deep in cross section (except infracaudal in *L. chavesi*); body firm → 3

- 3a. Prc₁ to Prc₂ interspace equal to, or more than, 3 times diameter of photophore of this series → 4
- 3b. Prc₁ to Prc₂ interspace much less than 3 times diameter of photophore of this series → 5
- 4a. Last 2 or 3 AOa entirely behind anal-fin base; 2 AOp; length of infracaudal luminous organ at least 1.5 times depth of caudal peduncle; pterotic spine directed posteriorly; crescent of whitish tissue on dorsal half of iris *L. chavesi*
- 4b. No AOa behind anal-fin base; 4 or 5 (rarely 3) AOp; length of infracaudal luminous organ less than 1.5 times depth of caudal peduncle; pterotic spine directed downward and forward; no crescent of whitish tissue on iris *L. dea*
- 5a. Total gill rakers 16 or less, usually 14; supracaudal organ equal to or slightly longer than infracaudal organ *L. urophaos atlantica*
- 5b. Total gill rakers 18 or more; supracaudal organ shorter than infracaudal organ → 6
- 6a. Distance between anal-fin base and anterior margin of infracaudal organ much less than length of infracaudal organ; all AOp over infracaudal organ; distance between vertical at rear margin of orbit and end of maxilla subequal to or longer than horizontal diameter of eye *L. pontifex*
- 6b. Distance between anal-fin base and anterior margin of infracaudal organ equal to, or more than, length of infracaudal organ; AOp₁ (and usually AOp₂) in front of infracaudal organ; distance between vertical at rear margin of orbit and end of maxilla about one-half diameter of eye *L. speculigera*

Key to the species of *Lampanyctus* occurring in the area

- 1a. Branchiostegal membrane with minute serial photophores between branchiostegal rays → 2
- 1b. No minute serial photophores on branchiostegal membrane between branchiostegal rays → 4
- 2a. Luminous scale at adipose-fin origin absent; VLO midway between lateral line and pelvic-fin base *L. pusillus*
- 2b. Luminous scale present at adipose-fin origin; VLO at or 1 photophore diameter below lateral line → 3
- 3a. Gill rakers 3 or 4 + 1 + 9 (8), total 13 or 14; AO 6 (5–7) + 6 or 7 (5–8), total 12 or 13 (11); anal-fin origin under penultimate ray of dorsal fin *L. alatus*
- 3b. Gill rakers 6 (7) + 1 + 13 or 14 (15), total 20 or 21 (22–23); AO 7 or 8 (rarely 9) + 7 or 8 (rarely 6 or 9), total 15 (14, rarely 16); anal-fin origin under third or fourth last dorsal ray . *L. australis*
- 4a. One or more photophores on cheek → 5
- 4b. No photophores on cheek → 8
- 5a. Luminous scale at adipose-fin origin absent *L. photonotus*
- 5b. Luminous scale present at or just anterior to adipose-fin origin → 6
- 6a. Total gill rakers on first gill arch 21 to 26; pectoral fin short, not reaching pelvic-fin base *L. macdonaldi*
- 6b. Total gill rakers on first gill arch 15 to 18; pectoral fin long, reaching far beyond pelvic-fin base → 7

- 7a. AOa 9 (8–10), with AOa₁ and/or AOa₂ abruptly depressed, line passing through AOa₁ to AOa₂ below AOa₃; gill rakers 4 + 1 + 10 (rarely 9 or 11), total 15 (rarely 14 or 16); total number of vertebrae 38 (37) ***L. intricarius***
- 7b. AOa 6 (7), with AOa₁ and AOa₂ not abruptly depressed, line passing through AOa₁ to AOa₂ above AOa₃; gill rakers 5 (rarely 4) + 1 + 11 (10–12), total 17 (16–18); total number of vertebrae 36 (35) ***L. crocodilus***
- 8a. Prc₂ to Prc₄ forming straight oblique line, with Prc₃ on or touching Prc₂ to Prc₄ line, or Prc₂ to Prc₄ only slightly arched with concavity directed posteriorly and ventrally → **9**
- 8b. Prc₂ to Prc₄ forming arc with concavity directed anteriorly and dorsally → **10**
- 9a. Gill rakers 4 + 1 + 10 (rarely 9 or 11), total 15 (rarely 14 or 16); eye diameter 2.8 to 3.2 in upper-jaw length ***L. vadulus***
- 9b. Gill rakers 3 + 1 + 9 (rarely 8 or 10), total 13 (rarely 12 or 14); eye diameter 3.5 to 3.9 in upper-jaw length ***L. nobilis***
- 10a. VO series level; series of luminous scales on ventral caudal peduncle not extending entire distance from procurrent caudal rays to anal-fin base; Prc₃ at level of Prc₁; pectoral-fin rays 13 or 14; total AO 12 or 13 ***L. tenuiformis***
- 10b. VO series arched; series of luminous scales on ventral caudal peduncle extending from procurrent caudal rays to anal-fin base; Prc₃ above level of Prc₁; pectoral-fin rays 15 to 17; total AO 15 or 16 ***L. festivus***

Key to the species of *Lepidophanes* occurring in the area

- 1a. Gill rakers 3 + 1 + 8 (rarely 7), total 12 (rarely 11); no small saddle-like luminous patches on midline between posterior end of dorsal fin and adipose-fin origin; luminous tissue at pelvic-fin origin and below pectoral-fin base ***L. gaussi***
- 1b. Gill rakers 4 + 1 + 9 (rarely 8 or 10), total 14 (rarely 13 or 15); small saddle-like luminous patches on midline between posterior end of dorsal fin and adipose-fin origin; no luminous tissue at pelvic-fin base or below pectoral-fin base ***L. guentheri***

Key to the species of *Lobianchia* occurring in the area

- 1a. Pol much closer to lateral line than anal-fin base or ventral contour of caudal peduncle; SAO forming gentle arc, with concavity directed anterodorsally; Prc₄ separated from Prc₃ by greatly enlarged interspace, lying at base of middle caudal rays; distance between Prc₄ and Prc₃ equal to or usually greater than distance between Prc₁ and Prc₃ ***L. dofleini***
- 1b. Pol midway between lateral line and anal-fin base or lower; SAO series on a straight or slightly curved line, with concavity directed posteroventrally; Prc evenly spaced, sometimes Prc₄ somewhat displaced posteriorly; distance between Prc₄ and Prc₃ always shorter than distance between Prc₁ and Prc₃ ***L. gemellarii***

Key to the species of *Loweina* occurring in the area

- 1a. 2 SAO photophores; 4 VO photophores; gill rakers 2 + 1 + 5 or 6, total 8 or 9 ***L. rara***
- 1b. 3 SAO photophores; 2 VO photophores, at positions corresponding to VO₁ and VO₄;
gill rakers 3 + 1 + 8 or 9 (7–10), total 12 or 13 (11–14) ***L. interrupta***

Key to the species of *Myctophum* occurring in the area

- 1a. Body short and deep, with body depth 3 to 3.4 times in standard length; supracaudal organs present in males and females, infracaudal organs absent ***M. selenops***
- 1b. Body elongate, with body depth 3.8 times or more in standard length; supracaudal organs present in males, very rarely females, infracaudal organs present in females, very rarely males. → 2

- 2a. Three or more AOp photophores above anal-fin base; Pol more than one photophore diameter in front of vertical through adipose-fin origin → 3
- 2b. Two or less AOp photophores above anal-fin base; Pol under adipose-fin base or less than one photophore diameter in front of vertical through adipose-fin origin → 4

- 3a. Prc₂ less than 1 photophore diameter below lateral line; Prc₁ to Prc₂ interspace about equal to AOp to Prc₁ interspace; PLO closer to lateral line than to upper pectoral-fin base; posterodorsal margin of opercle serrate; palatine teeth minute and irregularly scattered ***M. phengodes***
- 3b. Prc₂ more than 2 photophore diameters below lateral line; Prc₁ to Prc₂ interspace about 2 or more in AOp to Prc₁ interspace; PLO midway between lateral line and upper pectoral-fin base; posterodorsal margin of opercle smooth; palatine teeth enlarged and in single row along outer lateral margin ***M. punctatum***

- 4a. Line through centres of SAO₂ and SAO₁ passing closer to VO₂ than VO₃, or further anteriorly ***M. asperum***
- 4b. Line through centres of SAO₂ and SAO₁ passing through or behind VO₃ → 5

- 5a. Posterodorsal margin of opercle sharply angulate (juveniles) to pointed (adults) with small area of serrations in best specimens; palatine teeth large and in single row along outer lateral margin ***M. nitidulum***
- 5b. Posterodorsal margin of opercle evenly rounded, with or without serrations; palatine teeth minute and irregularly scattered → 6

- 6a. Total gill rakers 21 or less; scales spinoid in specimens over 30 mm; posterodorsal margin of opercle smooth ***M. affine***
- 6b. Total gill rakers 23 or more; scales cycloid; posterodorsal margin of opercle serrate in specimens over 30 mm ***M. obtusirostre***

Key to the species of *Nannobranchium* occurring in the area

- 1a. Pectoral fins present → 2
- 1b. Pectoral fins absent → 6

- 2a. VO_2 elevated and anteriorly displaced to above VO_1 *N. isaacsi*
- 2b. VO_2 not, or only slightly raised and not displaced, approximately midway between VO_1 and VO_3 → 3
- 3a. Black pigment cap covering posterior tips of supracaudal and infracaudal luminous organs (sometimes lost); SAO_1 behind vertical through VO_3 ; Prc_3 on vertical midway between Prc_2 and Prc_4 forming straight oblique line → 4
- 3b. No black pigment cap covering posterior tips of supracaudal and infracaudal luminous organs; SAO_1 before vertical through VO_3 ; Prc_3 closer to vertical from Prc_4 than Prc_2 , usually directly below Prc_4 → 5
- 4a. Length of caudal peduncle more than length of upper jaw; total AO 14 to 17 *N. lineatum*
- 4b. Length of caudal peduncle less than length of upper jaw; total AO 11 or 12 *N. cuprarium*
- 5a. Pol on, slightly before or slightly behind vertical through adipose-fin origin; adipose-fin origin well in advance of vertical through base of last anal-fin ray *N. atrum*
- 5b. Pol well in front of vertical through adipose-fin origin; adipose-fin origin on, slightly before or slightly behind vertical through base of last anal-fin ray (Note: very small juvenile specimens of *N. achirus* with pectoral fins) *N. achirus* (in part)
- 6a. Gill rakers 4 or 5 + 1 + 10 or 11, total 15 to 17; distance from tip of snout to dorsal-fin origin more than 50% standard length; size at sexual maturity 90 mm *N. wisneri*
- 6b. Gill rakers 5 or 6 + 1 + 11 to 13, total 17 to 20; distance from tip of snout to dorsal-fin origin less than 50% standard length; size at sexual maturity 150 mm (Note: large juveniles and adult specimens of *N. achirus* without pectoral fins) *N. achirus* (in part)

Key to the species of *Notoscopelus* occurring in the area

- 1a. Gill rakers 4 + 1 + 9 (rarely 8 or 10), total 14 (rarely 13 or 15); AO 7(6–8) + 4 (3–5), total 11(10–12); enlarged teeth on rear half of lower jaw *N. (N.) caudispinosus*
- 1b. Total gill rakers more than 18; total AO 13 to 17 (rarely 12); no enlarged teeth on rear half of lower jaw → 2
- 2a. Gill rakers 26 or more → 3
- 2b. Gill rakers 25 or less → 4
- 3a. Dorsal-fin rays 22 (21); gill rakers 8 + 1 + 17 (18), total 26 (27) [higher north of area]; adult males with supracaudal luminous organ, but no luminous tissue on cheek or above orbit *N. (N.) kroeyerii*
- 3b. Dorsal-fin rays 23 to 26; gill rakers 9 (8) + 1 + 18 (17–19), total 28 (26–29); adult males with luminous tissue on cheek and above orbit, but no supracaudal luminous organ *N. (Pareiophus) bolini*
- 4a. Total gill rakers 20 or 21 (rarely 19 or 22–23); total AO 13 or 14 (rarely 12–14) *N. (N.) resplendens*
- 4b. Total gill rakers 24 (rarely 23 or 25); total AO 15 to 17 [not in area] *N. (N.) elongatus*


Key to the species of *Symbolophorus* occurring in the area

- 1a. Pol on or behind vertical through adipose-fin origin; PLO nearer to lateral line than to upper pectoral-fin base; palatine and dentary with numerous rows of minute subequal teeth; gill rakers slender and lath-like ***S. rufinus***
- 1b. Pol well in advance of vertical through adipose-fin origin; PLO midway between lateral line and upper pectoral-fin base, or nearer upper pectoral-fin base; outer row of teeth on palatine and inner row of teeth on dentary enlarged; gill rakers spatulate → 2
- 2a. Pectoral fin with pigment spot (specimens larger than 60 mm); gill rakers 21 or more (very rarely 20); GR 6 (7, very rarely 5) + 1 + 15 (14–16, rarely 13), total 22 (21–23, very rarely 20 or 24) ***S. boops***
(Subantarctic species in southeast Atlantic south of about 19°S)
- 2b. Pectoral fin without pigmentation; gill rakers 20 or less (very rarely 21) → 3
- 3a. AOa series noticeably arched, AOa₁ depressed with line through centres of AOa₃ to AOa₂ passing above AOa₁ → 4
- 3b. AOa series straight or only very slightly arched, AOa₁ level with or slightly lower than AOa₂ with line through centres of AOa₃ to AOa₂ passing through AOa₁ or touching black dorsal rim of AOa₁ photophore ***S. krefftii***
(tropical Atlantic: from about 20°N to 06°S west of 20°W, and to about 18°S east of 0°)
- 4a. Females with infracaudal organ only, of 3 (2 to 4) luminous patches, sometimes overlapping or partially coalesced; males with supracaudal organ only, of 1 to 3 coalesced, luminous patches immediately in front of dorsal procurrent caudal rays . . . ***S. veranyi***
(North Atlantic temperate-subtropical species, between about 54°N–34°N, with isolated specimens to about 18°N in upwelled waters off West Africa)
- 4b. Females with both supracaudal and infracaudal organ, of 2 (1) coalesced luminous patches supracaudally and 3 (2) partially coalesced luminous patches infracaudally; oval luminous patches (see figure for variations in 2 male specimens) ***S. barnardi***
(Southern Convergence species: in southeast Atlantic between 29°S–42°S)

Key to the species of *Taaningichthys* occurring in the area

- 1a. Body photophores absent ***T. paurolychnus***
- 1b. Body photophores present → 2
- 2a. VO 8–10; AO (5–7) + (4–6), total 9–13; Pol on or anterior to vertical through adipose-fin origin; Prc₁ to Prc₂ interspace equal to or more than 2 photophore diameters ***T. minimus***
- 2b. VO 3–5; AO (1–4) + (1–2), total 2–5; Pol well behind vertical through adipose-fin origin; Prc₁ to Prc₂ interspace equal to or less than one photophore diameter ***T. bathyphilus***

List of species occurring in the area

The symbol  is given where keys to species and species accounts are included.

-  *Bentosema glaciale* (Reinhardt, 1837).
-  *Bentosema suborbitale* (Gilbert, 1913).
-  *Bolinichthys distofax* Johnson, 1975.
-  *Bolinichthys indicus* (Nafpaktitis and Nafpaktitis, 1969).
-  *Bolinichthys photothorax* (Parr, 1928).
-  *Bolinichthys supralateralis* (Parr, 1928).
-  *Centrobranchus nigroocellatus* (Günther, 1873).
-  *Ceratoscopelus maderensis* (Lowe, 1839).
-  *Ceratoscopelus warmingii* (Lütken, 1892).
-  *Diaphus adenomus* Gilbert, 1905.
-  *Diaphus anderseni* Tåning, 1932.
-  *Diaphus bertelseni* Nafpaktitis, 1966.
-  *Diaphus brachycephalus* Tåning, 1928.
-  *Diaphus diadematus* Tåning, 1932.
-  *Diaphus dumerilii* (Bleeker, 1856).
-  *Diaphus effulgens* (Goode and Bean, 1896).
-  *Diaphus fragilis* Tåning, 1928.
-  *Diaphus garmani* Gilbert, 1906.
-  *Diaphus holti* Tåning, 1918.
-  *Diaphus hudsoni* Zubrigg and Scott, 1976.
-  *Diaphus lucidus* (Goode and Bean, 1896).
-  *Diaphus luetkeni* (Brauer, 1904).
-  *Diaphus meadi* Nafpaktitis, 1978.
-  *Diaphus metopoclampus* (Cocco, 1829).
-  *Diaphus mollis* Tåning, 1928.
-  *Diaphus ostensfeldi* Tåning, 1932.
-  *Diaphus perspicillatus* (Ogilby, 1898).
-  *Diaphus problematicus* Parr, 1928.
-  *Diaphus rafinesquii* (Cocco, 1838).
-  *Diaphus splendidus* (Brauer, 1904).
-  *Diaphus subtilis* Nafpaktitis, 1968.
-  *Diaphus taaningi* Norman, 1930.
-  *Diaphus termophilus* Tåning, 1928.
-  *Diaphus vanhoeffeni* (Brauer, 1906).
-  *Diogenichthys atlanticus* (Tåning, 1928).
-  *Electrona risso* (Cocco, 1829).
-  *Gonichthys cocco* (Cocco, 1829).
-  *Hygophum benoiti* (Cocco, 1838).
-  *Hygophum hygomii* (Lütken, 1892).
-  *Hygophum macrochir* (Günther, 1864).
-  *Hygophum reinhardtii* (Lütken, 1892).
-  *Hygophum taaningi* Becker, 1965.

- *Lampadena anomala* Parr, 1928.
- *Lampadena chavesi* Collett, 1905.
- *Lampadena dea* Fraser-Brunner, 1949.
- *Lampadena luminosa* (Garman, 1899).
- *Lampadena pontifex* Krefft, 1970.
- *Lampadena speculigera* Goode and Bean, 1896.
- *Lampadena urophaos atlantica* Maul, 1969.
- *Lampanyctodes hectoris* (Günther, 1876).
- *Lampanyctus alatus* Goode and Bean, 1896.
- *Lampanyctus australis* Tåning, 1932.
- *Lampanyctus crocodilus* (Risso, 1810).
- *Lampanyctus festivus* Tåning, 1928.
- *Lampanyctus intricarius* Tåning, 1928.
- *Lampanyctus macdonaldi* (Goode and Bean, 1896).
- *Lampanyctus nobilis* Tåning, 1928.
- *Lampanyctus photonotus* Parr, 1928.
- *Lampanyctus pusillus* (Johnson, 1890).
- *Lampanyctus tenuiformis* Brauer, 1906.
- *Lampanyctus vadulus* Hulley, 1981.
- *Lampichthys procerus* (Brauer, 1904).
- *Lepidophanes gaussi* (Brauer, 1906).
- *Lepidophanes guentheri* (Goode and Bean, 1896).
- *Lobianchia dofleini* (Zugmayer, 1911).
- *Lobianchia gemellarii* (Cocco, 1838).
- *Loweina interrupta* (Tåning, 1928).
- *Loweina rara* (Lütken, 1892).
- *Myctophum affine* (Lütken, 1892).
- *Myctophum asperum* Richardson, 1845.
- *Myctophum nitidulum* Garman, 1899.
- *Myctophum obtusirostre* Tåning, 1928.
- *Myctophum phengodes* (Lütken, 1892).
- *Myctophum punctatum* Rafinesque, 1810.
- *Myctophum selenops* Tåning, 1928.
- *Nannobrachium achirus* (Andriashev, 1962).
- *Nannobrachium atrum* (Tåning, 1928).
- *Nannobrachium cuprarium* (Tåning, 1928).
- *Nannobrachium isaacsi* (Wisner, 1974).
- *Nannobrachium lineatum* (Tåning, 1928).
- *Nannobrachium wisneri* Zahuranec, 2000.
- *Notolychnus valdiviae* (Brauer, 1904).
- *Notoscopelus bolini* Nafpaktitis, 1975.
- *Notoscopelus caudispinosus* (Johnson, 1863).
- *Notoscopelus kroeyerii* (Malm, 1861).
- *Notoscopelus resplendens* (Richardson, 1845).
- *Protomyctophum arcticum* (Lütken, 1892).
- *Scopelopsis multipunctatus* Brauer, 1906.

- *Symbolophorus barnardi* (Tåning, 1932).
- *Symbolophorus boops* (Richardson, 1845).
- *Symbolophorus krefftii* Hulley, 1981.
- *Symbolophorus rufinus* (Tåning, 1928).
- *Symbolophorus veranyi* (Moreau, 1888).
- *Taaningichthys bathyphilus* (Tåning, 1928).
- *Taaningichthys minimus* (Tåning, 1928).
- *Taaningichthys paurolychnus* Davy, 1972.

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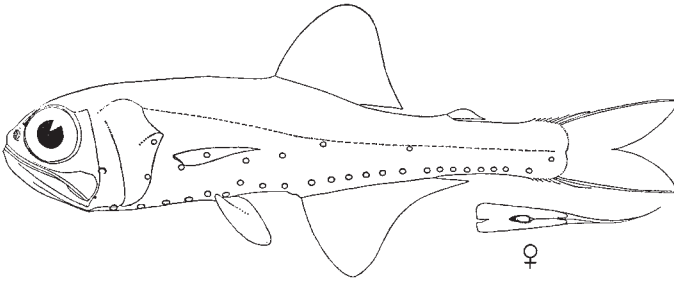
***Benthosema* Goode and Bean, 1896**

5 species; 2 species in area.

***Benthosema glaciale* (Reinhardt, 1837)**

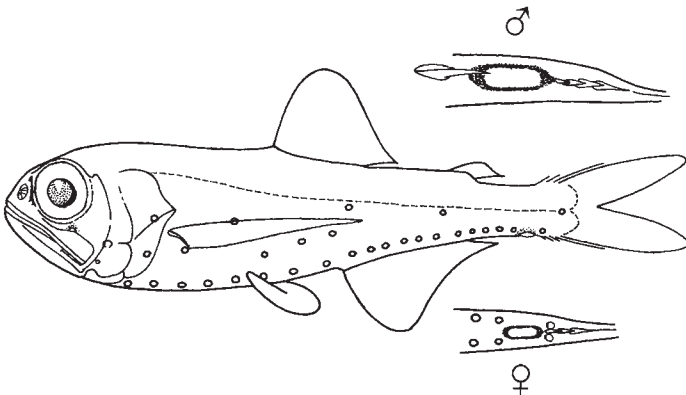
En – Glacier lanternfish; Fr – Lanterne glaciale.

Maximum size to 103 mm; sexually mature from about 50 mm. Oceanic, adults mesopelagic in depths of 275 to 850 m (day) and from surface to 225 m (night); all others non-migrators. Food items mainly calanoid copepods, euphausiids, and copepodites. North Atlantic and Mediterranean endemic: between 80°N and 32°N, with disjunct southern extension off Morocco and in Mauritanian upwelling region (25°N–11°N). Also from western Mediterranean basin.

***Benthosema suborbitale* (Gilbert, 1913)**

En – Smallfin lanternfish.

Maximum size to 39 mm; sexually mature from about 24 mm. Oceanic, adults mesopelagic in depths of 375 to 750 m (day) and surface to 125 m (night); juveniles non-migrators. In area between 37°N and southern Subtropical Convergence, with isolates to 45°N; absent in Mauritanian and Benguela upwelling regions, and in southern gyre off Brazil. Also from Gulf of Mexico, Caribbean and western Atlantic (10°S–42°N), with isolates to 57°N in Gulf Stream; Indian Ocean (36°N–30°S); and Pacific (33°N–34°S), with northern and southern extensions in western boundary currents.



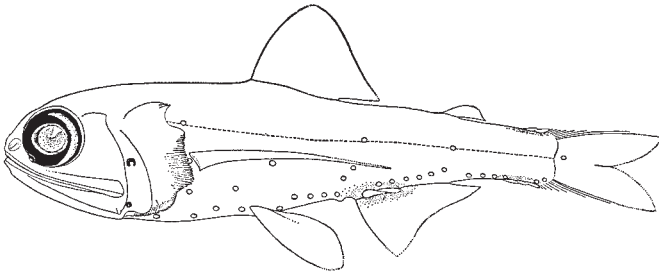
***Bolinichthys* Paxton, 1972**

7 species; 4 species in area.

***Bolinichthys distofax* Johnson, 1975**

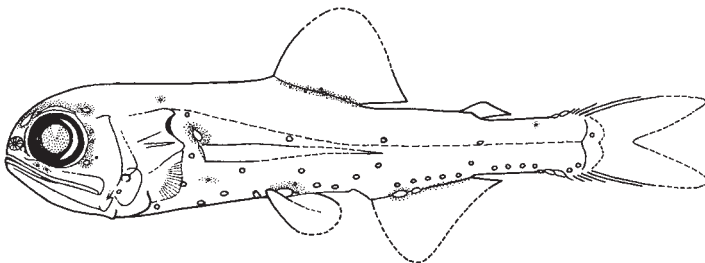
En – Barenose lanternfish.

Maximum size to 90 mm; sexually mature from about 75 mm. Oceanic, mesopelagic in depths of 490 to 690 m (day) and juveniles in 100 to 200 m (night); adults non-migrators. Uncommon in area, only in less-productive subtropical waters of southern gyre (06°S–16°S). Also from western Atlantic (25°N–26°S); and Pacific (32°N–13°S). No known records from Indian Ocean.

***Bolinichthys indicus* (Nafpaktitis and Nafpaktitis, 1969)**

En – Smoothcheek lanternfish.

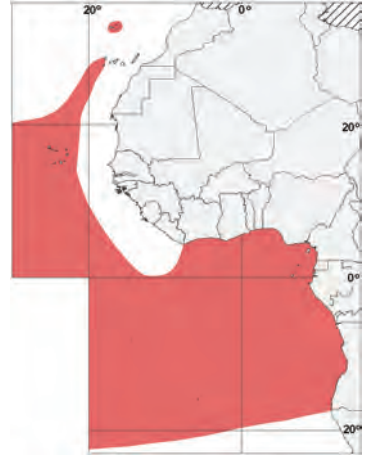
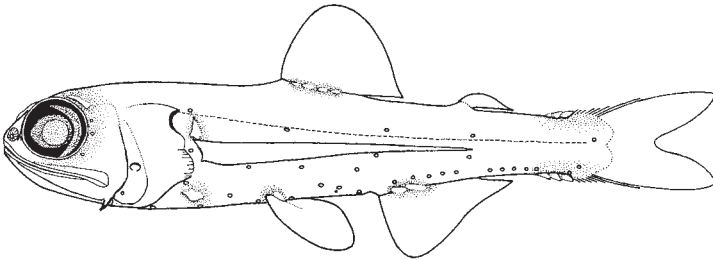
Maximum size to 45 mm; sexually mature from about 31 mm. Oceanic, mesopelagic in depths of 500 to 900 m (day) and 25 to 300 m (night). Spring/early summer spawner. In area between 36°N and 23°S, but absent in extended southern gyre (0°–21°S) and in Benguela upwelling region. Also from western Atlantic (10°N–42°N), with northern extension in Gulf Stream to 53°N east of 40°W, and from 18°S to southern Subtropical Convergence; Indian Ocean (15°S to Subtropical Convergence) and in Agulhas Current to 34°S, but absent in Mozambique Channel; 2 records off Western Australia (30°S to 34°S).



***Bolinichthys photothorax* (Parr, 1928)**

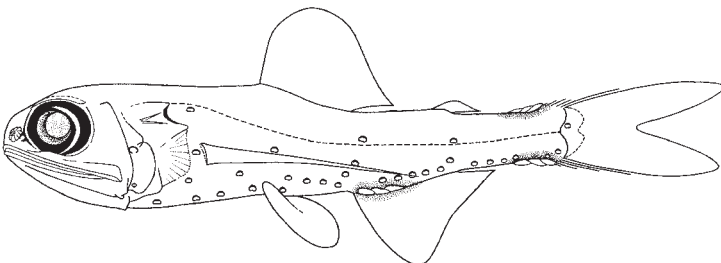
En – Spurcheek lanternfish.

Maximum size to 73 mm; sexually mature from about 54 mm. Oceanic, mesopelagic in depths of 425 to 750 m (day) and 40 to 500 m (night). Late winter/spring spawner (Bermuda) and summer/autumn (Hawaii). In area between 30°N and 20°S, with isolates to 33°N, but absent in Mauritanian upwelling region. Also from Gulf of Mexico, Caribbean and western Atlantic (43°N–25°S), with isolates to 38°S; Indian Ocean (08°N–26°S); and Pacific (12°N–22°S), with extensions to 35°N in Kuroshio Current and to 33°S in East Australian Current.

***Bolinichthys supralateralis* (Parr, 1928)**

En – Stubby lanternfish.

Maximum size to 117 mm; sexually mature from more than 90 mm. Oceanic, mesopelagic in depths of 375 to 750 m (day) and 40 to 650 m (night); large specimens benthopelagic and non-migrators. In area between 22°N and 02°S, and off Madeira and Canary Islands, but absent in Gulf of Guinea and between 02°S and 28°S in eastern sector. Also from Gulf of Mexico, Caribbean and western Atlantic (42°N–40°S), with extension in Gulf Stream to 58°N east of 30°W; Indian Ocean off Madagascar, South Africa (27°S–35°S), and St Paul/New Amsterdam islands; western Pacific (23°N–45°S); and Central Pacific (31°N–35°S).



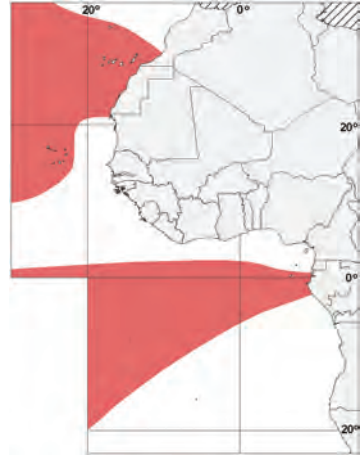
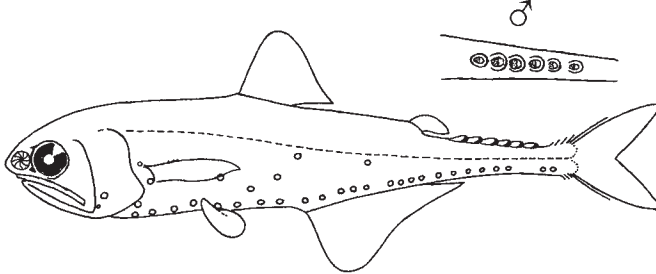
***Centrobranchus* Fowler, 1904**

4–5 species; 1 species in area.

***Centrobranchus nigroocellatus* (Günther, 1873)**

En – Roundnose lanternfish.

Maximum size to 50 mm; sexually mature from about 34 mm. Oceanic, mesopelagic in depths of 375 to 650 m (day) and from surface to 200 m (night). Late winter/early spring (Bermuda) spawner. Food items pelagic gastropods. In area south of diagonal 36°N–30°N to 10°N (western sector) and between 03°N and 20°S, but absent in Mauritanian upwelling and Equatorial Counter Current regions, and south of 04°S (eastern sector). Also from Gulf of Mexico, Caribbean, and western Atlantic (08°N–42°N), with isolates to 47°N in Gulf Stream, and between 03°S and 40°S; Indian Ocean between 03°S and 34°S west of 75°E, and off northwestern Australia; South China Sea; and Pacific between 44°N and 35°S, absent/rare in Equatorial Divergence region.

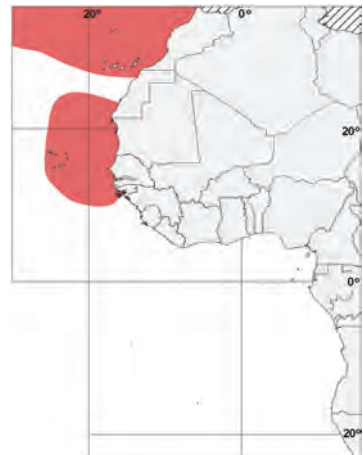
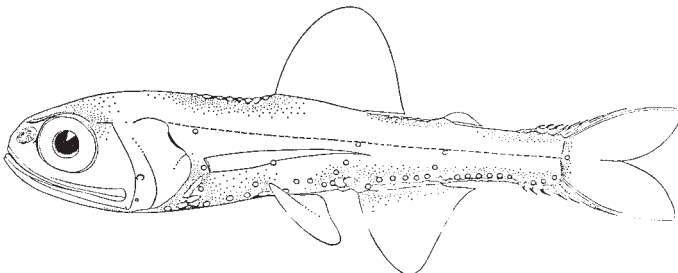
***Ceratoscopelus* Günther, 1864**

3 species; 2 species in area.

***Ceratoscopelus maderensis* (Lowe, 1839)**

En – Madeira lanternfish.

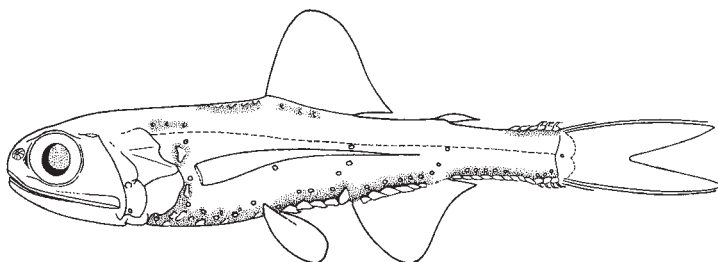
Maximum size to 81 mm; sexually mature from about 62 mm. Oceanic, adults mesopelagic in depths of 100 to 1 000 m (day), and 12 to 300 m and 600 to 800 m (night); some juveniles non-migrators. Food items mainly copepods and pelagic crustaceans. North Atlantic and Mediterranean endemic: between 50°N and 28°N, to Mauritanian upwelling region, and in eastern and western Mediterranean basins.



***Ceratoscopelus warmingii* (Lütken, 1892)**

En – Warming's lanternfish.

Maximum size to 81 mm; sexually mature from about 44 mm (North and Central Atlantic) and 59 mm (South Atlantic). Oceanic, mesopelagic in depths of 700 to 1 000 m (day) and 20 to 200 m (night). Late spring/summer spawner. Throughout area, but apparently absent in Mauritanian upwelling region. Also from Gulf of Mexico, Caribbean, and tropical and subtropical Atlantic (42°N–45°S), with isolates to 59°N in Gulf Stream; Indian (14°N–44°S west of 70°E) and off Western Australia; Pacific (35°N–38°S); and in Great Australian Bight.



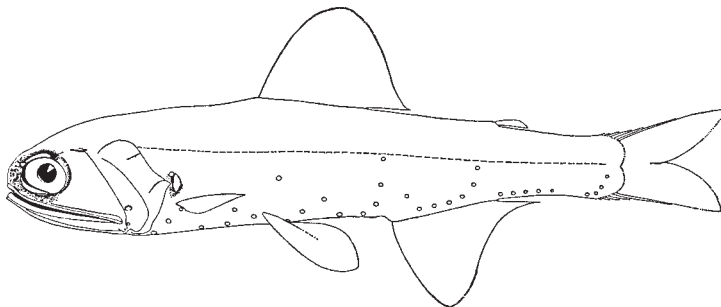
***Diaphus* Eigenmann and Eigenmann, 1890**

More than 70 species; 25 species in area.

***Diaphus adenomus* Gilbert, 1905**

En – Firebrow lanternfish.

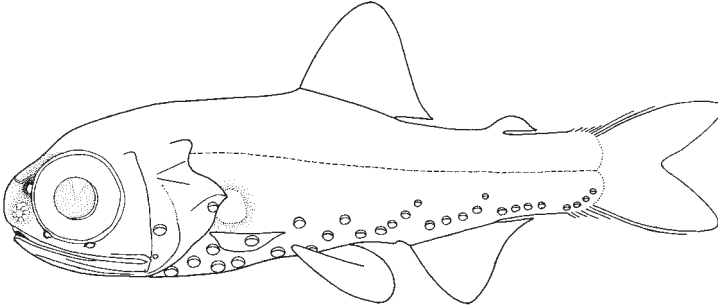
Maximum size 207 mm. Pseudoceanic, adults benthopelagic in depths of 500 to 600 m (day) and below 180 m (night); some in midwater. In area off Casablanca and eastern Canary Islands. Also from Atlantic (off Bahamas, Gulf of Mexico, Caribbean, Brazil); and Pacific off Hawaii and off Japan (Sagami Bay, Suruga Bay, Kyushu-Palau Ridge) and Nasca and Sala y Gomez Ridges.



***Diaphus anderseni* Tåning, 1932**

En – Andersen's lanternfish.

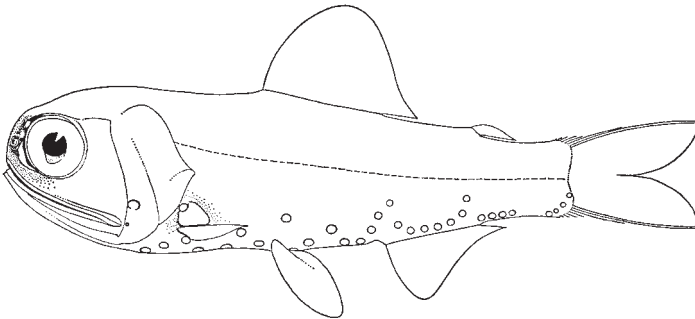
Maximum size to 32 mm; sexually mature from about 27 mm. Oceanic, mesopelagic in depths of 300 to 560 m (day) and upper 100 m (night). In area west of 0° between 05°S and 23°S, with limit at southern Subtropical Convergence. Also from North Atlantic (doubtful record off Venezuela); eastern Pacific (40°N–20°N and 04°N–27°S); and western Pacific (28°N–37°S). One Indian Ocean record at 18.67°S, 116.70°E (off Port Hedland, Western Australia).



***Diaphus bertelseni* Nafpaktitis, 1966**

En – Bertelsen's lanternfish.

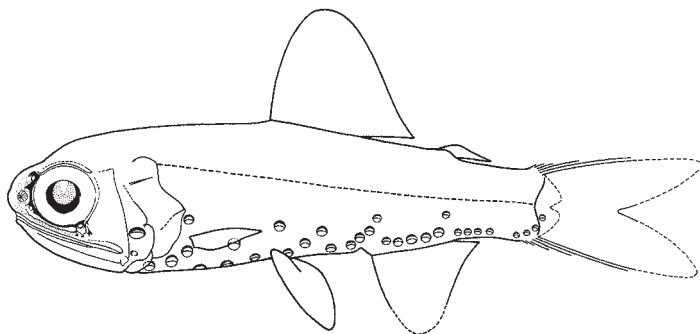
Maximum size to 100 mm. Oceanic, mesopelagic in depths of 200 to 300 m (day) and 60 to 175 m (night). In area between 36°N and 26°N and west of 06°W between 04°N and 23°S, but absent in Mauritanian upwelling region and over minimum region off Brazil. Also from Gulf of Mexico, Caribbean, and western Atlantic (03°N–38°N); western Pacific off New Caledonia and New South Wales; and central Pacific (0°–27°N).



***Diaphus brachycephalus* Tåning, 1928**

En – Shorthead lanternfish.

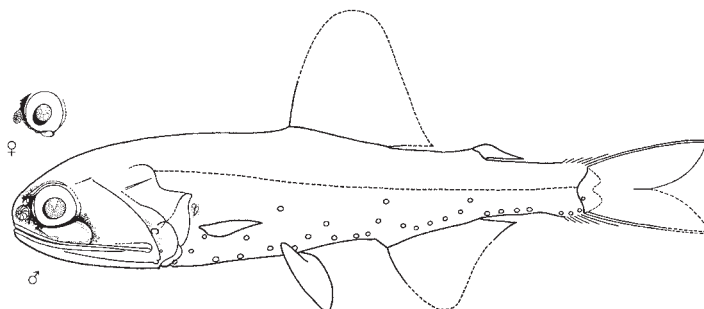
Maximum size to 60 mm; sexually mature from about 38 mm. Oceanic, adults mesopelagic in depths of 300 to 600 m (day) and 150 to 200 m (night), with juveniles below 30 m; large males partial/non-migrators. Summer spawner. In area west of 08°W between 34°N to 23°S, but absent from Mauritanian upwelling region and southeast sector east of 08°W. Also in Gulf of Mexico, Caribbean, and western Atlantic (42°N–36°S) and southeast sector in Agulhas rings (south of 30°S); western Indian Ocean (02°S–24°S) and in Agulhas Current, and off northwest Australia; western Pacific (36°N–37°S); and Central Pacific (32°N–26°S), absent in Equatorial Divergence region.



***Diaphus diadematus* Tåning, 1932**

En – Crown lanternfish.

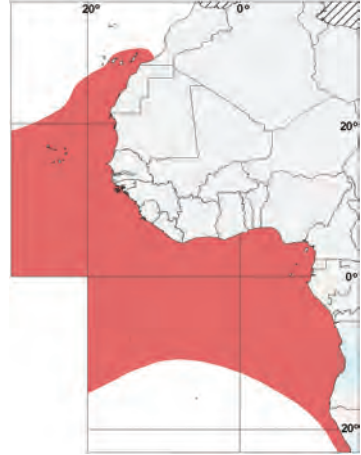
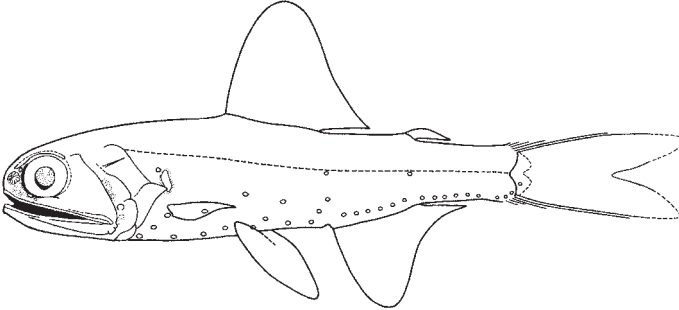
Maximum size to 42 mm; sexually mature from about 35 mm. Oceanic, mesopelagic in upper 100 m (night). In area south of 18°S in exfoliated Agulhas rings on arc Tristan da Cunha – 35°S, 0°E. Also from Indian Ocean, disjunctly off Western Australia/Sumatra and Mozambique Channel/Agulhas Current; western Pacific (18°N–28°S); Southeast Asian seas; and central Pacific (04°N–25°S) between 165°W and 119°W.



***Diaphus dumerilii* (Bleeker, 1856)**

En – Dumeril's lanternfish.

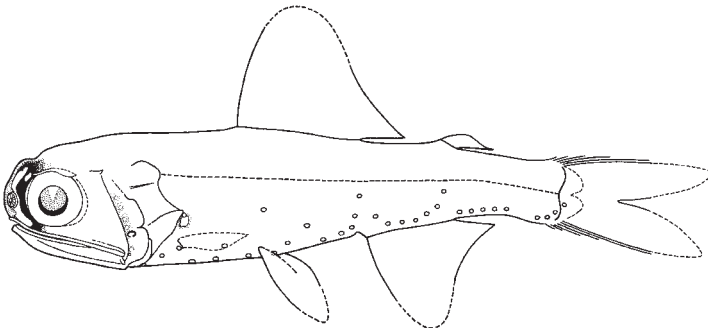
Maximum size to 65 mm (in area); sexually mature from about 47 mm. Oceanic, mesopelagic in depths of 225 to 750 m (day) and from surface to 125 m (night). Probable Atlantic endemic; in area from 30°N to 5°S (western sector) and to 23°S (eastern sector). Also from Gulf of Mexico, Caribbean, and tropical waters of western Atlantic to 52°N, with isolates off Ireland (52–57°N); western South Atlantic (25°S–45°S). Records from Indo-Pacific require verification.



***Diaphus effulgens* (Goode and Bean, 1896)**

En – Headlight lanternfish.

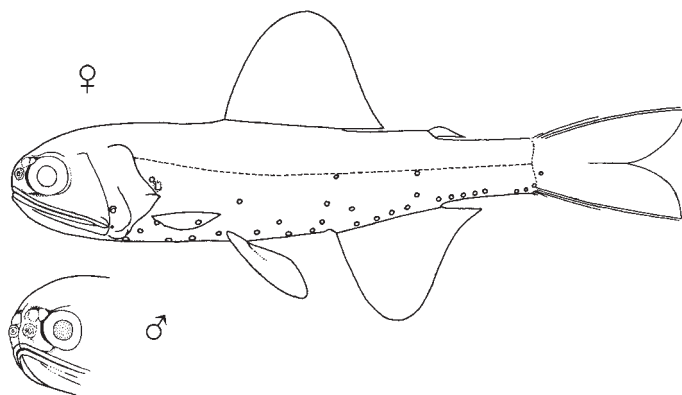
Maximum size more than 150 mm; size at sexual maturity unknown. Oceanic, mesopelagic in depths of 325 to 650 m (day) and 40 to 175 m (night); large specimens (> 100 mm) non-migrators; size stratification with depth. Possible spring spawner in deepwater. Disjunctly in area between 36°N to 17°N and 18°S to southern Subtropical Convergence, but absent in Benguela upwelling region. Also from Gulf of Mexico, Caribbean, western Atlantic west of 40°W (10°N–42°N), with northern extension to 58°N in Gulf Stream east of 30°W; Indian Ocean west of 80°E (18°S–42°S), and off Perth; Southeast Asian seas; western Pacific (0°–38°S); and central and eastern Pacific (32°N–40°S).



***Diaphus fragilis* Tåning, 1928**

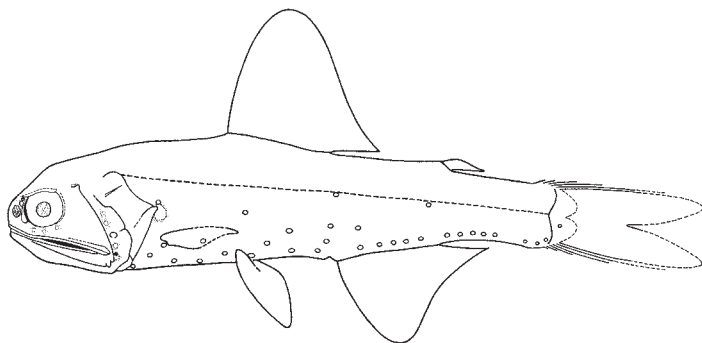
En – Fragile lanternfish.

Maximum size to 99 mm; sexually mature from about 58 mm. Oceanic, mesopelagic in depths of 520 to 600 m (day) and 15 to 125 m (night). In area west of 0° between 26°N and 23°S, but absent in Gulf of Guinea, eastern South Atlantic and Benguela upwelling region. Also from Gulf of Mexico, Caribbean, and western Atlantic (40°N–34°S); western Indian Ocean (08°N–12°S); Southeast Asian seas; western Pacific (0°–34°S), with two records off Japan (35°N, 129°E); Central Pacific (30°N–25°S); and eastern Pacific (15°N–25°S), with isolates east of 110°W.

***Diaphus garmani* Gilbert, 1906**

En – Garman's lanternfish.

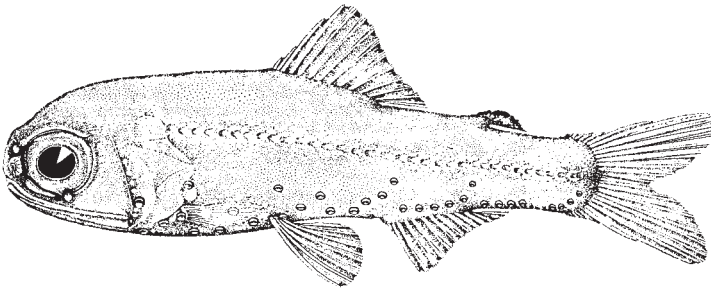
Maximum size to 60 mm; sexually mature from about 40 mm. Pseudoceanic, adults benthopelagic, with juveniles often oceanic, in depths of 325 to 750 m (day) and from surface to 125 m (night). Several unconfirmed records in area at: 14.73°N, 21.93°W; 01.10°N, 11.36°W; and off Canary Islands and Senegal. Also from western Atlantic seaboard west of 20°W (10°S–40°N) and in Caribbean, apparently absent from Gulf of Mexico; western Indian Ocean seaboard (22°N–36°S) and off Pt Hedland (Western Australia); Southeast Asian seas; and western South Pacific (03°N–35°S) and off Japan.



***Diaphus holti* Tåning, 1918**

En – Holt's lanternfish.

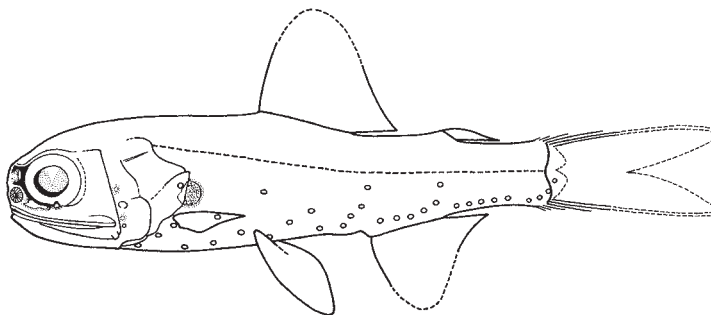
Maximum size to 70 mm; sexually mature from about 45 mm. Oceanic, mesopelagic in depths of 225 to 650 m (day) and 40 to 275 m (night); size stratification with depth, with adult females below 450 m. Probable Atlantic and Mediterranean endemic: in area between 36°N and 07°N. Also in Mediterranean and eastern North Atlantic (mainly east of 40°W to 58°N). Due to an apparent relationship with Mediterranean outflow water, records from eastern Gulf of Guinea south to 18°S and southwest Indian Ocean (29.50°S, 64.93°E) may be erroneous.



***Diaphus hudsoni* Zubrigg and Scott, 1976**

En – Hudson's lanternfish.

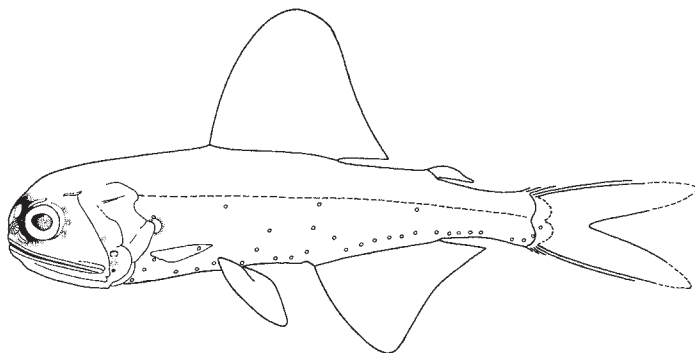
Maximum size to 84 mm; sexually mature from about 54 mm. Oceanic, mesopelagic in depths mainly below 250 m (night). Summer spawner. No known fisheries, but density values of up to 5.6 tonnes/km² estimated at shelf-break off west coast of South Africa. In area in Benguela upwelling region, with isolates farther offshore to 02°W. Also circumglobally in region of southern Subtropical Convergence (33°S–52°S), with northern extensions in eastern boundary currents.



***Diaphus lucidus* (Goode and Bean, 1896)**

En – Spotlight lanternfish.

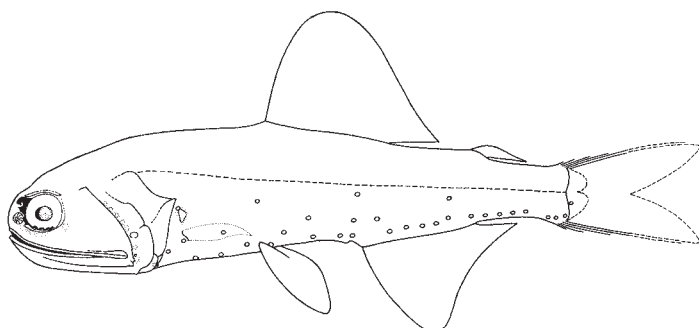
Maximum size to 118 mm; sexually mature from about 90 mm. Oceanic, mesopelagic in depths of 425 to 750 m (day) and 40 to 550 m (night). Throughout area south of diagonal 36°N, 30°W / 33°N, 16°W, but absent in Mauritanian and Benguela upwelling regions. Also from Gulf of Mexico, Caribbean, western Atlantic (40°N–40°S), less abundant off southern Brazil, and in Agulhas rings north to 30°S (eastern sector); Indian Ocean (14°N–40°S west of 80°E) and in Agulhas Current; southeast Asian seas; western Pacific (02°N–30°S); and central Pacific (28°N–26°S), apparently absent in eastern Pacific.



***Diaphus luetkeni* (Brauer, 1904)**

En – Lütken's lanternfish.

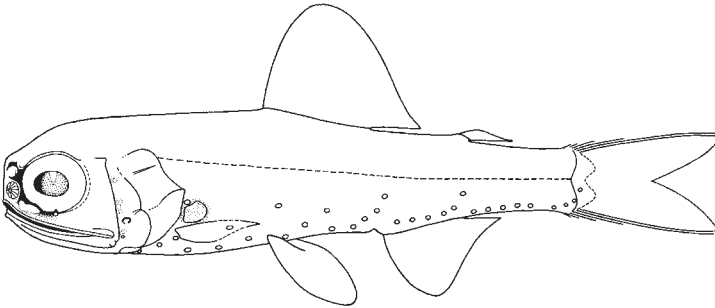
Maximum size to 60 mm; sexually mature from about 41 mm. Oceanic, mesopelagic in depths of 375 to 750 m (day) and 40 to 325 m (night). In area between 24°N and 10°S (west of 0°) or about 18° to 20°S (east of 0°), with isolates off Madeira and lower seasonal abundance in Mauritanian upwelling region. Also from tropical waters of Atlantic, Indian, and Pacific oceans (12°N–25°S), with northern (42°N in Gulf Stream; 36°N in Kuroshio) and southern (36°S in Agulhas; 34°S in East Australian) extensions in western boundary currents, absent south of 10°S in western Atlantic.



***Diaphus meadi* Nafpaktitis, 1978**

En – Mead's lanternfish.

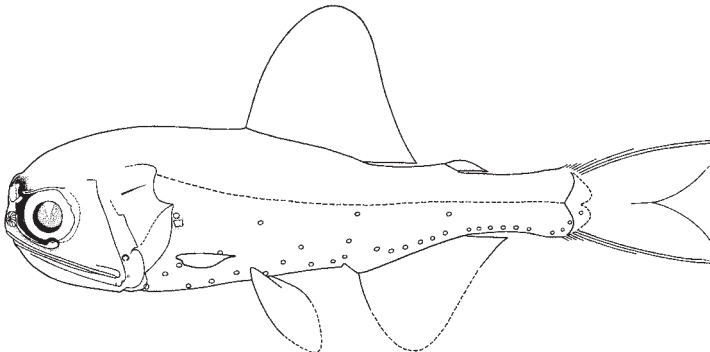
Maximum size to 54 mm; sexually mature from about 35 mm. Oceanic, mesopelagic in depths of 80 to 250 m (night); size stratification with depth. Spring/early summer spawner. One isolated record in area at 21.58°S, 02.00°W. Also circumglobally in region of southern Subtropical Convergence (29°S–47°S), apparently absent in region 115°W to coast of Chile, and north of about 32°S in Benguela upwelling region. Latter suggests specimens reported as *Diaphus holti* from eastern Gulf of Guinea and south to 18°S require further investigation.



***Diaphus metopoclampus* (Cocco, 1829)**

En – Bluntnose lanternfish.

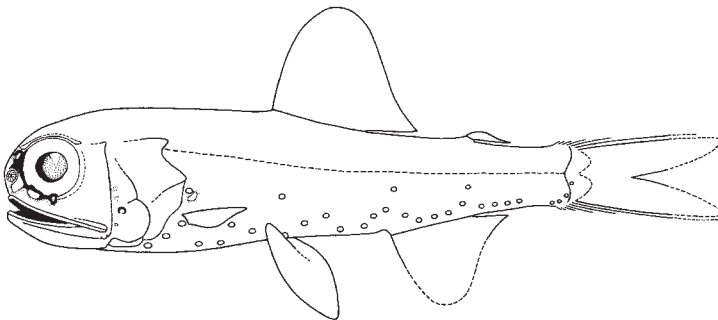
Maximum size to 75 mm; sexually mature from about 48 mm. Oceanic, mesopelagic in depths of 375 to 850 m (day) and 90 to 850 m (night); size stratification with depth. Spring/summer spawner. In area between 36°N and 20°N, with isolates south to 06°N. Also from Gulf of Mexico and disjunctly in western Atlantic (28°N–40°N and 28°S–40°S), with northern extension east of 30°W in Gulf Stream to 57°N; Mediterranean; Indian Ocean (08°N–30°S), with southern extension in Agulhas Current; western Pacific (10°S–37°S) and off Japan; and central Pacific (10°S–25°S) and off Hawaii.



***Diaphus mollis* Tåning, 1928**

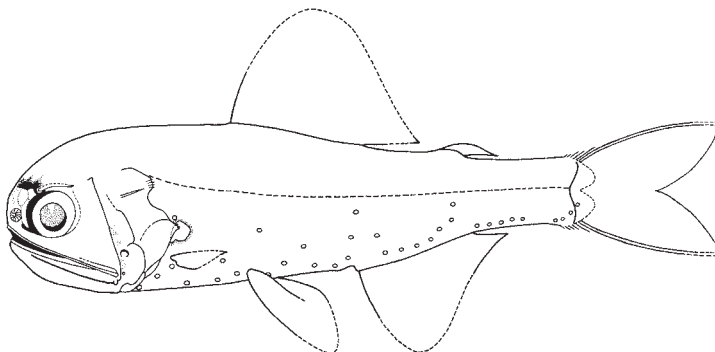
En – Soft lanternfish.

Maximum size 66 mm; sexually mature from about 30 mm. Oceanic, mesopelagic in depths of 300 to 600 m (day) and 50 to 300 m (night); size and stage stratification with depth evident only at night. Early spring/autumn spawner. Throughout area, but absent in Mauritanian upwelling region, Gulf of Guinea and southeast sector. Also from Gulf of Mexico, Caribbean, and western Atlantic (47°N to 40°S), lower abundance in Sargasso Sea and off Brazil; Indian Ocean (05°N–32°S), with southern extension in Agulhas Current; and Pacific (35°N–39°S).

***Diaphus ostenfeldi* Tåning, 1932**

En – Ostenfeld's lanternfish.

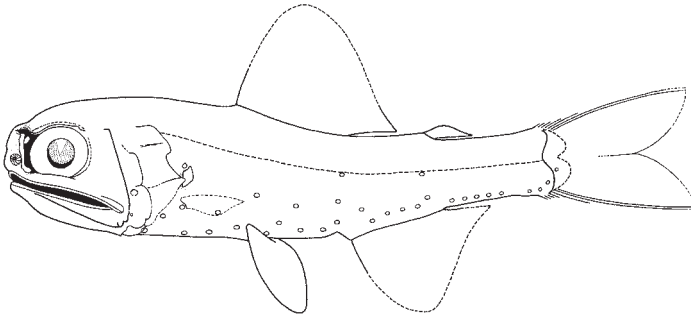
Maximum size to 120 mm; sexually mature from about 100 mm. Oceanic, mesopelagic at night in depths less than 100 m (juveniles) or below 160 m (specimens larger than 35 mm). Likely presence but not yet recorded in area, but known from 23.72°S, 12.93°E and 23.42°S, 11.65°E. Also circumglobally in region of southern Subtropical Convergence (33°S–58°S), with northern extensions in eastern boundary currents.

Not yet recorded in the area.

***Diaphus perspicillatus* (Ogilby, 1898)**

En – Flatface lanternfish.

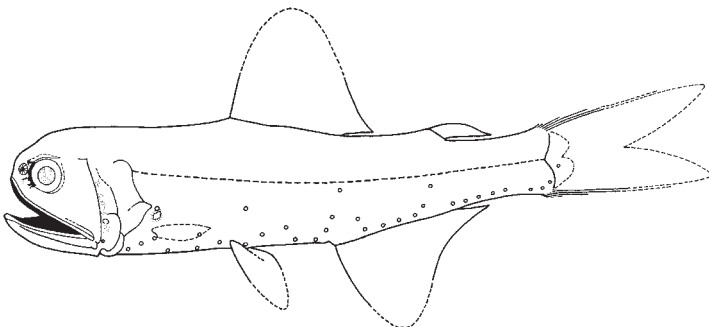
Maximum size to 71 mm; sexually mature from about 54 mm. Oceanic, mesopelagic in depths of 375 to 750 m (day) and from surface to 125 m (night). In area west of 08°W between 28°N and 20°S, but absent in Mauritanian upwelling region, Gulf of Guinea, and eastern Central and South Atlantic. Also from Gulf of Mexico, Caribbean, and western Atlantic (44°N–38°S west of 36°W), and in Agulhas rings off Cape Town; Indian Ocean (07°N–40°S: western sector) and off Western Australia; western Pacific (02°N–35°S), with northern extension in Kuroshio Current to Japan; and Central Pacific (31°N–25°S).



***Diaphus problematicus* Parr, 1928**

En – Problematic lanternfish.

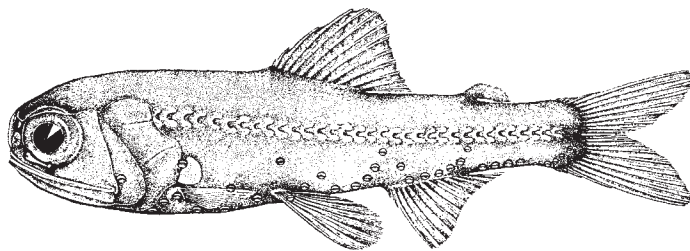
Maximum size to 105 mm; sexually mature from about 70 mm. Oceanic, mesopelagic in depths of 375 to 750 m (day) and 40 to 225 m (night). In area west of 09°W between 24°N and 23°S, but absent from eastern sector, Gulf of Guinea and Benguela upwelling region. Also from Gulf of Mexico, Caribbean, and western Atlantic (40°N–39°S); Indian Ocean (02°S–26°S: western sector), with southern extension in Agulhas Current, and off Western Australia (18°S–26°S); Southeast Asian seas; and Pacific (08°N–20°S), with northern extension in Kuroshio Current to Japan.



***Diaphus rafinesquii* (Cocco, 1838)**

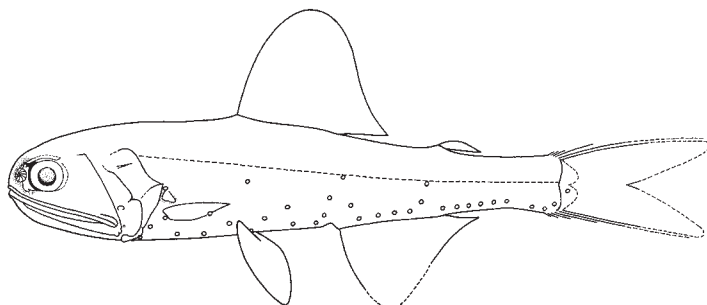
En – Rafinesque's lanternfish.

Maximum size to 90 mm; sexually mature from about 65 mm. Oceanic, mesopelagic in depths of 325 to 750 m (day) and 40 to 600 m (night); size stratification with depth at night. Autumn/winter spawner. Probable North Atlantic and Mediterranean endemic: in area between 36°N and 16°N. Also from Mediterranean, Gulf of Mexico, and western Atlantic (42°N–08°N), with northern extension to 62°N east of 20°W. Records from Indian and Pacific oceans require verification.

***Diaphus splendidus* (Brauer, 1904)**

En – Horned lanternfish.

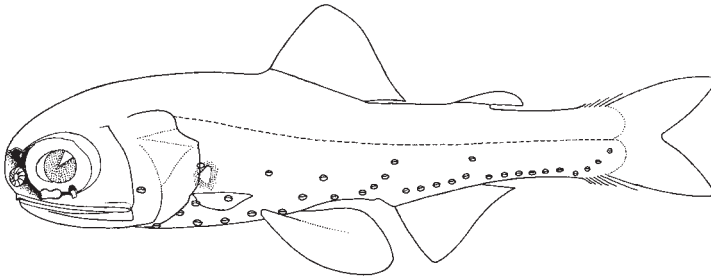
Maximum size to 90 mm; sexually mature from about 50 mm. Oceanic, mesopelagic in depths of 375 to 750 m (day) and 40 to 225 m (night). In area between 30°N and 23°S, but absent in Mauritanian and Benguela upwelling regions, Gulf of Guinea and eastern Central Atlantic. Also from Gulf of Mexico, Caribbean, and western Atlantic (32°N–38°S), with northern extension to 42°N in Gulf Stream; western Indian Ocean (12°N–12°S), with southern extension to 32°S in Agulhas Current; and Pacific (05°N–26°S), with extensions to 35°N in Kuroshio and 38°S in East Australian currents.



***Diaphus subtilis* Nafpaktitis, 1968**

En – Flabby lanternfish.

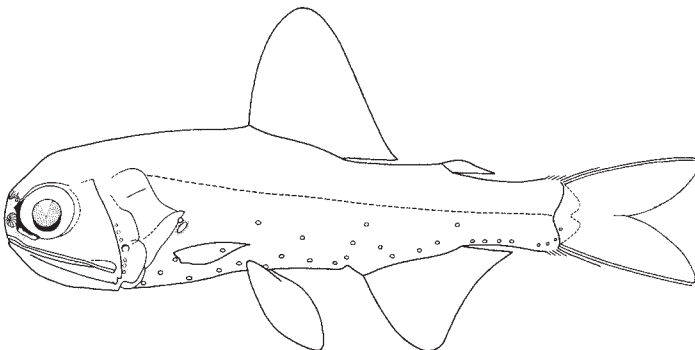
Maximum size to 85 mm; sexually mature from about 70 mm. Oceanic, mesopelagic in depths of 375 to 750 m (day) and 40 to 550 m (night). Rare. Atlantic endemic: in area disjunctly between 27°N–16°N and 02°N–04°S, but population linked west of 30°W. Also from Gulf of Mexico, Caribbean, and western Atlantic (40°N–38°S).



***Diaphus taaningi* Norman, 1930**

En – Slopewater lanternfish.

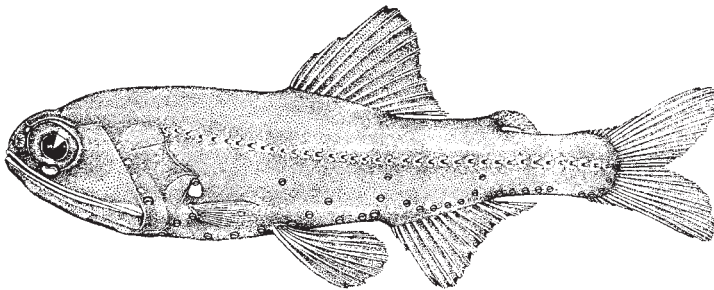
Maximum size to 70 mm; sexually mature from about 40 to 50 mm. Pseudoceanic, pelagic in depths of 325 to 475 m (day) and 40 to 250 m (night). Atlantic endemic: in area from Mauritanian upwelling region south to about 22°S. Also from Gulf of Mexico, Caribbean, and western Atlantic (25°S–40°N); and off the Guianas and Venezuela.



Diaphus termophilus Tåning, 1928

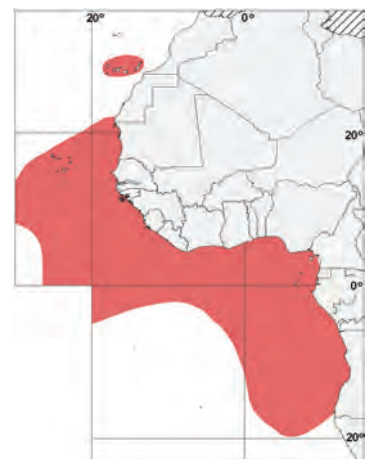
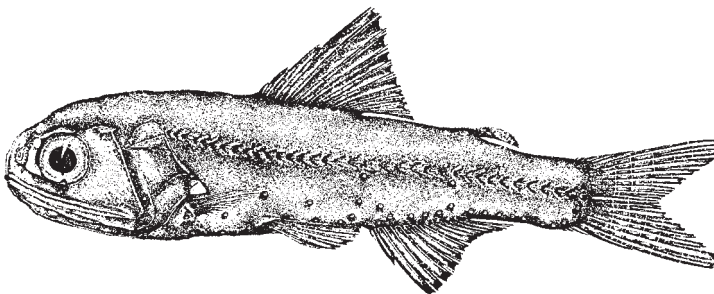
En – Warmwater lanternfish.

Maximum size to 117 mm; sexually mature from about 63 mm. Oceanic, mesopelagic in depths of 325 to 850 m (day) and below 100 m (night). In area along eastern perimeter of North Atlantic gyre (30°N–18°N), with one record in Mauritanian upwelling region. Also from Gulf of Mexico, Caribbean, and western Atlantic (10°N–42°N); Indian Ocean (08°N–24°S) as isolates; Southeast Asian seas (18°N–10°S); western Pacific (02°N–42°S); and Central Pacific (05°N–26°S). Also off Hawaii and Japan.

***Diaphus vanhoeffeni*** (Brauer, 1906)

En – VanHöffen's lanternfish.

Maximum size to 42 mm; sexually mature from about 27 mm. Oceanic, mesopelagic in depths of 275 to 750 m (day) and 40 to 125 m (night). No known fisheries, but highly productive with production:biomass ratio (P/B) 4.9. Eastern Atlantic endemic: in area east of 30°W between 20°N and 20°S, with isolates north to about 28°N. Also off La Plata in stomach of a hake.



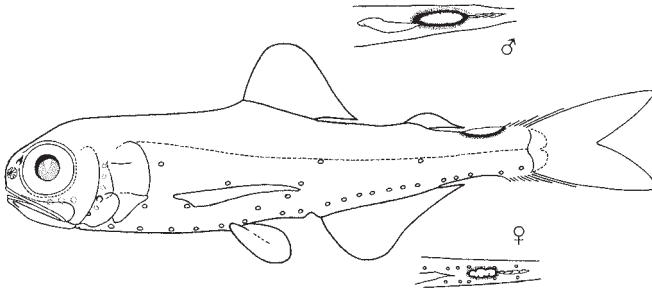
***Diogenichthys* Bolin, 1939**

3 species; 1 species in area.

***Diogenichthys atlanticus* (Tåning, 1928)**

En – Atlantic lanternfish.

Maximum size to 27 mm; sexually mature from 22 mm. Oceanic, adults mesopelagic in depths of 400 to 1 250 m (day) and 18 to 1 050 m (night); small juveniles non-migrators. Early spring spawner. Throughout area, but absent in southern gyre off Brazil. Also widespread in Atlantic (49°N–48°S), less abundant in regions of low productivity; southern Indian Ocean (23°S–45°S); and Pacific (40°N–40°S).

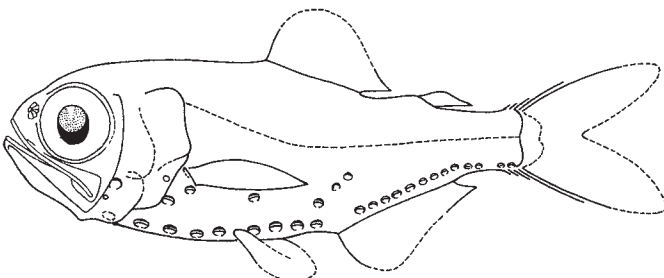
***Electrona* Goode and Bean, 1896**

5 species; 1 species in area.

***Electrona risso* (Cocco, 1829)**

En – Risso's lanternfish.

Maximum size to 82 mm; sexually mature from about 59 mm. Oceanic, mesopelagic in depths of 225 to 750 m (day) and 90 to 550 m (night); size stratification with depth at night. In area between 36°N and 23°S, but absent from 32°N to 20°N, in southern gyre and in Benguela upwelling region. Also from Atlantic east of 40°W between 60°N and 52°S, absent from Gulf of Mexico, Caribbean, southern and northern Sargasso Sea; Indian Ocean (03°N–06°S and 25°S–44°S); and Pacific off California, Peru, off southeast Australia and New Zealand, and in Equatorial Divergence region. Generally restricted to between 10°C and 15°C isotherms at 200 m, where primary productivity greater than 50 gC/m²/y.



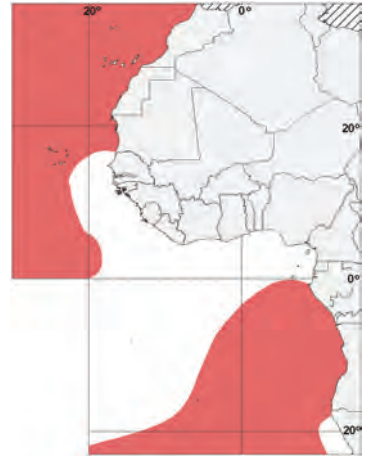
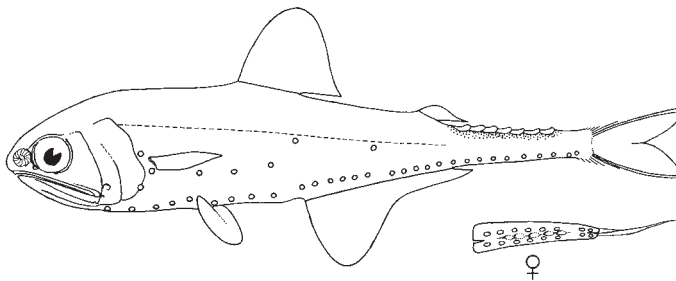
***Gonichthys* Gistel, 1850**

4 species; 1 species in area.

***Gonichthys cocco* (Cocco, 1829)**

En – Cocco's lanternfish.

Maximum size to 60 mm; sexually mature from about 38 mm. Oceanic, adults mesopelagic in depths of 500 to 675 m (day) and from surface to 200 m (night); juveniles apparently non-migrators. Spring/early summer spawner. Throughout area, but absent equatorially, in southern gyre off Brazil and in Benguela upwelling region. Also present in Mediterranean Sea, Gulf of Mexico, and western Atlantic (42°N to southern Subtropical Convergence), with northern extension to 50°N east of 40°W; absent/rare in Caribbean and South Sargasso Sea. Indian and Pacific Ocean records suspect.

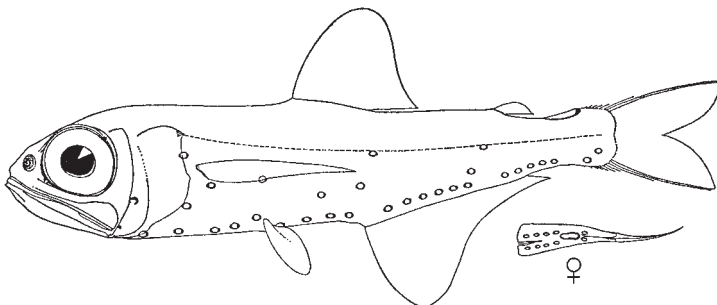
***Hygophum* Bolin, 1939**

9 species; 5 species in area.

***Hygophum benoiti* (Cocco, 1838)**

En – Benoit's lanternfish.

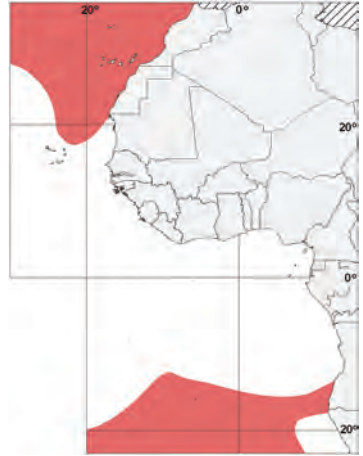
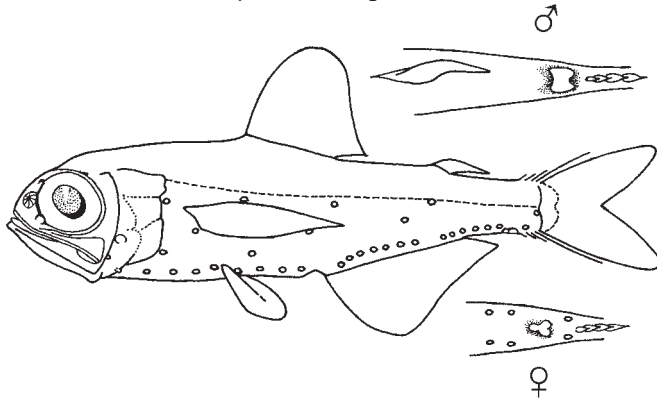
Maximum size to 55 mm; sexually mature from about 40 mm. Oceanic, adults mesopelagic in depths of 700 to 925 m (day) and 20 to 1 000 m (night); juveniles non-migrators. Spring/summer spawner. North Atlantic and Mediterranean endemic: in area between 48°N and 16°N. Also from eastern and western Mediterranean basins, Gulf of Mexico and western Atlantic (43°N–28°N).



***Hygophum hygomii* (Lütken, 1892)**

En – Hygom's lanternfish.

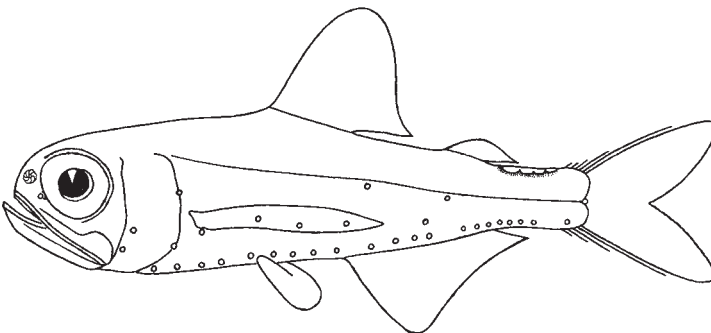
Maximum size to 68 mm; sexually mature from about 58 mm. Oceanic, adults mesopelagic in depths of 400 to 700 m (day) and 10 to 100 m (night); juveniles non-migrators. Late summer/autumn spawner. Disjunctly in area between 38°N–20°N and 13°S–40°S, but apparently absent in Benguela upwelling region. Also from eastern and western Mediterranean basins, Gulf of Mexico, and western Atlantic (20°N–43°N and 25°S–42°S); and Indian and Pacific oceans between 23°S and southern Subtropical Convergence.



***Hygophum macrochir* (Günther, 1864)**

En – Largefin lanternfish.

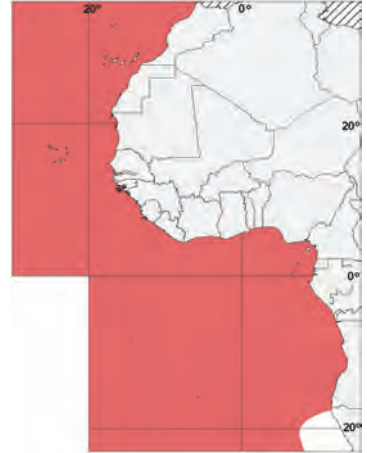
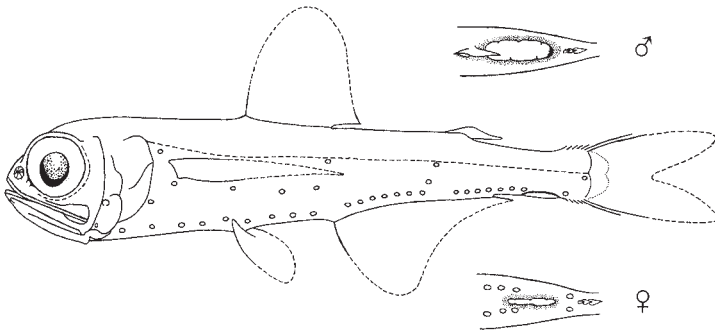
Maximum size to 60 mm; sexually mature from about 45 mm. Oceanic, mesopelagic in depths between 275 and 750 m (day) and between surface and 125 m (night). Atlantic endemic: in area between about 20°N–0° and in region of Equatorial Countercurrent, with southern extension to about 16°S in eastern sector. Also from Gulf of Mexico, Caribbean, and western Atlantic (40°N–18°S).



***Hygophum reinhardtii* (Lütken, 1892)**

En – Reinhardt's lanternfish.

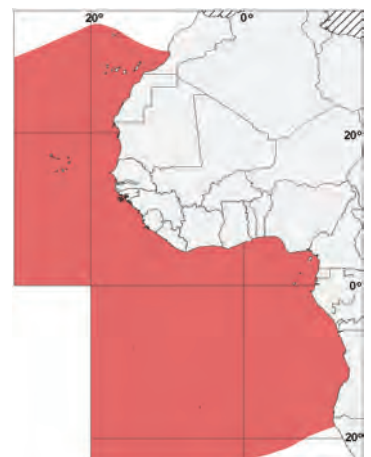
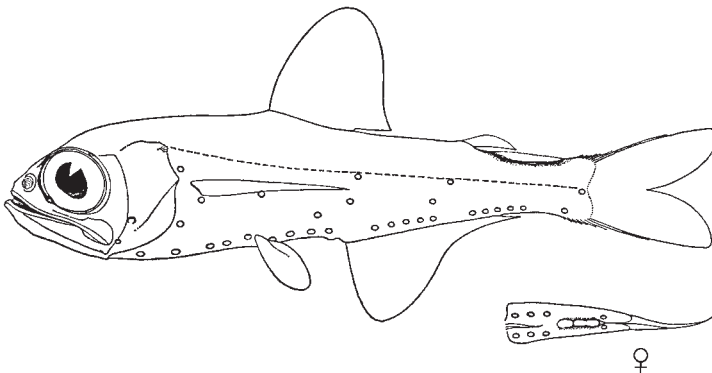
Maximum size to 61 mm; sexually mature from about 46 mm. Oceanic, adults mesopelagic in depths of 600 to 850 m (day), and between surface and 250 m (night); non-migrating juveniles in 600 to 900 m (night). Throughout area, but apparently less common equatorially and absent in Benguela upwelling region. Also from Gulf of Mexico, Caribbean and western Atlantic (42°N–36°S); northern Indian Ocean (07°N–04°S); and Pacific (35°N–38°S), including Equatorial Divergence region, but absent in tropical waters.



***Hygophum taaningi* Becker, 1965**

En – Tåning's lanternfish.

Maximum size to 61 mm; sexually mature from about 46 mm. Oceanic, adults mesopelagic in depths of 475 to 1 000 m (day), and from surface to 250 m (night); some juveniles non-migrators. Atlantic endemic: in area south of 34°N to 22°S (eastern sector) and to 30°S (western sector), but apparently absent in Benguela upwelling region. Also from Gulf of Mexico, Caribbean, and western North Atlantic (0°–42°N).



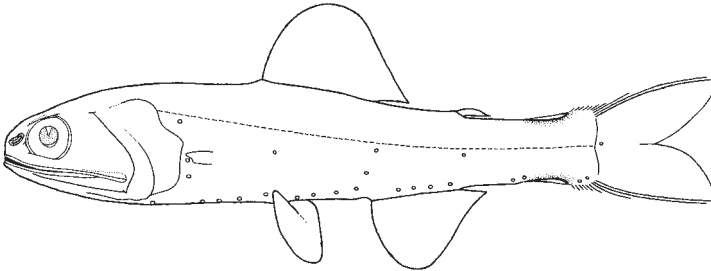
***Lampadena* Goode and Bean in Gill, 1893**

Two subgenera: *Dorsadena* Coleman & Nafpaktitis, 1972 with 1 species: not in area; *Lampadena* Goode and Bean, 1893 with 8 species, 7 in area.

***Lampadena anomala* Parr, 1928**

En – Anomalous lanternfish.

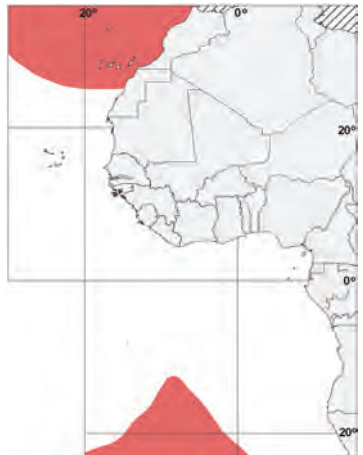
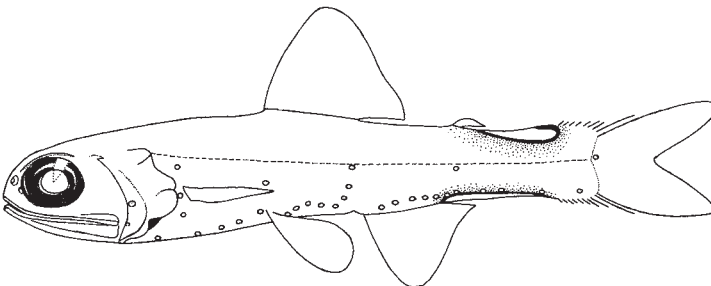
Maximum size to 180 mm. Oceanic, adults meso- and bathypelagic in depths of 800 to 2 000 m (day), and mainly below 1 000 m (night), but small specimens as shallow as 330 m. Uncommon. In area between 38°N and 17°S, but apparently absent from eastern sector. Also from Gulf of Mexico, Caribbean, and western Atlantic (40°N–16°S); Indian Ocean (18°N–05°S); South China Sea; off New Guinea and eastern Australia; and Central Pacific (28°N–10°S).



***Lampadena chavesi* Collett, 1905**

En – Chaves' lanternfish.

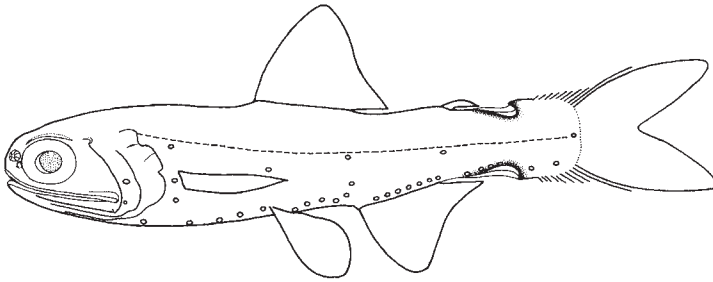
Maximum size to 80 mm; sexually mature from about 58 mm. Oceanic, mesopelagic in depths of 600 to 800 m (day) and 40 to 175 m (night), sometimes at surface. In area between 42°N–26°N and between 13°S–38°S, but apparently absent from Benguela upwelling region. Also from western Atlantic (27°N–42°N); Indian Ocean (20°S–33°S) and off Perth; and eastern South Pacific (30°S–34°S).



***Lampadena dea* Fraser-Brunner, 1949**

En – Goddess lanternfish.

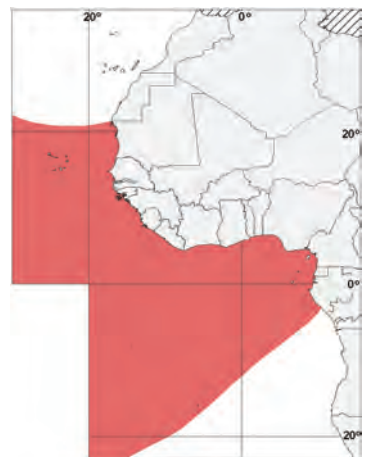
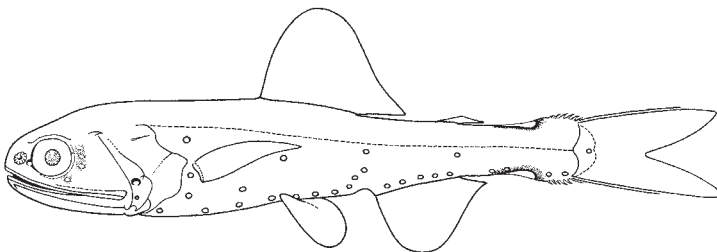
Maximum size to 89 mm. Oceanic, meso- and bathypelagic in depths of 350 to 2 390 m (day) and upper 150 m (night). One record in area at 21.58°S, 02.00°W. Also circumglobally between 25°S and 49°S, apparently with exclusively oceanic distribution.



***Lampadena luminosa* (Garman, 1899)**

En – Luminous lanternfish.

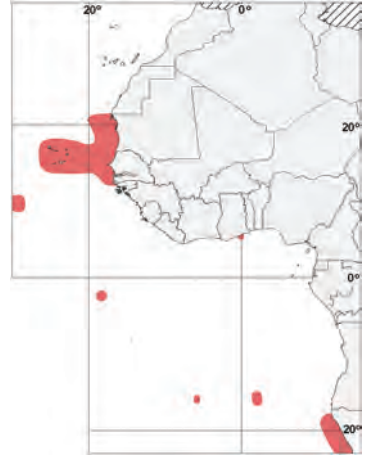
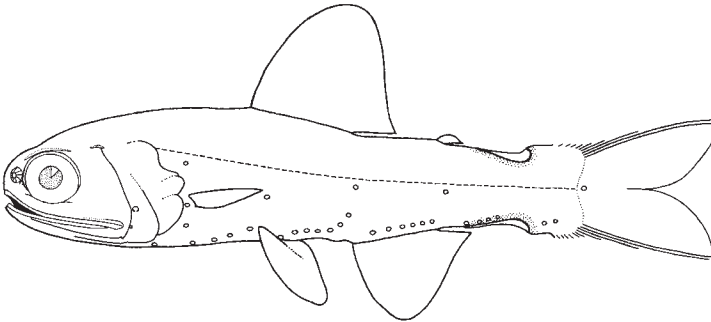
Maximum size to 200 mm; sexually mature at lengths greater than 150 mm. Oceanic, mesopelagic in depths of 425 to 850 m (day) and upper 100 m (night). In area between about 20°N and 16°S, but apparently absent in eastern South Atlantic except in Agulhas water pockets. Also from Gulf of Mexico, Caribbean, and western Atlantic (42°N–37°S); Indian Ocean (10°N–23°S), with southern extension to 33°S in Agulhas Current; and Pacific (40°N–27°S), with extension to 48°N in Kuroshio Current and to 34°S in East Australian Current.



***Lampadena pontifex* Krefft, 1970**

En – Priestly lanternfish.

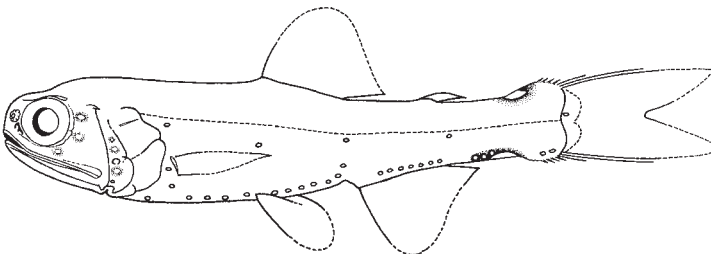
Maximum size to 110 mm. Pseudo-oceanic in depths of 275 to 750 m (day) and 90 to 275 m (night). Atlantic endemic: in area above continental and insular slopes from Mauritanian upwelling region, near St Helena, off Ghana, and off Namibia. Isolated specimens further offshore apparently associated with mid-Atlantic Ridge system. Single specimen from 16.02°S, 2.00°E (MCZ 103026), initially identified as *Lampadena notialis*, is *L. pontifex*.



***Lampadena speculigera* Goode and Bean, 1896**

En – Mirror lanternfish.

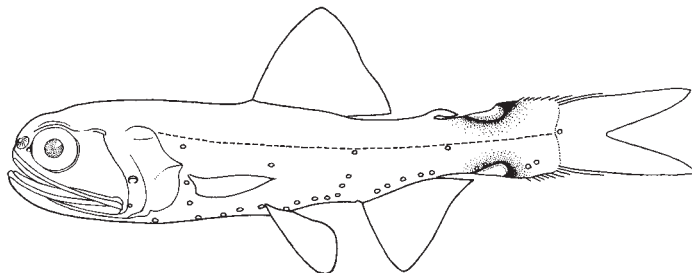
Maximum size to 153 mm. Oceanic, mesopelagic in depths of 475 to 950 m (day) and 60 to 750 m (night). In North Atlantic mainly between 68°N and 30°N, but with isolates to 17°N in Mauritanian upwelling region; in South Atlantic mainly between 22°S and 50°S (some records at about 60°S). Also from southern Indian Ocean (33°S–43°S); and off Australia, New Zealand, and Peru.



***Lampadena urophaos atlantica* Maul, 1969**

En – Atlantic tail-light lanternfish.

Maximum size to 200 mm; sexually mature from about 98 mm. Oceanic, mesopelagic in depths of 550 to 1 000 m (day) and 60 to 225 m (night). Late spring / early summer spawner. North Atlantic endemic subspecies: between 57°N and 22°N (eastern sector) and 42°N to 21°N (western sector). Nominata subspecies between 42°N and to about 40°S from off California coast to Japan and Peru/Chile to Australia and New Zealand.



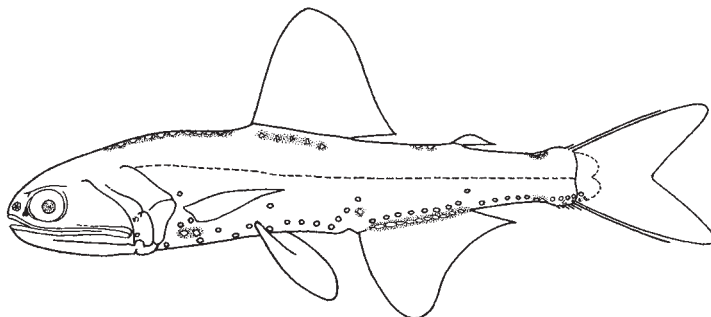
***Lampanyctodes* Fraser-Brunner, 1949**

Monotypic.

***Lampanyctodes hectoris* (Günther, 1876)**

En – Hector's lanternfish; **Fr** – Lanterne de Hector; **Sp** – Linternillas de Hector.

Maximum size to 70 mm; sexually mature from about 40 mm. Pseudo-oceanic, over continental shelves and upper slopes in depths of 100 to 850 m (day) and from surface to 850 m (night). Late winter/early spring spawner. Food items mainly copepods, amphipods and euphausiids; also nauplii and other crustacean larvae. Fished commercially, but sporadically (42 560 tonnes in 1973) for fish meal off South Africa. In area from Benguela upwelling region north to about 20°S. Also from southern Australia, New Zealand, and southern Peru.



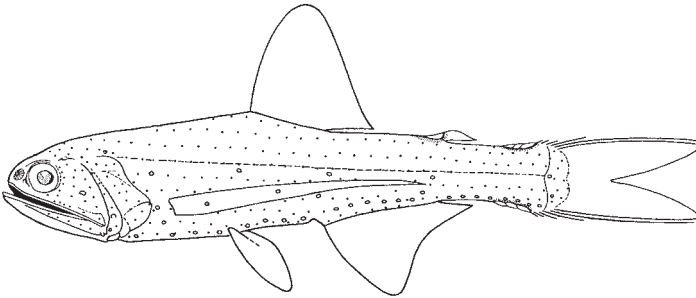
***Lampanyctus* Bonaparte, 1840**

More than 18 species; 10 species in area (status of *L. macdonaldi* not entirely clear).

***Lampanyctus alatus* Goode and Bean, 1896**

En – Winged lanternfish.

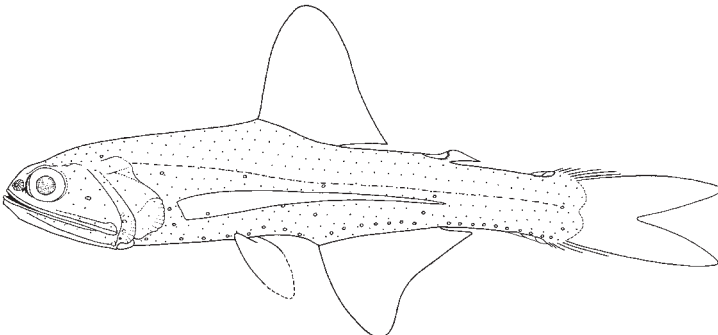
Maximum size to 61 mm; sexually mature from about 43 mm. Oceanic, mesopelagic in depths of 275 to 1 000 m (day) and 40 to 275 m (night). Throughout area, but absent in Benguela upwelling region and apparently absent off northeast Brazil. Also from Gulf of Mexico, Caribbean, and slope water regions of western sector of North Atlantic (46°N–08°S); Indian Ocean (09°N–42°S); Southeast Asian seas (20°N–10°S); and western Pacific (35°N–42°S, west of 150°W).



***Lampanyctus australis* Tåning, 1932**

En – Austral lanternfish.

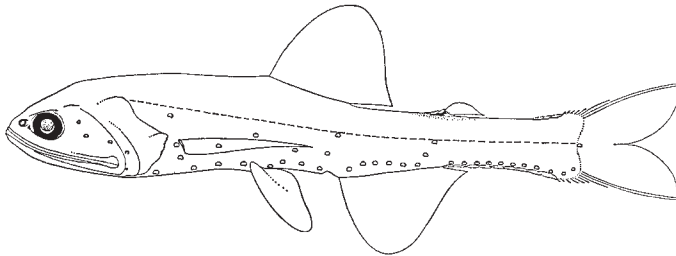
Maximum size to 131 mm; sexually mature from about 95 mm. Oceanic, mesopelagic with adults in depths below 500 m (night) and juveniles (less than 80 mm) in upper 100 m (night). Probable winter spawner. In area from Benguela upwelling region, with isolates farther offshore (17.99°S, 4.45°E) in eastern South Atlantic. Also circumglobally in region of southern Subtropical Convergence (28°S–56°S).



***Lampanyctus crocodilus* (Risso, 1810)**

En – Crocodile lanternfish; **Fr** – Lanterne crocodile.

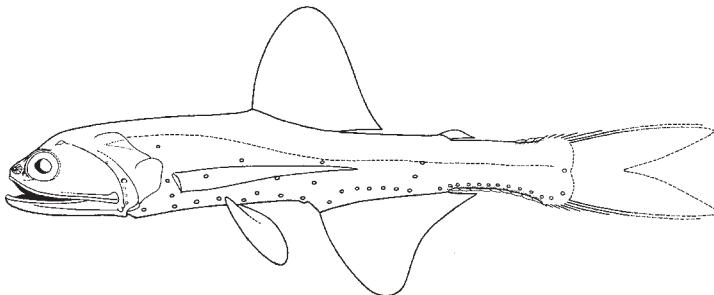
Maximum size to 172 mm (in Mediterranean to 200 mm); size at sexual maturity unknown, but females with large eggs (no oil droplets) from about 151 mm. Oceanic, adults mesopelagic in depths of 700 to 1 000 m (day), and 45 to 250 m and 400 to 1 000 m (night); subadults non-migrators. Autumn spawner in deep water. North Atlantic and Mediterranean endemic: in area between 63°N and 32°N (eastern sector), with isolates farther south to 28°N; and in Mauritanian upwelling region. Also from eastern and western Mediterranean basins and western sector of North Atlantic (69°N–28°N).



***Lampanyctus festivus* Tåning, 1928**

En – Festive lanternfish.

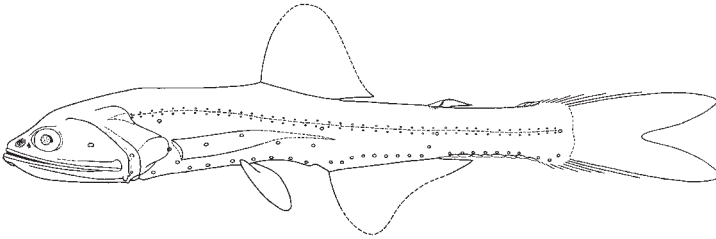
Maximum size to 138 mm; sexually mature from about 84 mm. Oceanic, mesopelagic in depths of 475 to 1 000 m (day) and 40 to 325 m (night). Spawning throughout year, with peak in winter (Bermuda). Disjunctly in area between 42°N and 12°N and about 12°S to southern Subtropical Convergence, but absent from Gulf of Guinea, northern Benguela upwelling region, and western regions of northern and southern gyres. Also from Gulf of Mexico and western North Atlantic (40°N–26°N), with isolates to 50°N; southern Indian Ocean (28°S–42°S); disjunctly from western Pacific (35°N–22°N and 16°S–38°S); and eastern Pacific (40°N–35°S).



***Lampanyctus intricarius* Tåning, 1928**

En – Intricate lanternfish.

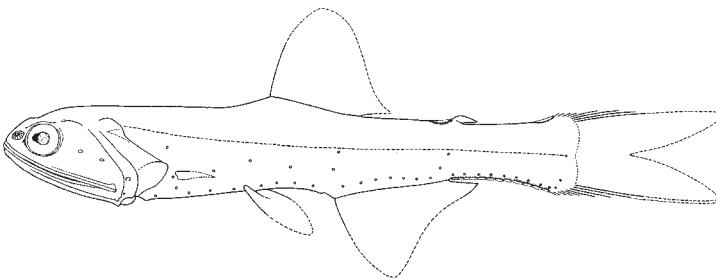
Maximum size to 200 mm; females 165 to 172 mm with developing ovaries. Oceanic, mesopelagic in depths of 550 to 750 m (day) and 40 to 550 m (night). In area in temperate waters of eastern sector of North Atlantic (65°N–30°N) and in Mauritanian and Benguela upwelling regions; isolates north to 14°S in southeastern sector. Also from western North Atlantic (32°N–40°N); circumglobally in region of southern Subtropical Convergence (30°S–55°S), with northern extensions to 18°S in eastern boundary currents.



***Lampanyctus macdonaldi* (Goode and Bean, 1896)**

En – MacDonald's lanternfish.

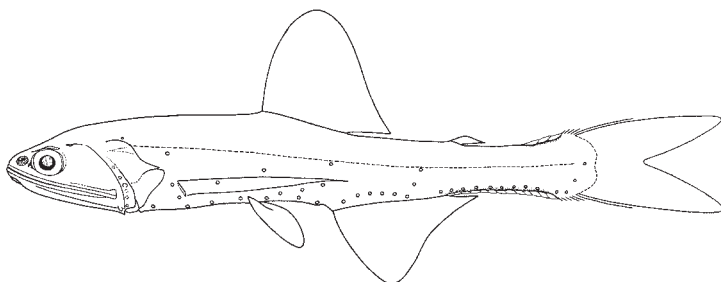
Maximum size to 160 mm; sexually mature from about 125 mm. Oceanic, mesopelagic in depths of 500 to 1 000 m (day), and 60 to 175 m (juveniles) and below 250 m (adults) at night. Probably not in area. One record (USNM 00219784: GR 8 + 1 + 18) from 04.13°S, 10.13°E (fishing depth 1 134 m) perhaps with erroneously-associated station data. Typically, with bi-temperate pattern in Atlantic: east of 30°W, specimens of northern population south to 43°N, and specimens of southern population north to 33°S. Also from western North Atlantic (70°N–32°N); and circumglobally in Southern Hemisphere (32°S–64°S).



***Lampanyctus nobilis* Tåning, 1928**

En – Noble lanternfish.

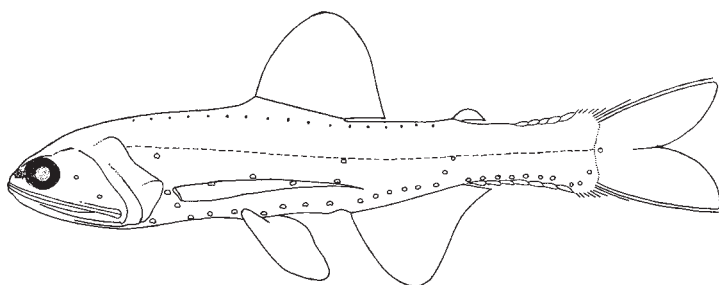
Maximum size to 124 mm; sexually mature from about 112 mm. Oceanic, mesopelagic in depths greater than 900 m (day) and 300 to 500 m (night). In area in tropical waters between 22°N and 21°S; apparently absent in Gulf of Guinea and eastern South Atlantic east of 09°E, except in Agulhas Water pockets off South Africa. Also from Gulf of Mexico, Caribbean, and western North Atlantic (42°N–0°); Indian Ocean (12°N–28°S), with southern extension to 33°S in Agulhas Current; and Pacific (30°N–26°S), with northern extension to 35°N in Kuroshio Current and southern extension to 34°S in East Australian Current.



***Lampanyctus photonotus* Parr, 1928**

En – Dotback lanternfish.

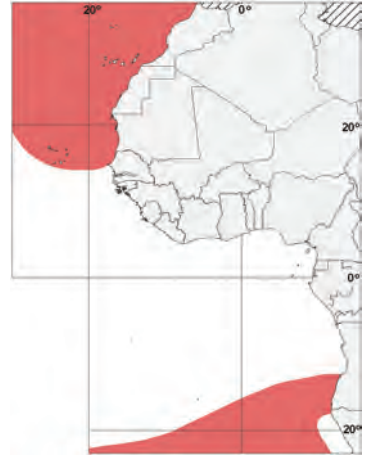
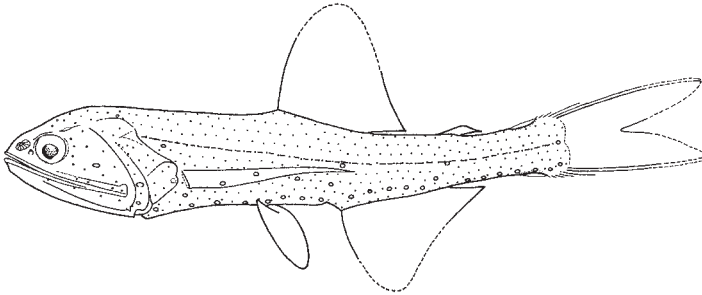
Maximum size to 85 mm; sexually mature from about 55 mm. Oceanic, adults mesopelagic in depths of 550 to 1 000 m (day) and 40 to 250 m (night); small juveniles non-migrators. Mainly spring/early summer spawner. Throughout western sector of area, but absent in Mauritanian and Benguela upwelling regions, Gulf of Guinea and in tropical waters of eastern sector between 0° and 15°S. Also throughout western sector of North Atlantic to 42°N (isolates to 52°N), absent in Gulf of Mexico; Southeast Asian seas; off New Caledonia and north of New Zealand (32°S).



***Lampanyctus pusillus* (Johnson, 1890)**

En – Pygmy lanternfish.

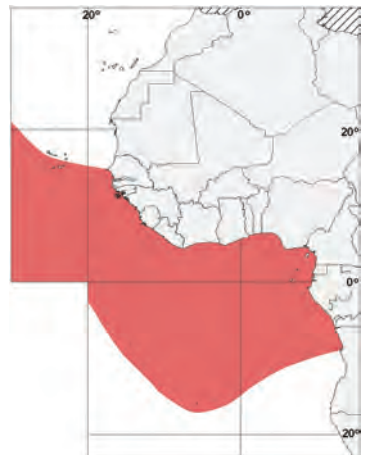
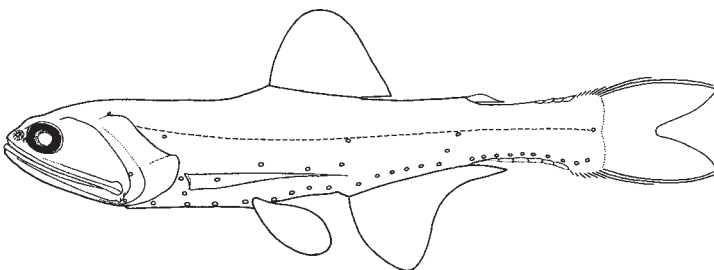
Maximum size to 43 mm; sexually mature from about 36 mm. Oceanic, mesopelagic in depths of 425 to 850 m (day) and 40 to 125 m (night); seasonal non-migrants or partial migrants. Mainly winter/spring spawner. Disjunctly in area between 55°N and 24°N, and between about 14°S to southern Subtropical Convergence, but absent in Benguela upwelling region. Also in western North Atlantic (50°N–24°N); and circumglobally in Southern Hemisphere (24°S–52°S).



***Lampanyctus tenuiformis* Brauer, 1906**

En – Slender lanternfish.

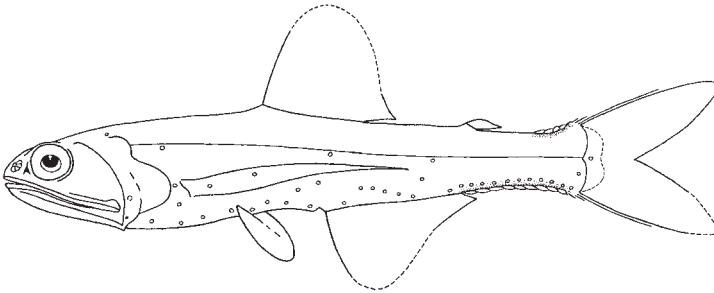
Maximum size to 153 mm; sexually mature from about 123 mm. Oceanic mesopelagic in depths of 300 to 700 m (day) and 40 to 325 m (night). In area in warmer waters between about 13°N and 16°S. Also off Brazil, Caribbean, and Gulf of Mexico, with isolates in Gulf Stream to 40°N; Indian Ocean (14°N to 10°S) with isolates to 33°S; and Pacific (44°N to 46°S).



***Lampanyctus vadulus* Hulley, 1981**

En – Nacreous lanternfish.

Maximum size to 99 mm; sexually mature from about 81 mm. Oceanic, mesopelagic in depths of 50 to 300 m (night). In area west of 18°W between 24°N and 03°S. Also off northern Brazil, French Guiana, Suriname, and Guyana (with one record off Cuba); Indian Ocean (10°N–12°S), with southern extension in Agulhas Current; and western South Pacific (04°S–18°S).

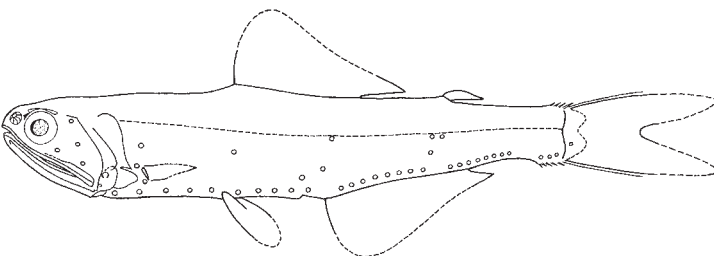
***Lampichthys* Fraser-Brunner, 1949**

Monotypic.

***Lampichthys procerus* (Brauer, 1904)**

En – Blackhead lanternfish.

Maximum size to 95 mm; sexually mature from about 80 mm. Oceanic, mesopelagic in depths of 700 to 1 200 m (day) and 100 to 700 m (night). In area south of about 23°S (eastern sector); two isolated records from south of Cape Lopez (00.60°S, 08.75°E) and west of Mayumba (03.38°S, 10.63°E) questionable. Also from all three oceans, mainly between 30°S and 50°S, with extensions into lower latitudes in eastern boundary currents.



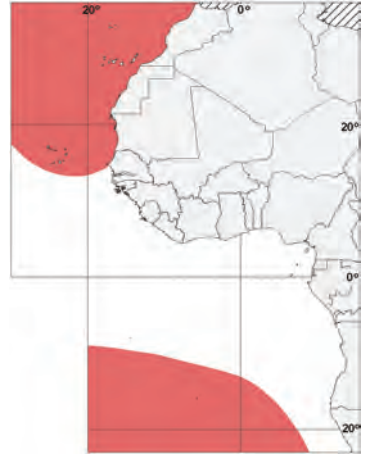
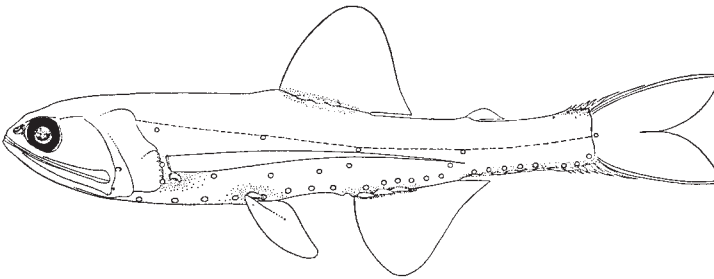
***Lepidophanes* Fraser-Brunner, 1949**

2 species; both in area.

***Lepidophanes gausi* (Brauer, 1906)**

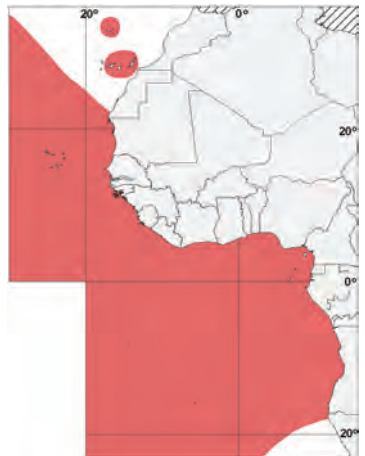
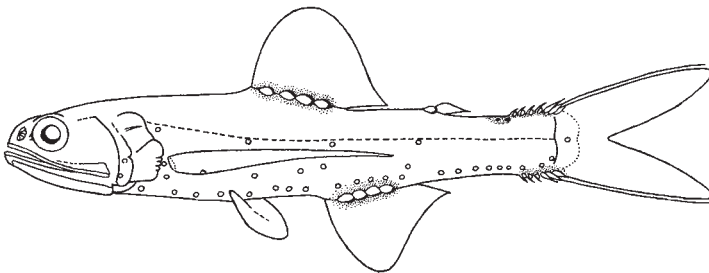
En – Gauss' lanternfish.

Maximum size to 50 mm; sexually mature from about 35 mm. Oceanic, adults mesopelagic in depths of 425 to 850 m (day) and from surface to 175 m (night); juveniles non-migrators; size stratification with depth. Spawns throughout year, with peak in spring. Atlantic endemic: disjunctly in area between 36°N and 13°N and between 13°S and 33°S, but apparently absent in Benguela upwelling region. Also in Gulf of Mexico and from western Atlantic (16°N–42°N and 10°S–38°S); associated with warmer, less-productive waters of northern and southern gyres.

***Lepidophanes guentheri* (Goode and Bean, 1896)**

En – Günther's lanternfish.

Maximum size to 78 mm; sexually mature from about 47 mm. Oceanic, mesopelagic in depths of 425 to 750 m (day) and 40 to 125 m (night). Atlantic endemic: in area generally between diagonal 35°N / 22°N and diagonal 19°S / 23°S, with isolates north to about 34°N, but absent in eastern sector south of 20°S. Also from Gulf of Mexico, Caribbean, and western Atlantic (42°N–48°S), with isolates to 45°N in Gulf Stream.



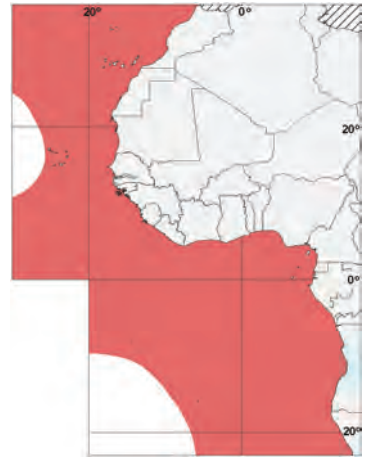
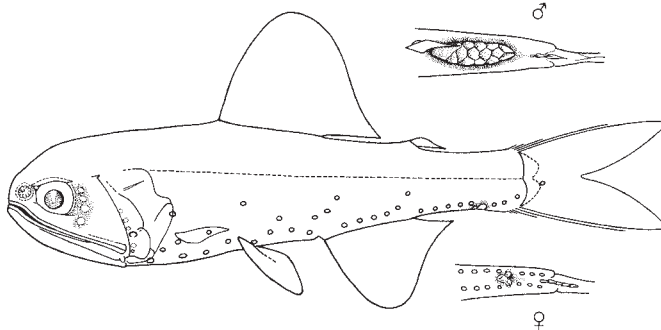
***Lobianchia* Gatti, 1903**

2 species; both in area.

***Lobianchia dofleini* (Zugmayer, 1911)**

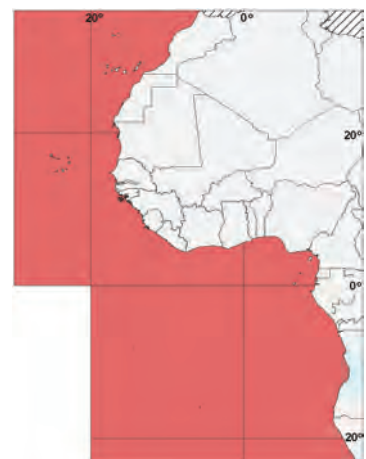
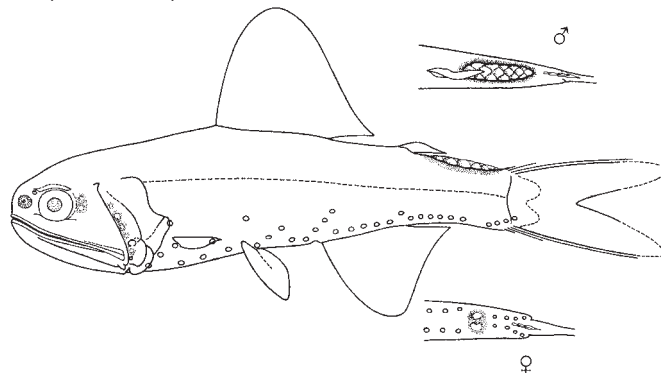
En – Doflein's lanternfish; **Fr** – Lanterne de Doflein.

Maximum size to 50 mm; sexually mature from about 31 mm. Oceanic, mesopelagic in depths of 300 to 500 m (day) and 25 to 200 m (night); size stratification with depth. Spawning peak early spring/summer. Throughout area, but absent in Gulf of Mexico, Caribbean, southern Sargasso Sea, and off northeast Brazil. Also from Mediterranean and western Atlantic (25°N–42°N and 28°S–53°S), with northern extension to 53°N east of 42°W in Gulf Stream; southern Indian and southern Pacific oceans (22°S–46°S); some northerly records in western Indian Ocean (05°N), Banda Sea, and off Hawaii.

***Lobianchia gemellarii* (Cocco, 1838)**

En – Gemellaro's lanternfish.

Maximum size to 60 mm, and more than 100 mm in expatriates; sexually mature from about 48 mm. Oceanic, mesopelagic in depths of 300 to 800 m (day), and 25 to 100 m (juveniles) and 200 to 300 m (adults) at night. Throughout area. Also from Mediterranean, Gulf of Mexico, Caribbean, and western Atlantic (43°N–43°S), with expatriates to 64°N in Gulf Stream, and to 52°S; Indian Ocean (02°N–33°S); and Pacific (35°N–35°S).



***Loweina* Fowler, 1925**

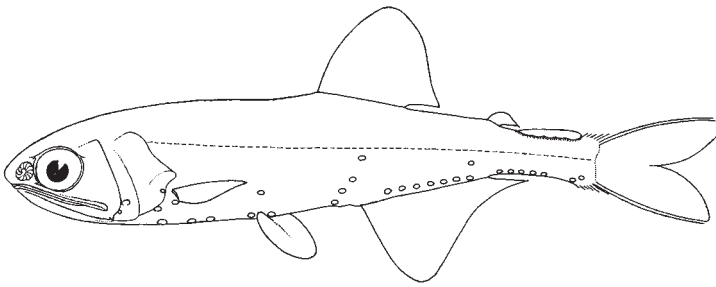
3 species: 1 species in area and 1 species (*L. interrupta*) just outside ECA limits at 39.77°N, 32.15°W (MCZ 151179) and 37.28°N, 13.83°W (ISH 54–1966).

***Loweina interrupta* (Tåning, 1928)**

En – Barebelly lanternfish.

Maximum size to 39 mm. Oceanic, mesopelagic in depths of 60 to 175 m and 800 m (night). Rare. Likely presence but not yet recorded from area. From Atlantic (30°N–45°N); North Pacific (31°N, 159°W); and all three oceans (30°S–45°S).

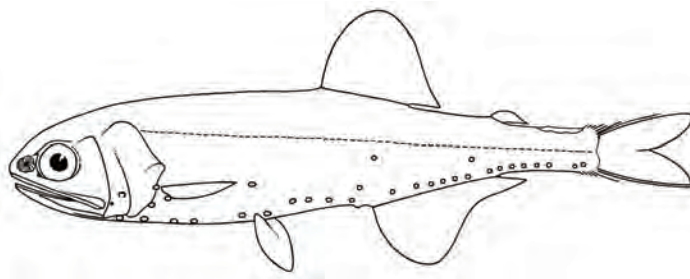
Not yet recorded in the area.



***Loweina rara* (Lütken, 1892)**

En – Rare lanternfish.

Maximum size to 45 mm; sexually mature from about 28 mm. Oceanic, mesopelagic in depths of 550 to 1 000 m (day) and from just below surface to 200 m (night). Uncommon. In area between diagonal 36°N / 32°N and about 05°N, and in eastern sector between 08°S and 12°S; two regions probably linked in Gulf of Guinea via Equatorial Countercurrent system. Also from cooler tropical- subtropical waters of western Atlantic (23°N–43°N), absent in Gulf of Mexico, Caribbean, and South Sargasso Sea, and central South Atlantic; Indian Ocean (01°N–34°S); and Pacific off NSW (Australia) and New Zealand, and in eastern sector between 42°N and 29°S.



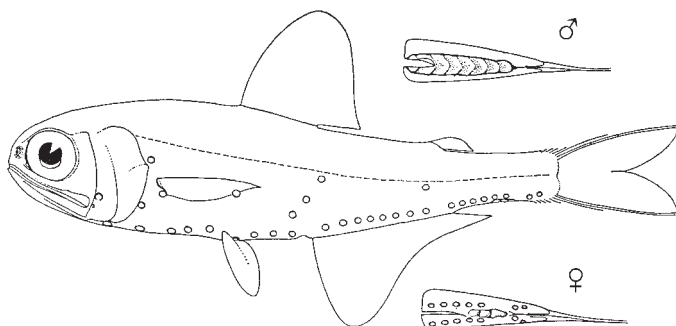
***Myctophum* Rafinesque, 1810**

15 species; 7 species in area.

***Myctophum affine* (Lütken, 1892)**

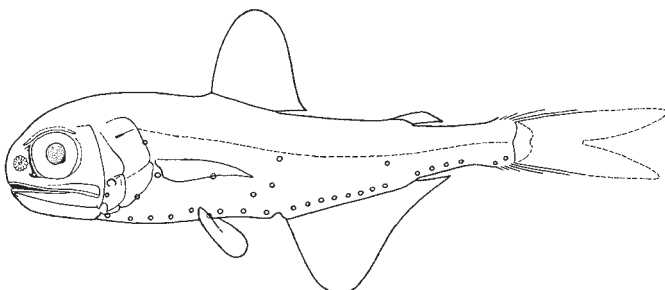
En – Metallic lanternfish.

Maximum size to 79 mm; sexually mature from about 50 mm. Oceanic, mesopelagic in depths of 300 to 600 m (day), and from surface to 275 m (night). Atlantic endemic: in area between 24°N and 04°S, Gulf of Guinea and eastern sector south to 21°S, with tongue-like western extension to 05°W. Also from Gulf of Mexico, Caribbean, and western Atlantic (42°N to equator), absent in Sargasso Sea region and Central Gyre east of 63°W.

***Myctophum asperum* Richardson, 1845**

En – Prickly lanternfish.

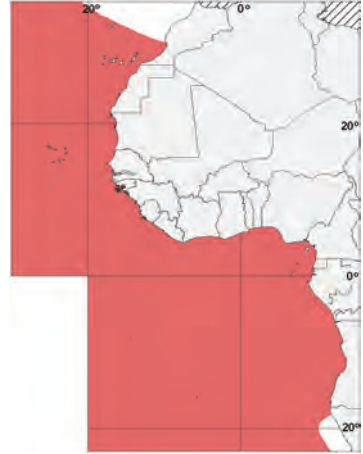
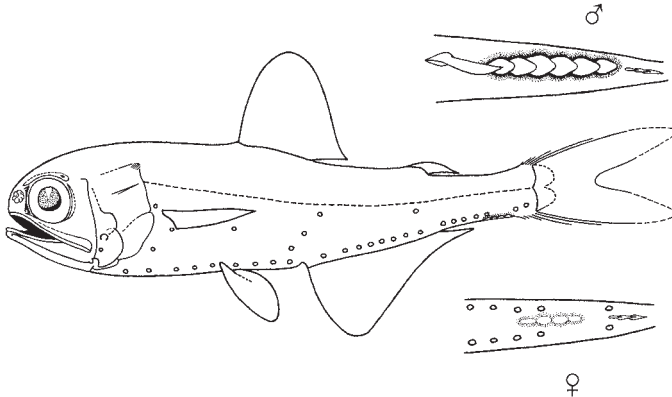
Maximum size to 72 mm; sexually mature from about 65 mm. Oceanic, mesopelagic in depths of 425 to 750 m (day), and from surface to 125 m (night). In area between 22°N and 10°S (eastern sector), and in Equatorial Current system from Gulf of Guinea to 08°S. Also from Gulf of Mexico, Caribbean, and western Atlantic (42°N to equator), generally absent in Central Gyre; and North and South Equatorial Current systems of Pacific and Indian oceans (27°N–30°S), with southern extensions in East Australian and Agulhas Currents, and northern extension in Kuroshio Current.



***Myctophum nitidulum* Garman, 1899**

En – Pearlyspotted lanternfish.

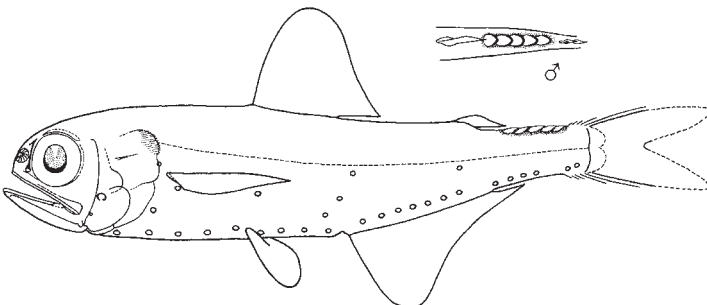
Maximum size to 83 mm; sexually mature from about 64 mm. Oceanic, mesopelagic in depths of 475 to 850 m (day), and mainly from surface to 5 m (night), with some specimens as deep as 950 m. Extended spawning season off Bermuda (spring/autumn) and in tropical waters (September/April). Throughout area, but absent north of 30°N off Moroccan coast, and in Benguela upwelling region except in Agulhas Water pockets. Also from Gulf of Mexico, Caribbean, and western Atlantic (48°N–36°S), with northern extension to 57°N in Gulf Stream; Indian Ocean (17°N–34°S); and Pacific (40°N–35°S).



***Myctophum obtusirostre* Tåning, 1928**

En – Bluntnout lanternfish.

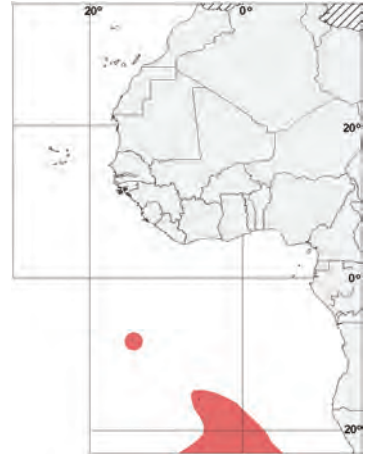
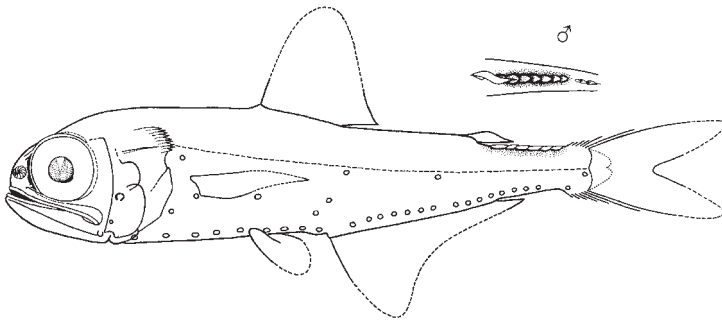
Maximum size to about 85 mm; sexually mature from about 74 mm. Oceanic, mesopelagic in depths of 325 to 700 m (day), and from surface to 125 m (night). In area between 22°N and 11°S, but apparently absent east of about 17°W in equatorial waters and in eastern South Atlantic except in Agulhas Water pockets. Also from Gulf of Mexico, Caribbean, and western Atlantic (42°N–40°S), with extension to 52°N in Gulf Stream; Indian Ocean (11°N–10°S), with extension through Mozambique Channel to 34°S in Agulhas Current; and Pacific (35°N–12°S), with southern extension in East Australian Current to 32°S.



***Myctophum phengodes* (Lütken, 1892)**

En – Bright lanternfish.

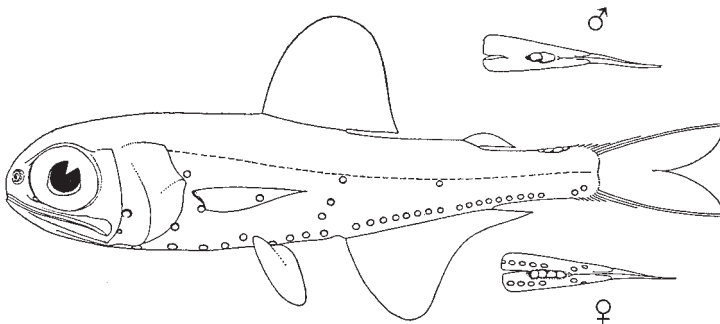
Maximum size to 93 mm; sexually mature from about 74 mm. Oceanic, mesopelagic in depths below about 540 m (day), and from surface to about 200 m (night). Circumglobal between 28°S and 40°S, with northern extensions to 15°S in eastern South Atlantic (isolates to 08°S), and to 18°S off Peru.



***Myctophum punctatum* Rafinesque, 1810**

En – Spotted lanternfish.

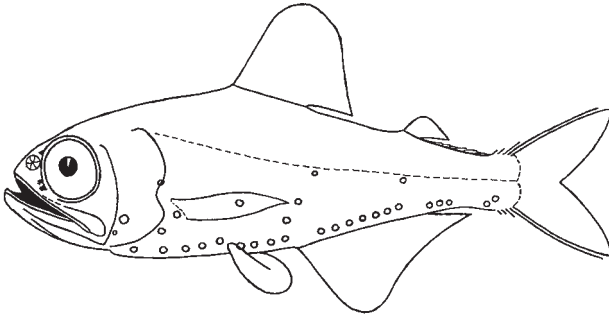
Maximum size to about 107 mm; sexually mature from about 50 mm. Oceanic, mesopelagic in depths of 225 to 750 m (day), and from surface to 125 m (night). Winter/early spring spawner. Food items include copepods, euphausiids, zoea stages of brachyurans and “fish fry”. North Atlantic and Mediterranean endemic: in area south to 34°N, but with isolates off Canary Islands, in northern Mauritanian upwelling region, and off Cape Verde Islands. Also from eastern and western Mediterranean basins; and western Atlantic (30°N–68°N).



***Myctophum selenops* Tåning, 1928**

En – Lunar lanternfish.

Maximum size to 72 mm; sexually mature from about 50 mm. Oceanic, mesopelagic in depths of 225 to 450 m (day), and 40 to 225 m (night), but mainly below 100 m. Disjunctly in area between 36°N and 18°N, and from 05°N to 10°S (western sector) and to about 16°S (central sector); apparently absent in Gulf of Guinea and eastern sector. Also from Gulf of Mexico, Caribbean and western North Atlantic (42°N–38°S); southern Indian Ocean (12°S–28°S) and in Agulhas Current Water off South Africa, with extension into eastern South Atlantic; and Pacific (35°N–22°S); with East Australia Current extension to 37°S.



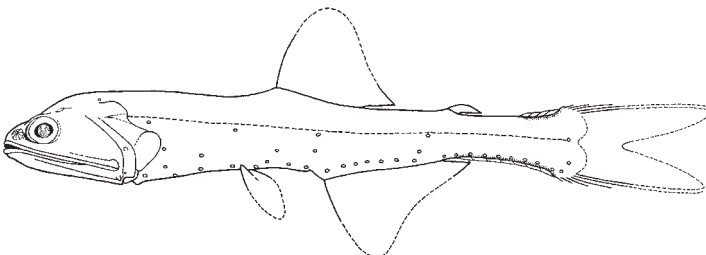
***Nannobranchium* Günther, 1887**

17 nominal species; 6 species in area.

***Nannobranchium achirus* (Andriashev, 1962)**

En – Cripplefin lanternfish.

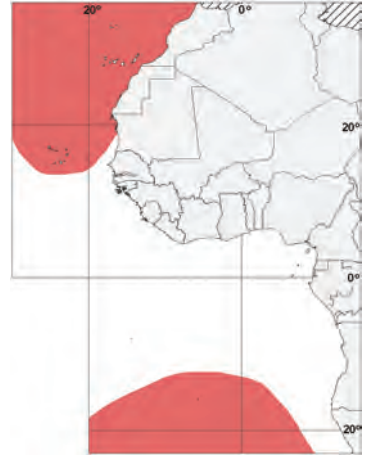
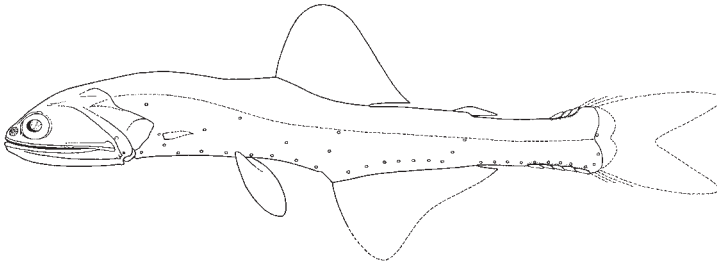
Maximum size to 162 mm; sexually mature from about 133 mm. Oceanic, bathypelagic in depths generally below 500 m (night), but shallower in upwelling regions. One record in area at 21.58°S, 02.00°W (ISH data: specimen discarded). Also circumglobal from region of southern Subtropical Convergence to well south of Antarctic Polar Front, with northern extensions to about 21°S in eastern boundary current regions.



***Nannobranchium atrum* (Tåning, 1928)**

En – Dusky lanternfish.

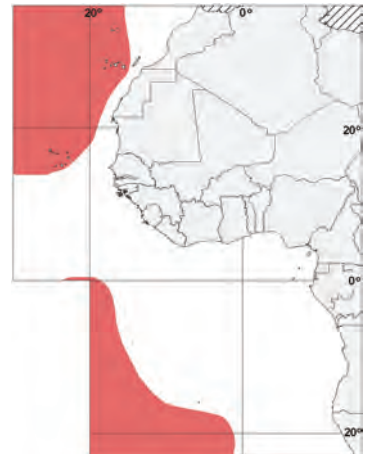
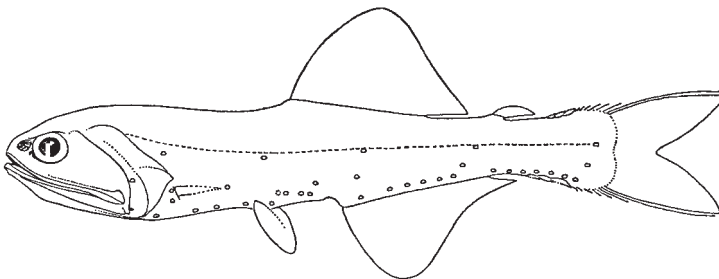
Maximum size to 130 mm; sexually mature from about 90 mm. Oceanic, mesopelagic in depths of 550 to 850 m (day) and 60 to 850 m (night); size stratification both day and night. Mainly autumn spawner. Disjunctly in area between 36°N and 15°N and between 14°S and 46°S. Also from Gulf of Mexico and western Atlantic (25°N–42°N), with northern extension to 59°N east of 30°W; Indian Ocean (12°S–43°S); and western Pacific (24°S–42°S).



***Nannobranchium cuprarium* (Tåning, 1928)**

En – Atlantic blackcap lanternfish.

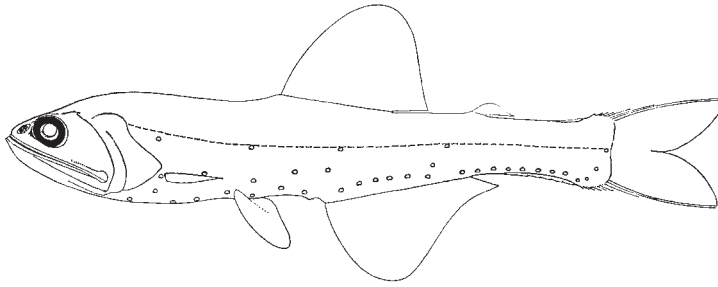
Maximum size to 110 mm; sexually mature from about 75 mm. Oceanic, mesopelagic in depths of 650 to 1 000 m (day) and 40 to 280 m (night); size stratification with depth. Mainly summer spawner. Atlantic endemic: disjunctly in area between 36°N and 15°N and between about 0° and 30°S, where apparently confined to waters of high temperature and salinity of southern gyre. Also from Gulf of Mexico, Caribbean, and western Atlantic (12°N–42°N), with extension to 48°N in Gulf Stream.



***Nannobrachium isaacsi* (Wisner, 1974)**

En – Isaac's lanternfish.

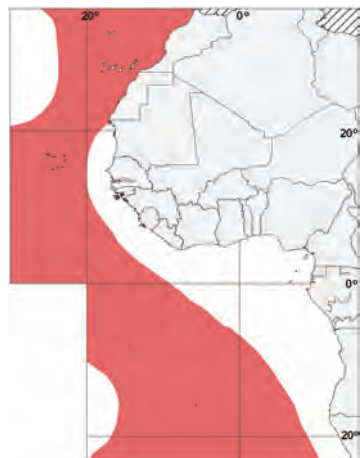
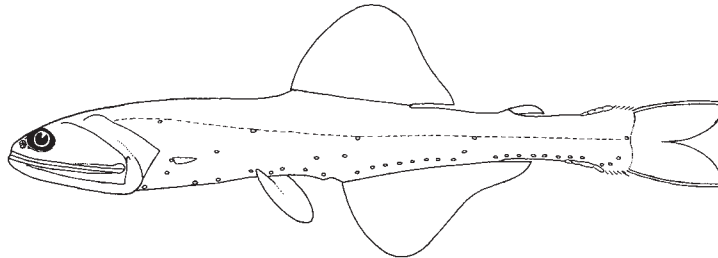
Maximum size to 133 mm; sexually mature from about 110 mm. Oceanic, mesopelagic in depths of 550 to 750 m (day) and 40 to 325 m (night). Atlantic endemic: in area between about 20°N and 05°S, and in region of Equatorial Countercurrent, with southern extension to about 16°S in eastern sector. Also west of 30°W between 11°N and 03°N.



***Nannobrachium lineatum* (Tåning, 1928)**

En – Longtail blackcap lanternfish.

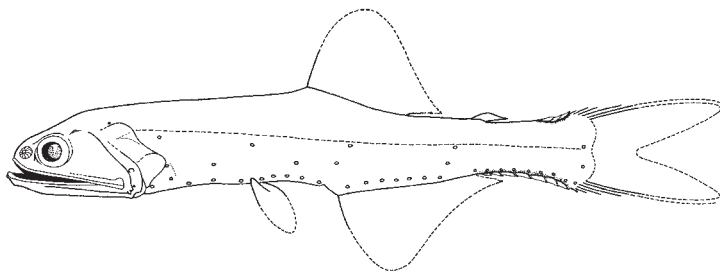
Maximum size to more than 235 mm; sexually mature from about 152 mm. Oceanic, mesopelagic in depths of 650 to 1 000 m (day) and 60 to 225 m (night). In area between 36°N and 28°S, but absent/rare from southwestern Sargasso Sea, southern gyre off Brazil, Mauritanian, and Benguela upwelling regions, and (questionably) absent from Gulf of Guinea. Also from Gulf of Mexico, Caribbean, and western Atlantic (10°S–42°N), with isolates to 50°N; Indian Ocean (10°N–32°S); Southeast Asian seas; and Pacific (40°N–30°S).



***Nannobrachium wisneri* Zahuranec, 2000**

En – Wisner's lanternfish.

Maximum size to 90 mm; sexually mature from about 73 mm. Oceanic, mesopelagic in depths of about 1 000 m (day) and as shallow as 95 m (night). One record in area at 19.27°S, 01.13°E (ZMUC). Also circumglobal from southern Subtropical Convergence (32°S–44°S), with northern extension to 19°S in eastern South Atlantic; absent south and east of Australia.



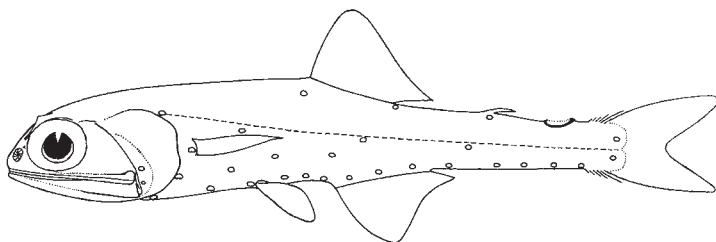
***Notolychnus* Fraser-Brunner, 1949**

Monotypic.

***Notolychnus valdiviae* (Brauer, 1904)**

En – Topside lanternfish.

Maximum size to 25 mm; sexually mature from about 19 to 24 mm. Oceanic, mesopelagic in depths of 400 to 700 m (day) and 25 to 700 m (night); size stratification with depth; juveniles migrators, adults migrators or non-migrators. Early summer spawning peak. Throughout area, but absent from Benguela upwelling region. Also widespread in Atlantic (56°N–52°S), Indian (17°N–44°S), and Pacific (45°N–40°S) oceans.



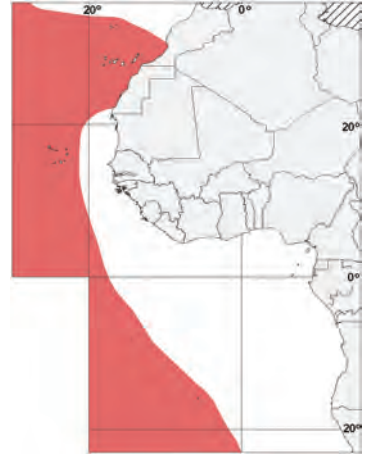
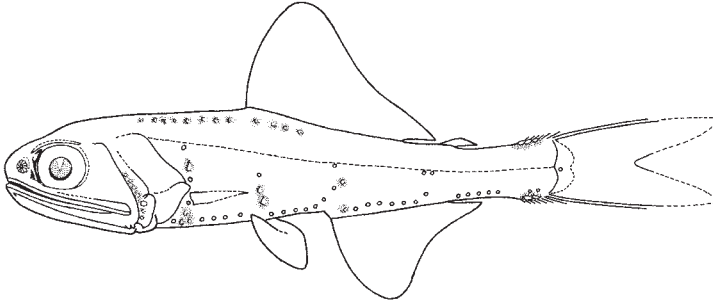
***Notoscopelus* Günther, 1864**

Two subgenera: *Notoscopelus* Günther, 1864 with 5 species; 3 species in area; *Pareiophus* Nafpaktitis, 1975 with 1 species in area. Note: In this guide, *Notoscopelus (Notoscopelus) elongatus* (Costa, 1844) is considered confined to western Mediterranean basin.

***Notoscopelus (Notoscopelus) caudispinosus* (Johnson, 1863)**

En – Spinetail lanternfish.

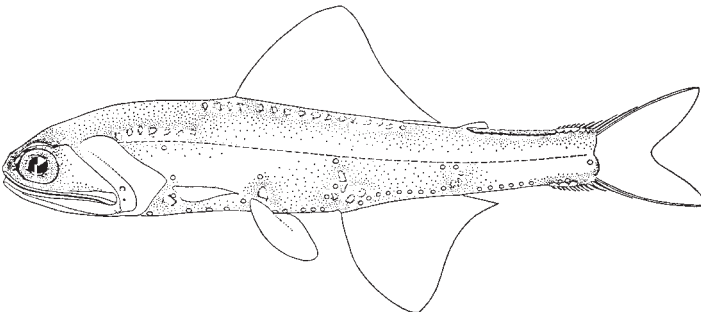
Maximum size to 140 mm. Oceanic, mesopelagic in depths of greater than 1 000 m (day), and between surface and 175 m (night). Probable autumn/winter spawner. In area between 35°N and 30°S, but absent in Mauritanian upwelling region, Gulf of Guinea, and eastern South Atlantic. Also from Gulf of Mexico, Caribbean, and western Atlantic (41°N–39°S), rare in South Sargasso Sea; Indian Ocean (05°S–28°S), with southern extension in Agulhas Current, and off northwest Australia; and Pacific off Japan, southeast Australia, New Caledonia, and Hawaii.



***Notoscopelus (Notoscopelus) kroeyerii* (Malm, 1861)**

En – Krøyer's lanternfish.

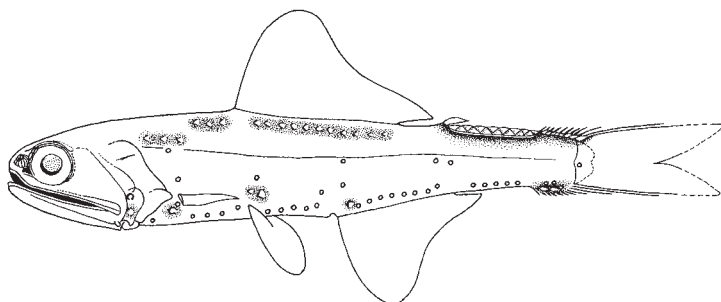
Maximum size to 143 mm. Oceanic, mesopelagic in depths of 325 to 1 000 m (day), and between surface and 125 m (night). North Atlantic endemic: mainly between about 60°N and 40°N, but isolated records to south of this limit and in Mauritanian upwelling region.



***Notoscopelus (Notoscopelus) resplendens* (Richardson, 1845)**

En – Patchwork lanternfish.

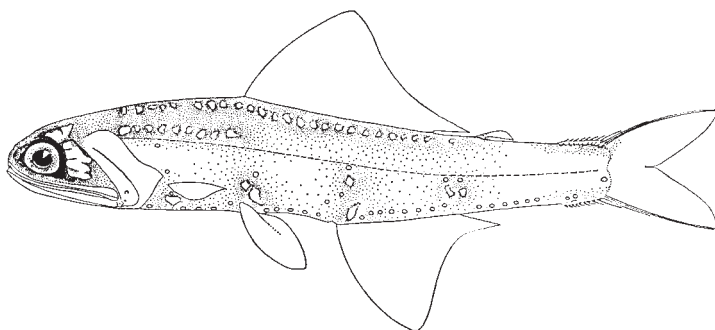
Maximum size to 95 mm; sexually mature from about 41 mm. Oceanic, adults mesopelagic in depths of 650 to 1 000 m (day), and between surface and 300 m (night); larvae and transforming specimens non-migrators. Late autumn/winter spawner. Throughout area, but absent in oxygen-minimum regions of southeast Sargasso Sea and in Gulf of Guinea. Also from Gulf of Mexico, Caribbean, and western Atlantic (45°N–42°S), absent in core of southern gyre; Indian Ocean (24°S–30°S); western Pacific (40°N–40°S); and eastern Pacific (35°N–35°S).



***Notoscopelus (Pareiophus) bolini* Nafpaktitis, 1975**

En – Fanfare lanternfish.

Maximum size to 102 mm; females gravid from 87 mm. Oceanic, meso- and bathypelagic in depths greater than 1 000 m (day), and from surface to 125 m (night). North Atlantic endemic: mainly between 50°N and 35°N east of 50°W, but isolates further south in eastern sector from off Canary Islands, and in Mauritanian upwelling region. Also from eastern and western Mediterranean basins.



***Protomyctophum* Fraser-Brunner, 1949**

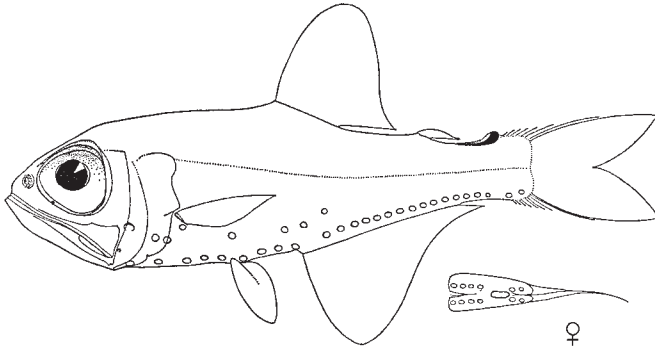
Two subgenera: *Protomyctophum* Fraser-Brunner, 1949 with 7 species – none in area; *Hierops* Fraser-Brunner, 1949 with 7 species – 1 species recorded just outside ECA limits: at 40.78°N, 28.68°W (MCZ 103012) and at about 39°N, 20°W to 30°W (Russian data).

***Protomyctophum (Hierops) arcticum* (Lütken, 1892)**

En – Arctic lanternfish.

Maximum size to 45 mm; sexually mature from about 32 mm. Oceanic, mesopelagic in depths of 250 to 850 m (day) and 90 to 325 m (night). Probably not in area. North Atlantic endemic: between 66°N and 39°N.

Not yet recorded in the area.



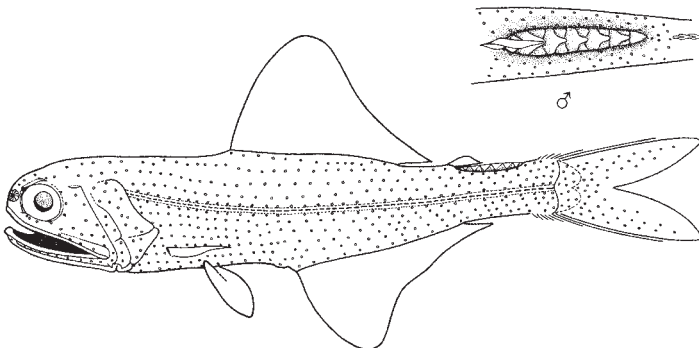
***Scopelopsis* Brauer, 1906**

Monotypic.

***Scopelopsis multipunctatus* Brauer, 1906**

En – Multispotted lanternfish.

Maximum size to 81 mm; sexually mature from about 62 mm. Oceanic, mesopelagic in depths of 75 to 400 m; size stratification with depth. Mainly in region of southern Subtropical Convergence, but extending northward in tongue to 10°S between 10°W and 5°E. Also from Indian (23°–40°S) and Pacific (31°–43°S) oceans.



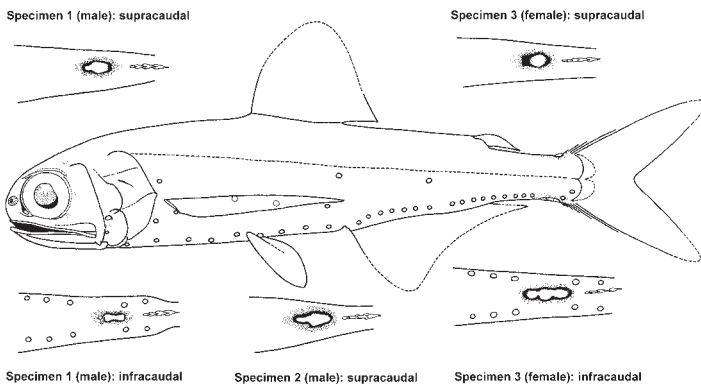
***Symbolophorus* Bolin and Wisner in Bolin, 1959**

About 10 species; 5 species in area. Genus requires major taxonomic revision.

***Symbolophorus barnardi* (Tåning, 1932)**

En – Barnard's lanternfish.

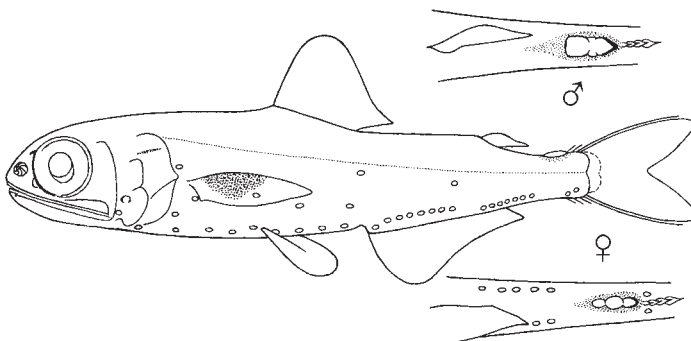
Maximum size to 116 mm; sexually mature from about 82 mm. Oceanic, mesopelagic in depths below 430 m (day), and from surface to about 450 m (night). Winter spawner. One unconfirmed record in area at 19.50°S, 11.52°E (IIBP 18/1985). Also circumglobal in temperate waters of South Atlantic (27°S–45°S); South Indian Ocean (37°S–45°S); off west, south, and east Australia and New Zealand (32°S–43°S); and off Chile (25°S–33°S).



***Symbolophorus boops* (Richardson, 1845)**

En – Spotfin lanternfish.

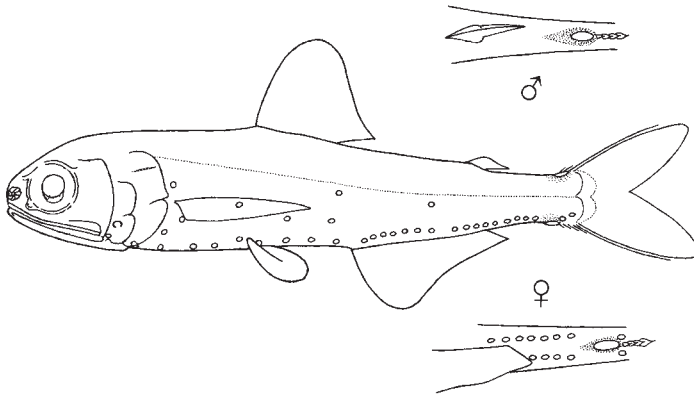
Maximum size to 157 mm; sexually mature from about 114 mm. Oceanic, mesopelagic in depths of 225 to 450 m (day) and 10 to 280 m (night). Summer spawner. No known fisheries, but catch rates of about 32 tonnes/hour estimated at shelf-break off west coast of South Africa. Sporadic in area north to 18°S (off northern Namibia). Also circumglobal in temperate waters (30°S–52°S), with northern extension to 18°S in eastern South Atlantic.



***Symbolophorus krefftii* Hulley, 1981**

En – Krefft's lanternfish.

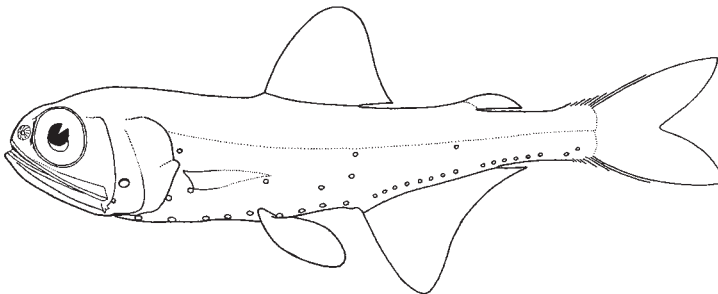
Maximum size to 112 mm; sexually mature from about 84 mm. Oceanic, adults mesopelagic in depths from surface to about 300 m (night); small juveniles in neuston tows during day. Atlantic endemic: in area between 24°N–04°S and between 07°S–20°S (eastern sector), but probably representing continuous distribution through Gulf of Guinea.



***Symbolophorus rufinus* (Tåning, 1928)**

En – Rufous lanternfish.

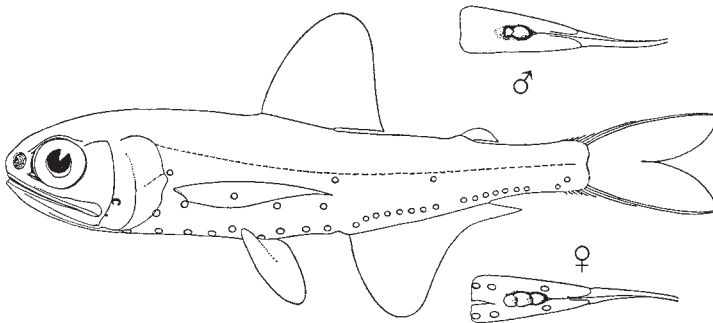
Maximum size to 94 mm; sexually mature from about 72 mm. Oceanic, mesopelagic in depths of 425 to 850 m (day), and from surface to 125 m (night). In area between 28°N and 23°S, but apparently absent off Moroccan coast, Gulf of Guinea and eastern sector of South Atlantic. Also from Gulf of Mexico and western Atlantic (40°N–28°S); central Indian Ocean (15°N–10°S) and in Mozambique Channel; and Pacific between 06°N–11°S and 150°E–130°W.



***Symbolophorus veranyi* (Moreau, 1888)**

En – V é r a n y ' s lanternfish; **Fr** – Lanterne à grandes écailles.

Maximum size to 120 mm; sexually mature from about 91 mm. Oceanic, mesopelagic in depths of 100 m and 700 to 800 m (day), and from surface to 150 m (night); size stratification with depth; postlarvae at 45 to 150 m, non-migrators. Spring/summer spawner. North Atlantic and Mediterranean endemic: in area south to 26°N, but with isolates in Mauritanian upwelling region. Also from eastern and western Mediterranean basins; and western Atlantic (30°N–50°N), with northern extension in Gulf Stream to 59°N east of 30°W.



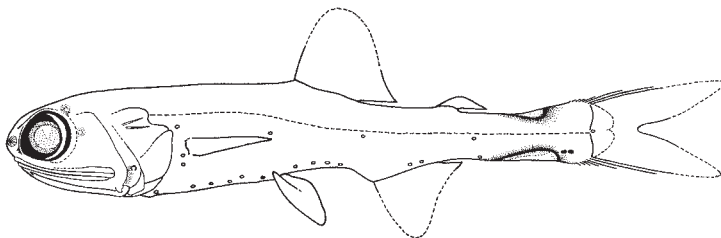
***Taaningichthys* Bolin, 1959**

3 species; 3 species in area.

***Taaningichthys bathyphilus* (Tåning, 1928)**

En – Deepwater lanternfish.

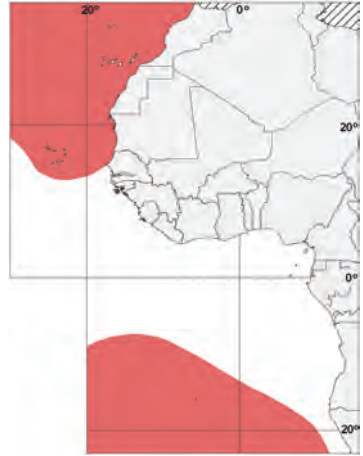
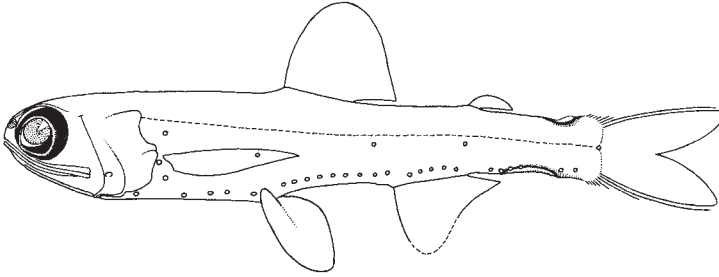
Maximum size to 80 mm; sexually mature from about 57 mm. Oceanic, meso- and bathypelagic in depths mainly below 675 m; non-migratory. Uncommon. Throughout area, but apparently absent off Brazil. Also from all three oceans between about 50°N and 45°S; one record south of Antarctic Polar Front.



***Taaningichthys minimus* (Tåning, 1928)**

En – Waistcoat lanternfish.

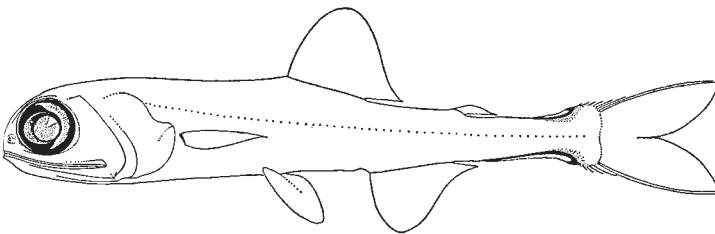
Maximum size to 65 mm; sexually mature from about 40 mm. Oceanic, mesopelagic in depths of 600 to 800 m (day) and 50 to 500 m (night); size stratification with depth. Spawning peak late winter-early spring. Disjunctly in area between 40°N–14°N and 18°S–30°S, but absent in Benguela upwelling region. Also from Indian Ocean (1 record); and Pacific (30°N–18°N and 12°S–25°S).



***Taaningichthys paurolychnus* Davy, 1972**

En – Naked lanternfish.

Maximum size to 95 mm; sexually mature from about 65 mm. Oceanic, bathypelagic in depths greater than 900 m; non-migratory. Rare. Two records (17.78°N, 25.37°W; 32.70°N, 16.70°W) in area. Also from Indian Ocean (04°S, 60°E); and Pacific (35°N–17°S).



New Index

A

Andersen's lanternfish	1886
Anomalous lanternfish	1902
Arctic lanternfish	1924
Astronesthidae	1861
Atlantic blackcap lanternfish	1919
Atlantic lanternfish	1898
Atlantic tail-light lanternfish	1905
Austral lanternfish	1906

B

Barebelly lanternfish	1914
Barenose lanternfish	1882
Barnard's lanternfish	1925
Benoit's lanternfish	1899
<i>Benthoosema</i>	1861, 1881
<i>Benthoosema glaciale</i>	1881
<i>Benthoosema suborbitale</i>	1881
Bertelsen's lanternfish	1886
Blackchins	1855
Blackhead lanternfish	1911
Bluntnose lanternfish	1892
Bluntnout lanternfish	1916
<i>Bolinichthys</i>	1882
<i>Bolinichthys distofax</i>	1882
<i>Bolinichthys indicus</i>	1882
<i>Bolinichthys photothorax</i>	1883
<i>Bolinichthys supralateralis</i>	1883
Bright lanternfish	1917

C

<i>Centrobranchus</i>	1860-1861, 1884
<i>Centrobranchus nigroocellatus</i>	1884
<i>Ceratoscopelus</i>	1884
<i>Ceratoscopelus maderensis</i>	1884
<i>Ceratoscopelus warmingii</i>	1885
<i>Chauliodus</i>	1861
Chaves' lanternfish	1902
<i>Chirostomias</i>	1861
CHLOROPHTHALMIDAE	1856
Cocco's lanternfish	1899
Cripplefin lanternfish	1918
Crocodile lanternfish	1907
Crown lanternfish	1887

D

Deepwater lanternfish	1927
<i>Diaphus</i>	1885
<i>Diaphus adenomus</i>	1885
<i>Diaphus anderseni</i>	1886
<i>Diaphus bertelseni</i>	1886
<i>Diaphus brachycephalus</i>	1887
<i>Diaphus diadematus</i>	1887
<i>Diaphus dumerilii</i>	1888
<i>Diaphus effulgens</i>	1888
<i>Diaphus fragilis</i>	1889
<i>Diaphus garmani</i>	1889
<i>Diaphus holti</i>	1890
<i>Diaphus hudsoni</i>	1890
<i>Diaphus lucidus</i>	1891
<i>Diaphus luetkeni</i>	1891
<i>Diaphus meadi</i>	1892
<i>Diaphus metopoclampus</i>	1892
<i>Diaphus mollis</i>	1893
<i>Diaphus ostenfeldi</i>	1893
<i>Diaphus perspicillatus</i>	1894
<i>Diaphus problematicus</i>	1894
<i>Diaphus rafinesquii</i>	1895
<i>Diaphus splendidus</i>	1895
<i>Diaphus subtilis</i>	1896
<i>Diaphus taaningi</i>	1896
<i>Diaphus termophilus</i>	1897
<i>Diaphus vanhoeffeni</i>	1897
<i>Diogenichthys</i>	1860, 1898
<i>Diogenichthys atlanticus</i>	1898
Doflein's lanternfish	1913
Dotback lanternfish	1909
Dumeril's lanternfish	1888
Dusky lanternfish	1919

E

<i>Electrona</i>	1861, 1898
<i>Electrona risso</i>	1860, 1898

F

Fanfare lanternfish	1923
Festive lanternfish	1907
Firebrow lanternfish	1885
Flabby lanternfish	1896
Flatface lanternfish	1894
Fragile lanternfish	1889

G

Garman's lanternfish	1889
Gauss' lanternfish	1912
Gemellaro's lanternfish	1913
Glacier lanternfish	1881
Goddess lanternfish	1903
<i>Gonichthys</i>	1860, 1899
<i>Gonichthys cocco</i>	1899
GONOSTOMATIDAE	1856, 1861
<i>Gymnoscopelus</i>	1861
Günther's lanternfish	1912

H

Headlight lanternfish	1888
Hector's lanternfish	1905
Holt's lanternfish	1890
Horned lanternfish	1895
Hudson's lanternfish	1890
Hygom's lanternfish	1900
<i>Hygophum</i>	1899
<i>Hygophum benoiti</i>	1899
<i>Hygophum hygomii</i>	1900
<i>Hygophum macrochir</i>	1900
<i>Hygophum reinhardtii</i>	1901
<i>Hygophum taaningi</i>	1901

I

Intricate lanternfish	1908
Isaac's lanternfish	1920

K

Kreffft's lanternfish	1926
Krøyer's lanternfish	1922

L

<i>Lampadena</i>	1902
<i>Lampadena anomala</i>	1902
<i>Lampadena chavesi</i>	1902
<i>Lampadena dea</i>	1903
<i>Lampadena luminosa</i>	1903
<i>Lampadena notialis</i>	1904
<i>Lampadena pontifex</i>	1904
<i>Lampadena speculigera</i>	1904
<i>Lampadena urophaos atlantica</i>	1905
<i>Lampanyctodes</i>	1861, 1905
<i>Lampanyctodes hectoris</i>	1905
<i>Lampanyctus</i>	1856, 1906
<i>Lampanyctus alatus</i>	1906
<i>Lampanyctus australis</i>	1906
<i>Lampanyctus crocodilus</i>	1907
<i>Lampanyctus festivus</i>	1907

<i>Lampanyctus intricarius</i>	1908
<i>Lampanyctus macdonaldi</i>	1908
<i>Lampanyctus nobilis</i>	1909
<i>Lampanyctus photonotus</i>	1909
<i>Lampanyctus pusillus</i>	1910
<i>Lampanyctus tenuiformis</i>	1910
<i>Lampanyctus vadulus</i>	1911
<i>Lampichthys</i>	1911
<i>Lampichthys procerus</i>	1911
Lanternmule de Hector	1905
Lanterne crocodile	1907
Lanterne de Doflein	1913
Lanterne glaciaire	1881
Lanterne à grandes écailles	1927
Lanternfishes	1860
Largefin lanternfish	1900
Largescaled blackchin	1858
<i>Lepidophanes</i>	1912
<i>Lepidophanes gaussi</i>	1912
<i>Lepidophanes guentheri</i>	1912
Linternillas de Hector	1905
<i>Lobianchia</i>	1913
<i>Lobianchia dofleini</i>	1913
<i>Lobianchia gemellarii</i>	1913
Longtail blackcap lanternfish	1920
<i>Loweina</i>	1860, 1914
<i>Loweina interrupta</i>	1914
<i>Loweina rara</i>	1914
Luminous lanternfish	1903
Lunar lanternfish	1918
Lütken's lanternfish	1891

M

MYCTOPHIDAE	1860
MYCTOPHIFORMES	1855
MacDonald's lanternfish	1908
Madeira lanternfish	1884
Mead's lanternfish	1892
Metallic lanternfish	1915
Mirror lanternfish	1904
Multispotted lanternfish	1924
MYCTOPHIDAE	1856
<i>Myctophum</i>	1915
<i>Myctophum affine</i>	1915
<i>Myctophum asperum</i>	1915
<i>Myctophum nitidulum</i>	1916
<i>Myctophum obtusirostre</i>	1916
<i>Myctophum phengodes</i>	1917
<i>Myctophum punctatum</i>	1917

Myctophum selenops 1860,1918

N

NEOSCOPELIDAE 1855

Nacreous lanternfish 1911

Naked lanternfish 1928

Nannobranchium 1918

Nannobranchium achirus 1918

Nannobranchium atrum 1919

Nannobranchium cuprarium 1919

Nannobranchium isaacsi 1920

Nannobranchium lineatum 1920

Nannobranchium wisneri 1921

NEOSCOPELIDAE 1861

Neoscopelus 1855,1861

Neoscopelus macrolepidotus 1858

Neoscopelus microchir 1855,1858

Neoscopelus n. sp. 1858

Noble lanternfish 1909

Notolychnus 1860,1921

Notolychnus valdiviae 1921

Notoscopelus 1922

Notoscopelus (*Notoscopelus*)

caudispinosus 1922

Notoscopelus (Notoscopelus) elongatus . . 1922

Notoscopelus (Notoscopelus) kroeyerii . . 1922

Notoscopelus (Notoscopelus) resplendens 1923

Notoscopelus (Pareiophus) bolini 1923

O

Ostenfeld's lanternfish 1893

P

Pareiophus 1922

Patchwork lanternfish 1923

Pearlyspotted lanternfish 1916

PHOSICHTHYIDAE 1856,1861

Prickly lanternfish 1915

Priestly lanternfish 1904

Problematic lanternfish 1894

Protomyctophum 1924

Protomyctophum (Hierops) 1860

Protomyctophum (Hierops) arcticum . . . 1924

Pygmy lanternfish 1910

R

Rafinesque's lanternfish 1895

Rare lanternfish 1914

Reinhardt's lanternfish 1901

Risso's lanternfish 1898

Roundnose lanternfish 1884

Rufous lanternfish 1926

S

Scopelengys 1855,1861

Scopelengys tristis 1859

Scopelopsis 1860,1924

Scopelopsis multipunctatus 1924

Shorthead lanternfish 1887

Slender lanternfish 1910

Slopewater lanternfish 1896

Smallfin lanternfish 1881

Smallscaled blackchin 1858

Smoothcheek lanternfish 1882

Soft lanternfish 1893

Solivomer 1855

Sombre blackchin 1859

Spinetail lanternfish 1922

Spotfin lanternfish 1925

Spotlight lanternfish 1891

Spotted lanternfish 1917

Spurcheek lanternfish 1883

STERNOPTYCHIDAE 1856,1861

Stomiiformes 1861

Stubby lanternfish 1883

Symbolophorus 1925

Symbolophorus barnardi 1925

Symbolophorus boops 1925

Symbolophorus krefftii 1926

Symbolophorus rufinus 1926

Symbolophorus veranyi 1927

T

Taaningichthys 1860,1927

Taaningichthys bathyphilus 1927

Taaningichthys minimus 1928

Taaningichthys paurolychnus . 1856,1860,1928

Topside lanternfish 1921

Tåning's lanternfish 1901

V

VanHöffen's lanternfish 1897

Vérany's lanternfish 1927

W

Waistcoat lanternfish 1928

Warming's lanternfish 1885

Warmwater lanternfish 1897

Winged lanternfish 1906

Wisner's lanternfish 1921

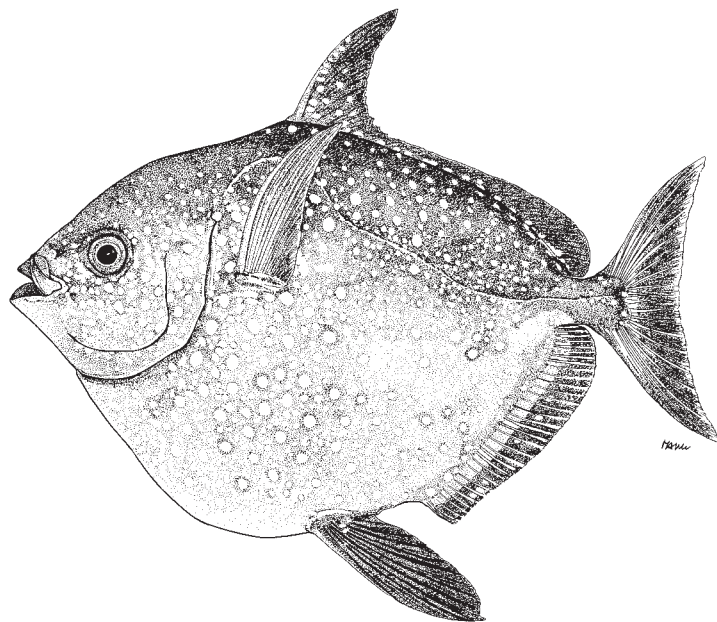
- A**
- achirus*, *Nannobranchium* 1918
adenomus, *Diaphus* 1885
affine, *Myctophum* 1915
alatus, *Lampanyctus* 1906
anderseni, *Diaphus* 1886
anomala, *Lampadena* 1902
arcticum, *Protomyctophum* (*Hierops*) 1924
asperum, *Myctophum* 1915
atlantica, *Lampadena urophaos* 1905
atlanticus, *Diogenichthys* 1898
atrum, *Nannobranchium* 1919
australis, *Lampanyctus* 1906
- B**
- barnardi*, *Symbolophorus* 1925
bathophilus, *Taaningichthys* 1927
benoiti, *Hygophum* 1899
bertelseni, *Diaphus* 1886
bolini, *Notoscopelus* (*Pareiophus*) 1923
boops, *Symbolophorus* 1925
brachycephalus, *Diaphus* 1887
- C**
- caudispinosus*, *Notoscopelus*
(*Notoscopelus*) 1922
chavesi, *Lampadena* 1902
cocco, *Gonichthys* 1899
crocodilus, *Lampanyctus* 1907
cuprarium, *Nannobranchium* 1919
- D**
- dea*, *Lampadena* 1903
diadematus, *Diaphus* 1887
distofax, *Bolinichthys* 1882
dofleini, *Lobianchia* 1913
dumerilii, *Diaphus* 1888
- E**
- effulgens*, *Diaphus* 1888
elongatus, *Notoscopelus* (*Notoscopelus*) . . 1922
- F**
- festivus*, *Lampanyctus* 1907
fragilis, *Diaphus* 1889
- G**
- garmanim*, *Diaphus* 1889
gaussi, *Lepidophanes* 1912
- gemellarii*, *Lobianchia* 1913
glaciale, *Benthoosema* 1881
guentheri, *Lepidophanes* 1912
- H**
- hectoris*, *Lampanyctodes* 1905
holti, *Diaphus* 1890
hudsoni, *Diaphus* 1890
hygomii, *Hygophum* 1900
- I**
- indicus*, *Bolinichthys* 1882
interrupta, *Loweina* 1914
intricarius, *Lampanyctus* 1908
isaacsi, *Nannobranchium* 1920
- K**
- kreffti*, *Symbolophorus* 1926
kroeyerii, *Notoscopelus* (*Notoscopelus*) . . 1922
- L**
- lineatum*, *Nannobranchium* 1920
lucidus, *Diaphus* 1891
luetkeni, *Diaphus* 1891
luminosa, *Lampadena* 1903
- M**
- macdonaldi*, *Lampanyctus* 1908
macrochir, *Hygophum* 1900
macrolepidotus, *Neoscopelus* 1858
maderensis, *Ceratoscopelus* 1884
meadi, *Diaphus* 1892
metopoclampus, *Diaphus* 1892
microchir, *Neoscopelus* 1855,1858
minus, *Taaningichthys* 1928
mollis, *Diaphus* 1893
multipunctatus, *Scopelopsis* 1924
- N**
- nigroocellatus*, *Centrobranchus* 1884
nitidulum, *Myctophum* 1916
nobilis, *Lampanyctus* 1909
notialis, *Lampadena* 1904
- O**
- obtusirostre*, *Myctophum* 1916
ostenfeldi, *Diaphus* 1893
- P**
- paurolychnus*, *Taaningichthys* 1856,1860,1928
perspicillatus, *Diaphus* 1894

- | | | | |
|--|------------|--|------|
| <i>phengodes</i> , <i>Myctophum</i> | 1917 | <i>suborbitale</i> , <i>Benthoosema</i> | 1881 |
| <i>photonotus</i> , <i>Lampanyctus</i> | 1909 | <i>subtilis</i> , <i>Diaphus</i> | 1896 |
| <i>photothorax</i> , <i>Bolinichthys</i> | 1883 | <i>supralateralis</i> , <i>Bolinichthys</i> | 1883 |
| <i>pontifex</i> , <i>Lampadena</i> | 1904 | T | |
| <i>problematicus</i> , <i>Diaphus</i> | 1894 | <i>taaningi</i> , <i>Diaphus</i> | 1896 |
| <i>procerus</i> , <i>Lampichthys</i> | 1911 | <i>taaningi</i> , <i>Hygophum</i> | 1901 |
| <i>punctatum</i> , <i>Myctophum</i> | 1917 | <i>termophilus</i> , <i>Diaphus</i> | 1897 |
| <i>pusillus</i> , <i>Lampanyctus</i> | 1910 | <i>tristis</i> , <i>Scopelengys</i> | 1859 |
| R | | U | |
| <i>rafinesquii</i> , <i>Diaphus</i> | 1895 | <i>urophaos atlantica</i> , <i>Lampadena</i> | 1905 |
| <i>rara</i> , <i>Loweina</i> | 1914 | V | |
| <i>reinhardtii</i> , <i>Hygophum</i> | 1901 | <i>vadulus</i> , <i>Lampanyctus</i> | 1911 |
| <i>resplendens</i> , <i>Notoscopelus</i> (<i>Notoscopelus</i>) | 1923 | <i>valdiviae</i> , <i>Notolychnus</i> | 1921 |
| <i>risso</i> , <i>Electrona</i> | 1860, 1898 | <i>vanhoeffeni</i> , <i>Diaphus</i> | 1897 |
| <i>rufinus</i> , <i>Symbolophorus</i> | 1926 | <i>veranyi</i> , <i>Symbolophorus</i> | 1927 |
| S | | W | |
| <i>selenops</i> , <i>Myctohum</i> | 1860 | <i>warmingii</i> , <i>Ceratoscopelus</i> | 1885 |
| <i>selenops</i> , <i>Myctophum</i> | 1918 | <i>wisneri</i> , <i>Nannobrachium</i> | 1921 |
| <i>speculigera</i> , <i>Lampadena</i> | 1904 | | |
| <i>splendidus</i> , <i>Diaphus</i> | 1895 | | |

Order LAMPRIFORMES**LAMPRIDAE****Opahs**

by J.E. Olney (†), Virginia Institute of Marine Science, Gloucester Point, VA, USA and
B.B. Collette, National Marine Fisheries Service Systematics Laboratory, National Museum of Natural History, Washington, DC, USA

Diagnostic characters: A large, deep, compressed, oval-shaped and brightly coloured fish. Mouth small and toothless. **Dorsal and anal fins long and single, both retractable into deep grooves, the first with a high anterior lobe;** caudal fin moderately forked; **pectoral fins long and sickle-shaped, placed high on sides,** their bases horizontal; pelvic fins large and placed on ventral margin of body, posterior to pectoral-fin origin. Body covered with very small, smooth scales. Lateral line strongly arched over pectoral-fin base. Total vertebrae 46 to 50; dorsal-fin rays, 48 to 52; anal-fin rays, 33 to 42. In lamprids (and all lampriforms), the anterior palatamaxillary ligament and the palatine prong are absent; as a result, the maxilla is free to extend, along with the premaxilla, well away from the ethmo-vomerine region during jaw protrusion. Other anatomical features of lamprids (and all lampriforms): first dorsal-fin pterygiophore inserts anterior to first neural spine; elongate ascending processes of premaxilla and a large rostral cartilage insert into a frontal vault or cradle; mesethmoid posterior to lateral ethmoids. In lamprids, the foramen magnum is bounded laterally by exoccipital condyles. **Colour:** fresh intact opah are a uniform solid golden orange to vermilion with small oval white spots but much of the body colour quickly changes to steel blue or bottle green after death.



Habitat, biology, and fisheries: Found from the surface to depths of about 200 m; apparently solitary, mainly an inhabitant of warm water, but wandering far north in summer months; uses its pectoral fins for burst swimming, employing large muscles attached to its shoulder girdle for thrust. *Lampris guttatus* is a solitary, wandering predator and powerful swimmer, consuming molluscs, crustaceans, and small fish, sometimes in large quantities. A marketable bycatch of tuna and swordfish longline fisheries bringing high prices because of its excellent tasting pink flesh. No catch statistics are available from the area but about 200 000 fish have been recorded in the Hawaiian long-line fishery (1994–2011).

Similar families occurring in the area

None. No other large marine fish has the typical body shape, colour and wing-like pectoral fins of *Lampris guttatus*.

List of species occurring in the area

Lampris guttatus (Brünnich 1788). To at least 163 cm fork length and 89 kg; average about 100 cm. The IGFA all-tackle game fish record is 73.93 kg; worldwide in tropical and temperate waters; probably scattered occurrence throughout the area. A second species, *L. immaculatus*, is widely distributed in cold and temperate waters of the southern hemisphere and does not occur in the area. A field study in Hawaii has suggested there may be a third, undescribed spotted species in that region.

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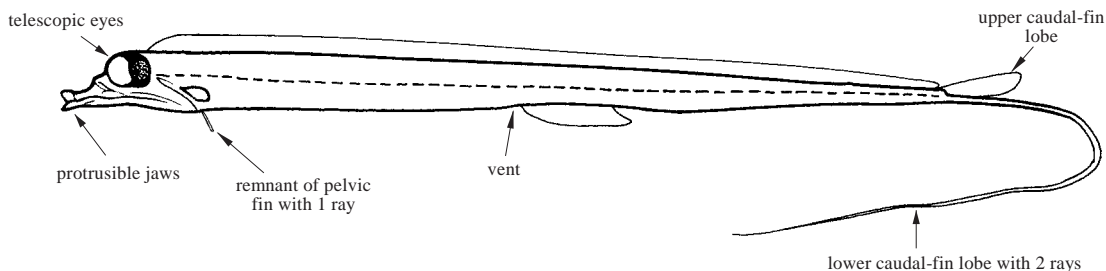
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STYLEPHORIDAE

Tube-eyed tapertails

by J.E. Olney (+), Virginia Institute of Marine Science, Gloucester Point, VA, USA and
K.E. Hartel, Harvard University, Massachusetts, USA

Diagnostic characters: Small to moderate-sized lampriform fishes (usually under 30 cm); body slender, elongate, somewhat compressed. **Eyes conspicuous, telescopic, directed forward and somewhat upward. Jaws highly protrusible, mouth small and tubular** (head tilted backward when jaws protruded, with a membranous pouch stretching from head to mouth, and volume of mouth cavity increasing dramatically); teeth absent. Dorsal-fin base long, extending from nape to caudal fin; first 2 dorsal-fin elements elongate, especially in small specimens; total dorsal-fin soft rays 115 to 124. Anal-fin base short, inserted at midbody; total anal rays 14 to 17. **No ink gland. Vent immediately before anal-fin origin. Caudal fin with 2 highly modified externally visible lobes; upper caudal-fin lobe with 5 or 6 short rays, lower with 2 long rays, forming a projection or taper equaling or exceeding body length when intact. Pelvic fins inserted below pectoral-fin base, each with 1 long ray almost invariably broken off near base and inconspicuous in postlarvae.** Pectoral fins with 10 or 11 soft rays; fin base obliquely rotated. Pelvic fins inserted below pectoral-fin base, with 1 soft ray, often broken and inconspicuous. Total vertebrae about 53; first 2 vertebrae highly reduced; second vertebra without neural spine and with neural arch m-shaped. **Colour:** body silver; head darkly pigmented, inside of mouth and gill chambers black; colours of fins in life unknown.



Habitat, biology, and fisheries: The only known species in this family, *Stylephorus chordatus*, is meso- or bathypelagic (captured at depths of 300 to 800 m) and uncommon. It feeds on small crustaceans, and is thought to capture prey while swimming in a vertical, head-up position. Worldwide in tropical and temperate waters; presumably found throughout the area. Little is known of its habits or reproduction. There is no fishery for the species.

Similar families occurring in the area

Radiicephalidae: similar modification of caudal-fin lobes, but with upper lobe tiny and situated farther back (just posterior to dorsal fin in stylephorids); eyes not telescopic; vent situated near mid-body (situated just anterior to anal fin in stylephorids).



Radiicephalidae

List of species occurring in the area

Note: The family Stylephoridae is conservatively retained here in the Lampriformes but recent molecular works (2007–2012) place this family in the Gadiformes. A single species in the family.

Stylephorus chordatus Shaw, 1791. To 32 cm, excluding elongate caudal filament. Circumglobal.

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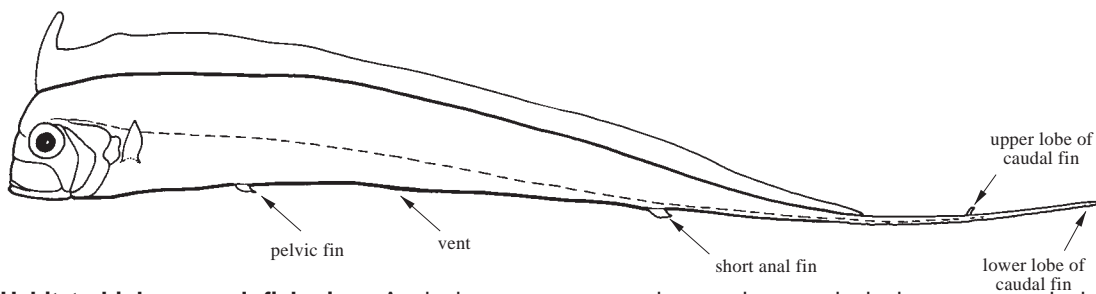
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RADIICEPHALIDAE

Tapertails

by J.E. Olney (+), Virginia Institute of Marine Science, Gloucester Point, VA, USA and
T.R. Roberts, Smithsonian Tropical Research Institute, Panama and Institute of Molecular Biosciences, Mahidol University, Thailand

D **Diagnostic characters:** Small to moderate-sized lampriform fishes; body slender, elongate, compressed, its depth gradually decreasing from the head to caudal peduncle. Upper jaw highly protrusible; jaw teeth absent; 1 to several teeth on roof of mouth. Dorsal fin long, its first rays inserting over eye; anterior dorsal-fin rays somewhat elongate; total dorsal-fin soft rays 150 to 160. Anal fin short, inconspicuous, posteriorly placed near caudal peduncle; total anal-fin soft rays 6 or 7. **Caudal fin highly modified; upper lobe tiny, with 4 or 5 very short rays directed obliquely upwards; lower lobe with about 6 or 7 thickened and extremely elongate rays forming a caudal projection or taper that may be equal to the body length in undamaged specimens.** Pectoral fins with 9 or 10 soft rays; fin base obliquely rotated. Pelvic fins with 9 soft rays in small specimens, often damaged or inconspicuous in adults; pelvic fins inserted well posterior to pectoral-fin base. **Scales absent except for tubular lateral-line scales.** Total vertebrae 114 to 121 (36 to 39 abdominal, 77 to 79 postabdominal). **Fourth to sixth abdominal centra with elongate haemal spines piercing ventral margin of body** (unique among fishes). In radiicephalids (and all lampriforms), the anterior palatamaxillary ligament and the palatine prong are absent; as a result, the maxilla is free to extend, along with the premaxilla, well away from the ethmo-vomerine region during jaw protrusion. Other anatomical features of radiicephalids (and all lampriforms): first dorsal-fin pterygiophore inserts anterior to first neural spine; elongate ascending processes of premaxilla and a large rostral cartilage insert into a frontal vault or cradle; mesethmoid posterior to lateral ethmoids. In radiicephalids (and lophotids), the supraoccipital bears an anteriorly directed process (a weak spine in radiicephalids, but broader and well-developed in lophotids). **Colour:** body silver; dorsal, pectoral and caudal fins may be tinted red.

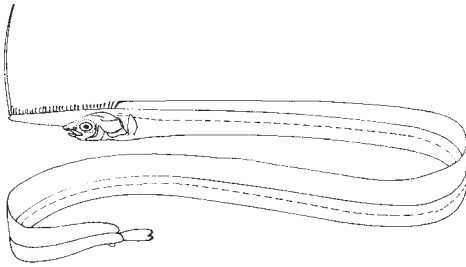


Habitat, biology, and fisheries: A single very rare species, perhaps epipelagic or mesopelagic, *Radiicephalus elongatus* attains 60 to 75 cm in length. Within the area it is known only from two large subadults taken off Morocco, and a few small immature specimens captured by research nets. Little is known of its habits or reproduction. Predators, food preferences, and parasites largely unreported. Like Lophotidae, it possesses a large exocrine gland that discharges a black, ink-like fluid through an opening near the vent, presumably as an alarm response. There is no fishery for the species.

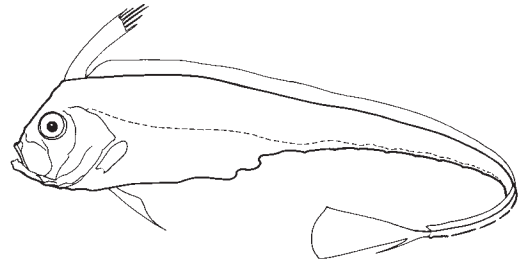
Similar families occurring in the area

Lophotidae: more dorsal-fin soft rays (206 to 392 versus 152 to 160); head with conspicuous fleshy crest or horn; ink gland; vent near end of body, just in front of very small anal fin near caudal fin (situated at midbody, far in advance of anal fin, in Radiicephalidae).

Trachipteridae: ink gland and anal fin absent; caudal fin not divided into distinct external lobes, without taper.



Lophotidae



Trachipteridae

List of species occurring in the area

A single species in the family.

Radiicephalus elongatus Osório, 1917. Usually under 80 cm. Mesopelagic in most oceans.

References

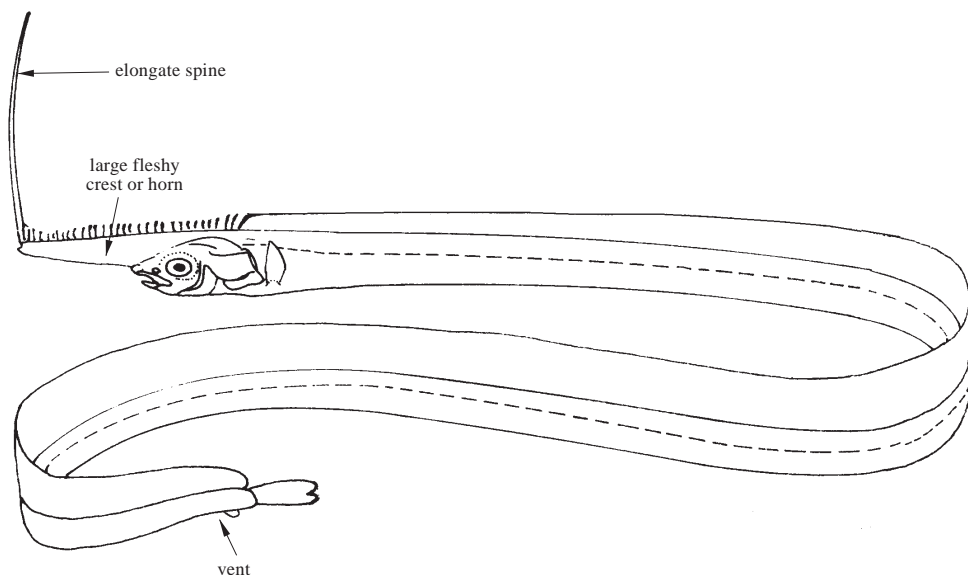
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LOPHOTIDAE

Crestfishes

by J.E. Olney (†), Virginia Institute of Marine Science, Gloucester Point, VA, USA

Diagnostic characters: Large, ribbon-like lampriform fishes (to 2 m); body elongate and compressed. **Head bears a large, fleshy crest or horn that extends forward to tip of jaw in *Lophotus*, and protrudes far forward of jaw in *Eumecichthys*; crest or horn bears an elongate spine and supports multiple dorsal-fin soft rays.** Upper jaw protrusible; small conical teeth present on jaws and vomer. Dorsal fin long, with 2 spines (first spine short, second spine elongate) inserting well forward of eye; total dorsal-fin soft rays 204 to 390. Anal fin short, posteriorly placed; total anal-fin soft rays 5 to 20. Caudal fin somewhat reduced, with 12 to 17 soft rays. Pectoral fins with 13 to 17 soft rays, its base almost horizontal. Pelvic fins absent or small, with 3 to 6 soft rays, inserted posterior to pectoral-fin base. **Scales absent, except for tubular lateral-line scales.** Total vertebrae, 124 to 200 (56 abdominal in *Eumecichthys*). In lophotids (and all lampriforms), the anterior palatamaxillary ligament and palatine prong are absent; as a result, maxilla is free to extend, along with the premaxilla, well away from the ethmo-vomerine region during jaw protrusion. Other anatomical features of lophotids (and all lampriforms): first dorsal-fin pterygiophore inserts anterior to first neural spine; elongate ascending processes of premaxilla and a large rostral cartilage insert into a frontal vault or cradle; mesethmoid posterior to lateral ethmoids. In lophotids (and radiicephalids), the supraoccipital bears an anteriorly directed process that is well developed and stout in lophotids, projects over the frontal arch, and supports the fleshy crest on the head. **Colour:** body silver with multiple dark vertical bands in *Eumecichthys*; body blue dorsally, grading to silver ventrally in *Lophotus*, lacking vertical bands, and having multiple white or silver spots; dorsal fin, pectoral fins, pelvic fins (when present), and caudal fin reddish in lophotids (and most other lampriforms).

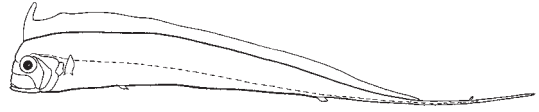


Habitat, biology, and fisheries: Lophotids are rare mesopelagic fishes that occur in most oceans. *Lophotus* consumes squids and small fishes. Eggs and larvae have been described, but little else is known of their habits and reproductive ecology. As in the Radiicephalidae, lophotids possess a tubular gland that overlies the hind gut, and discharges an ink-like black fluid through a separate opening near the vent, presumably as an alarm response. No fishery exists for them.

Remarks: There has been considerable taxonomic confusion on the named species of *Lophotus*. A recent molecular and meristic study provided evidence for the validity of 3 species, 2 species in the Pacific Ocean and 1 Atlantic species, *L. lacepede*.

Similar families occurring in the area

Radiicephalidae: fewer dorsal-fin elements (152 to 160 versus 206 to 392); no conspicuous cranial crest or horn; vent near mid-body, well behind pelvic fins and far in front of anal fin (near end of body and just in front of anal fin in lophotids).



Radiicephalidae

Key to the species of Lophotidae occurring in the area

- 1a. Crest on top of head extends forward to the tip of jaw (Fig. 1); dorsal fin with fewer than 300 rays ***Lophotus lacepede***
 1b. Crest on top of head protrudes far forward of the jaw (Fig. 2); dorsal fin with more than 300 rays ***Eumecichthys fiski***

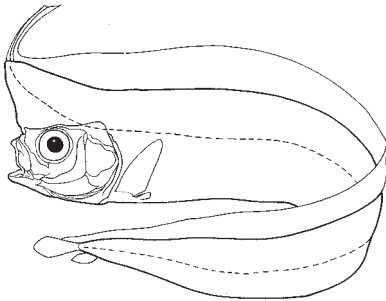


Fig. 1 *Lophotus lacepede*

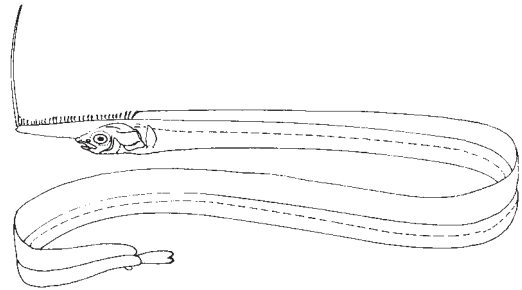


Fig. 2 *Eumecichthys fiski*

List of species occurring in the area

Eumecichthys fiski (Günther, 1890). To 130 cm. Mesopelagic in most oceans.

Lophotus lacepede Giorna, 1809. To 200 cm. Mesopelagic in the Atlantic ocean.

References

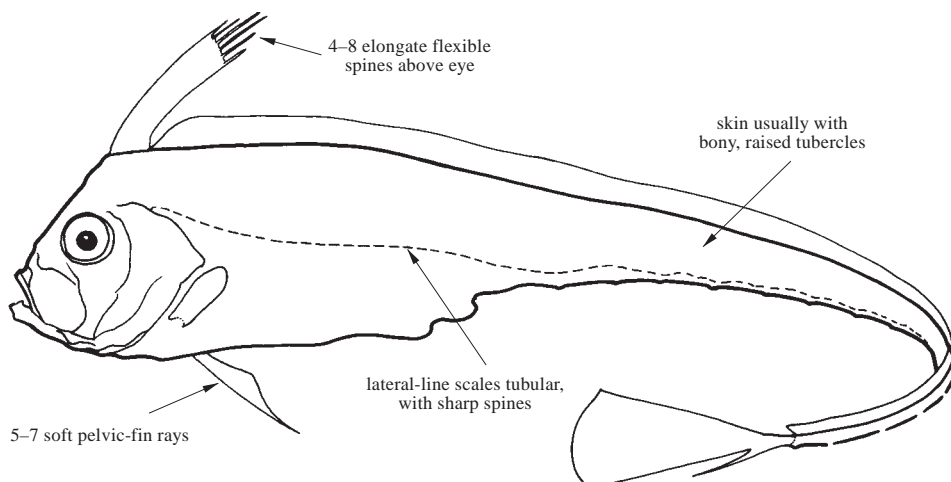
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- Robins, C.R., Ray, G.C. & Douglas, J. 1986. *A field guide to Atlantic coast fishes North America*. Boston, Houghton Mifflin Co., 354 p.

TRACHIPTERIDAE

Ribbonfishes

by J.E. Olney (†), Virginia Institute of Marine Science, Gloucester Point, VA, USA and
K.E. Hartel, Harvard University, Massachusetts, USA

Diagnostic characters: Large lampriform fishes (to 2 m); body elongate, ribbon-like, compressed. In most species, body depth gradually decreasing from head to caudal peduncle. Upper jaw highly protrusible, maxilla broad, pointed teeth on jaws, vomer, and palatines; bones of head and jaws thin and fragile. Dorsal fin very long, extending along entire body length to tail; **anterior dorsal-fin elements consisting of 4 to 8 elongate, flexible spines that insert above eye**; total dorsal-fin elements 120 to 190; dorsal-fin rays bear strong lateral spinules that tend to interlock with adjacent soft rays and strengthen the fin. Anal fin absent. Caudal fin with 2 lobes; upper lobe sometimes upturned, conspicuous, and fan-like; total caudal-fin soft rays usually 13 to 18; usually 5 to 9 soft rays in lower fin lobe, some of which are elongate; usually 5 to 7 soft rays in the upper fin lobe, all of which are elongate in *Zu*. **Pelvic fins with 5 to 7 soft rays; often elongate in juveniles; sometimes lost at metamorphosis. Skin usually covered with bony, raised, bump-like tubercles. Scales absent, except for lateral-line scales that are tubular and bear sharp spines.** (Scalloped ribbonfish, *Zu cristatus*, with distinctive scalloped or wavy ventral margin, and possessing small deciduous scales). Total vertebrae, 62 to 102; abdominal vertebrae, 18 to 40. In trachipterids (and all lampriforms), the anterior palatamaxillary ligament and palatine prong are absent; as a result, the maxilla is free to extend, along with premaxilla, well away from the ethmo-vomerine region during jaw protrusion. Other anatomical features of the trachipterids (and all lampriforms): first dorsal-fin pterygiophore inserts anterior to first neural spine; elongate ascending processes of premaxilla and a large rostral cartilage insert into a front vault or cradle; mesethmoid posterior to lateral ethmoids. In trachipterids (and regalecids), the dorsal-, caudal-, and pelvic-fin rays bear spinules that project laterally; in trachipterids, the parapophyses of each abdominal vertebra are well developed, but ribs are lacking. **Colour:** head and body usually silver with oblique dusky bars or with dark spots; fins deep crimson-red.

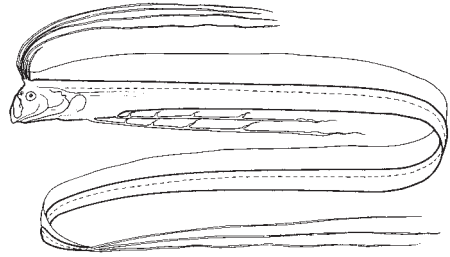


Habitat, biology, and fisheries: Trachipterids are rare mesopelagic fishes that occur in all oceans. They consume pelagic crustaceans, small fishes, and squids. Eggs free-floating, large, and red. Juveniles have been observed swimming in surface waters with their long anterior dorsal- and pelvic-fin rays trailing behind like the tentacles of jellyfish. Very little is known of their habits and reproductive ecology. There is no fishery for the group.

Remarks: Trachipterids are distributed worldwide in tropical and temperate waters. There are approximately 10 species in 3 genera (*Trachipterus*, *Zu* and *Desmodema*), at least 4 of which (*T. arcticus*, *T. trachypterus*, *Desmodema polystictum* and *Zu cristatus*) may occur in the area. Ranges of vertebral counts reported for *T. arcticus* (99 to 102) and *T. trachypterus* (84 to 96) do not overlap. Thus, both species are currently recognized as valid taxa. The validity of a fifth Atlantic species (*T. trachyurus* Poey, 1861) is currently unknown. The family is in need of revision.

Similar families occurring in the area

Regalecidae: also lacking anal fin, but with more dorsal-fin soft rays (260 to 412 versus 120 to 200), and attaining a far larger size. All other lampriform families possess an anal fin.



Regalecidae

Key to the species of Trachipteridae occurring in the area

- 1a. Caudal fin without 2 lobes and not sharply upturned; no long spines or bony tubercles along ventral edge of tail; dorsal fin with 120 to 124 elements ***Desmodema polystictum***
- 1b. Caudal fin with 2 lobes, the upper lobe sharply upturned; ventral edge of tail bears long spiny plates or bony tubercles; dorsal fin usually with more than 124 elements → 2
- 2a. Posterior portion of lateral line runs along ventral edge of tail as a series of sharp spines that point in alternating directions; wavy or scalloped ventral body margin; dorsal fin usually with less than 150 elements (120 to 150) ***Zu cristatus***
- 2b. Posterior portion of lateral line runs well above the ventral edge of tail; lateral line spines project laterally, and do not point in alternating directions; ventral body margin straight; dorsal fin usually with more than 150 elements (145 to 190) → 3
- 3a. Total vertebrae 84 to 96 ***Trachipterus trachipterus***
- 3b. Total vertebrae 99 to 102 ***Trachipterus arcticus***

List of species occurring in the area

Desmodema polystictum (Ogilby, 1898). To about 100 cm. Mesopelagic in all oceans.

Trachipterus arcticus (Brünnich, 1771). To about 250 cm. Mesopelagic in the North sea to South Africa.

Trachipterus trachipterus (Gmelin 1789) To about 250 cm. Mesopelagic in the Mediterranean to South Africa.

Zu cristatus (Bonelli, 1820). To about 120 cm. Mesopelagic in all oceans.

References

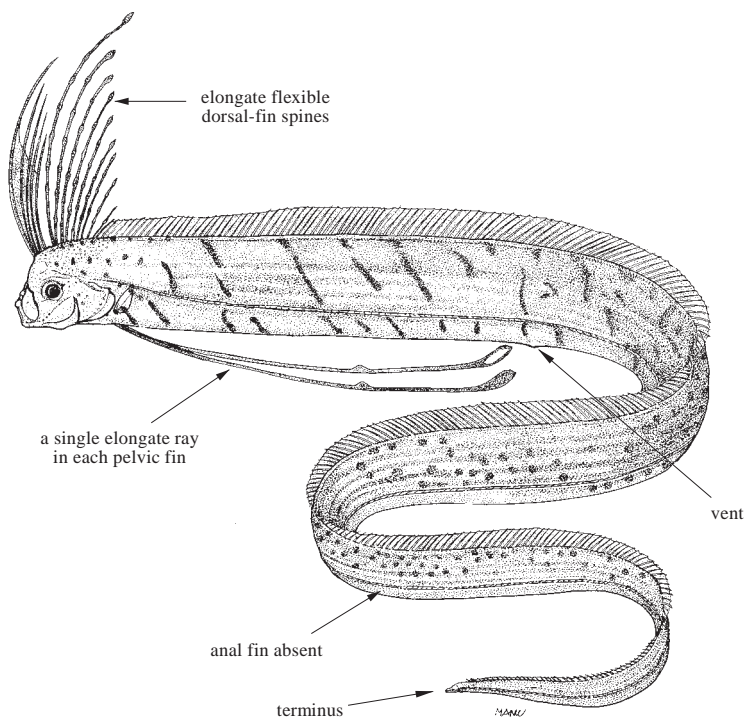
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- Palmer, G. 1961. The dealfishes (Trachipteridae) of the Mediterranean and north-east Atlantic. *Bulletin of the British Museum (Natural History), Zoology*, 7(7): 337–351.
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REGALECIDAE

Oarfishes

by T.R. Roberts, Smithsonian Tropical Research Institute, Panama and
Institute of Molecular Biosciences, Mahidol University, Thailand

Diagnostic characters: Epipelagic lampriform fishes to 8 m; body extremely elongate, strongly compressed. Dorsal-fin origin on head, extending to end of body. Anteriormost dorsal-fin rays form 2 dorsal-fin crests up to 1 m or more long, often badly damaged in stranded fish. Pectoral fins small, directed upwards. **Pelvic fins with 1 ray**; long, extending to vent if not damaged. **Anal fin absent**. Young fish with complete bodies usually have about 400 dorsal-fin rays and caudal fin with 3 or 4 rays. Fishes over 1 m long usually have lost part of the posterior or more precisely post-abdominal part of the body, thus have fewer dorsal-fin rays and no caudal fin. Jaws markedly protrusible. Jaw teeth usually absent, if present widely spaced, few in number and tiny. Scales absent. Body with several longitudinal rows of tubercles. Head and body covered with silvery guanine, which is easily rubbed off. **Colour:** head and body intense silvery, with dark black or bluish oblique marks. Dorsal fin (including crests) and pelvic fins often solid crimson red, sometimes clear with numerous bright red round spots. Rays of second dorsal-fin crest and of pelvic fins ornamented with black and red coloured flaps of fin membrane or skin. Inside of mouth black. Several days after death entire head turns black on stranded specimens. Sexual dichromatism unknown.



Habitat, biology, and fisheries: Large adults spend much of the time in vertical position with the head up and the dorsal-fin crests and pelvic fins extended. Most important food is krill (Euphausiidae). They are notably free of predators. Recent work on *Regalecus russellii* in California and Japan, still mostly unpublished, has revealed a diverse array of parasites from Protozoa through Metazoa. Individuals of *R. glesne* in the northeastern Atlantic are nearly all adult females apparently expatriated from the reproductive population in the western Atlantic. The Mediterranean is inhabited by a reproductive population apparently isolated from other populations. *R. russellii* is known from the eastern central Atlantic between 15° N and S latitude. Sexual dimorphism unknown or unrecognized. Reports that the posterior part of the body of large regalecids has been bitten off by sharks or other predators are unsubstantiated and probably untrue. Missing portion of post-abdominal body is due to a series of self-amputations or repetitive autotomy. In the most extreme examples of autotomy, the entire two-thirds or three-quarters of the body beyond the vent is lost, leaving only the head and trunk. Autotomy results in the end of the body forming a distinctive terminal scar or *terminus*.

Large *Regalecus* are edible (non-toxic) but humans and apparently also dogs, cats, seagulls, marine mammals, and sharks prefer not to eat them. There are no fisheries for *Regalecus* anywhere in the world. Unprecedented numbers of large *R. russellii* were caught in Japanese waters in all of the years from late 2009 through May 2014 (since then the numbers apparently have dropped to pre-2009 levels). Many of them occurred in male-female pairs with maturing (but not ripe) gonads. The number of occurrences of large *R. russellii* in the Gulf of California was also exceptionally high from October 2012 through May 2014. Its presence there is due to expatriation from the North Pacific population of the species that reproduces in the western Pacific. All or nearly all of the members of the species that occurred in Southern California and in the Gulf of California since 2010 probably were part of the population explosion of this species that began in the western Pacific some time before 2009. *Regalecus glesne* did not experience any population explosions in recent years, and populations of *R. russellii* have not exploded anywhere else since 2009.

Just why both species of *Regalecus* strand themselves, occasionally in pairs which might or might not be male-female, has been the topic of much unfounded speculation, especially in Japan and California. The old idea that strandings occur due to fish being washed or driven ashore by storms is contradicted by numerous recent observations of them swimming ashore in fine weather. Nor does the widespread belief that oarfish strandings are harbingers of earthquakes stand up to investigation. The strandings occur in geographically definable areas, mainly or exclusively when oarfish find themselves in places beyond their normal range. Thus *R. russellii* in the western North Pacific, where they normally reproduce, occasionally drift across the ocean to the eastern North Pacific, where they do not reproduce. Observations since 2010 indicate that all or most such fish strand themselves soon after arrival. The same evidently occurs when fish in the western North Atlantic drift across the ocean to the eastern North Atlantic.

The most likely hypothesis as to why oarfish actively strand themselves seems to be that finding themselves in the wrong place, they attempt to swim to where they should be even if this results in stranding. Supposed strandings of large oarfish in Japan and elsewhere in East Asia within their normal range probably all result from fish caught by fishermen that have been thrown back into the sea and subsequently wash ashore dead.

Remarks: *Agrostichthys*, the only other regalecid genus, is restricted to temperate waters of the southern hemisphere.

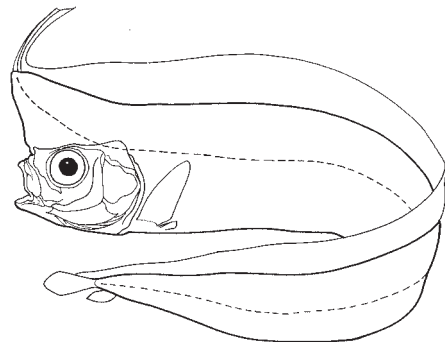
Similar families occurring in the area

Trachipteridae: (especially the genus *Trachipterus*) agrees with *Regalecus* in the silvery coloration and in lack of anal fin, and somewhat in head and mouth shape, but the dorsal fin originates farther posteriorly and does not form 2 crests anteriorly; the pelvic fins usually have 5 to 7 rays, and the caudal fin 7 rays. The jaws have numerous small but not tiny conical teeth. *Trachipterus* do not self-amputate, so their body usually remains whole and the caudal fin is present throughout life.

Lophotidae: *Lophotus* is similar to *Regalecus* in overall appearance. Anal fin is present but very small and positioned so far posterior that it may be mistaken for part of the caudal fin. *Lophotus* has a long dorsal fin originating very far anteriorly but with only a single relatively small anterior crest. Lophotidae have a cloacal ink sac not found in Regalecidae and Trachipteridae.



Trachipteridae



Lophotidae

Key to adults and large juveniles of Regalecidae occurring in the area

- 1a.** Second dorsal-fin crest with 5 to 11 rays; 33 to 37 rakers on first gill arch; 45 to 56 abdominal vertebrae ***Regalecus glesne***
- 1b.** Second dorsal-fin crest with 1 ray; 46 to 60 rakers on first gill arch; 34 to 37 abdominal vertebrae ***Regalecus russellii***

Note on identification of early life history stages of *Regalecus*

Larvae of *Trachipterus* and *Lophotus* frequently have been misidentified as *Regalecus*. At present the only known way to distinguish the larvae of the 2 species of *Regalecus* is by counts of their abdominal body segments or **myomeres**, which should correspond to counts of abdominal vertebrae in the adults.

List of species occurring in the area

Regalecus glesne Ascanius, 1772. Circumglobal in cooler waters, to 8 m.

Regalecus russellii (Cuvier, 1816). Circumglobal in warmer waters, to 8 m.

Reference

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New Index

A*Agrostichthys* 1940**C**

Crestfishes 1935

D*Desmodema* 1937*Desmodema polystictum* 1937**E***Eumecichthys* 1935**L**

LAMPRIDAE 1929

LAMPRIFORMES 1929

LOPHOTIDAE 1935

Lampriforms 1937

Lampris immaculatus 1930*Lampris guttatus* 1929-1930

LOPHOTIDAE 1934, 1940

Lophotids 1935

Lophotus 1935, 1940-1941*Lophotus lacepede* 1935**O**

Oarfishes 1939

Opahs 1929

R

RADIICEPHALIDAE 1933

REGALECIDAE 1939

RADIICEPHALIDAE 1931, 1935-1936

Radiicephalus elongatus 1933

REGALECIDAE 1938

Regalecids 1939

Regalecus 1940-1941*Regalecus glesne* 1939-1940*Regalecus russellii* 1939-1940

Ribbonfishes 1937

S

STYLEPHORIDAE 1931

Scalloped ribbonfish 1937

Stylephorus chordatus 1931**T**

TRACHIPTERIDAE 1937

Tapertails 1933

TRACHIPTERIDAE 1934, 1940

Trachipterids 1937

Trachipterus 1937, 1940-1941*Trachipterus arcticus* 1937*Trachipterus trachypterus* 1937*Trachipterus trachyurus* 1937

Tube-eyed tapertails 1931

Z*Zu* 1937*Zu cristatus* 1937**A***arcticus, Trachipterus* 1937**C***chordatus, Stylephorus* 1931*cristatus, Zu* 1937**E***elongatus, Radiicephalus* 1933**G***glesne, Regalecus* 1939-1940*guttatus, Lampris* 1929-1930**I***immaculatus, Lampris* 1930**L***lacepede, Lophotus* 1935**P***polystictum, Desmodema* 1937**R***russellii, Regalecus* 1939-1940**T***trachypterus, Trachipterus* 1937*trachyurus, Trachipterus* 1937

Order POLYMIXIIFORMES

POLYMIXIIDAE

Beardfishes

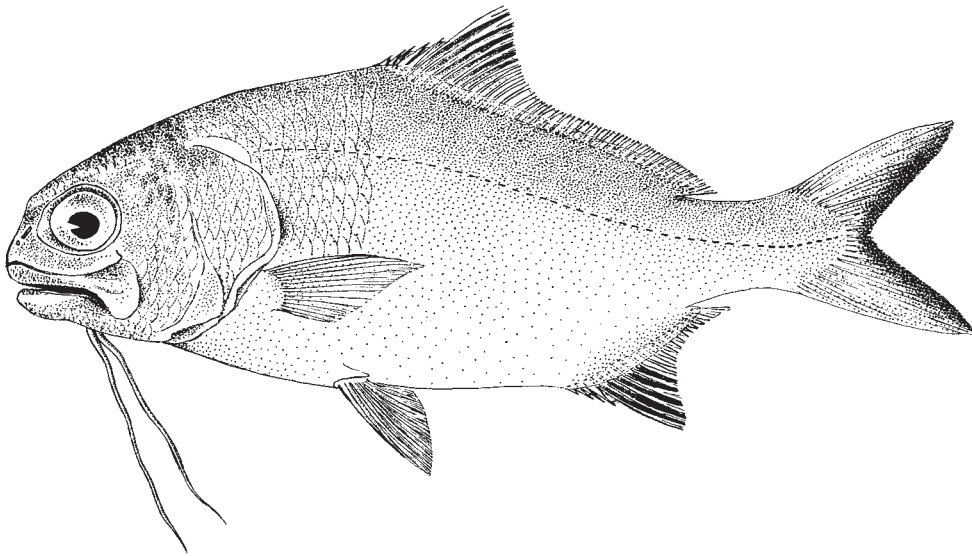
by J.A. Moore, Florida Atlantic University, Jupiter, FL, USA

A single species occurring in the area.

Polymixia nobilis Lowe, 1836

Frequent synonyms / misidentifications: None / None.

FAO names: En – Stout beardfish; Fr – Poisson chèvre robuste; Sp – Chivato de fondo.



Diagnostic characters: Small to moderate-sized (to about 40 cm total length) acanthomorph (spiny-finned) fishes. Body oblong and laterally compressed. Head moderate-sized; no deep sensory canals separated by bony ridges, scales extending across nape to area over eye; no spines on preopercle or opercle; **pair of long chin barbels originating from hyoid, behind symphysis of lower jaw**. Eye large, equal to or larger than snout length. **Snout rounded and prominent**. Mouth extending to posterior margin of eye; **two supramaxillae**. **Teeth villiform, in bands on jaws, vomer, palatines, ectopterygoids, and endopterygoids (roof of mouth)**. Seven branchiostegal rays, first 3 minuscule and support the hyoid barbel, **only last 4 externally visible**. Single dorsal fin long, with 4 or 5 spines and 34 to 38 soft rays; anal fin with 3 or 4 spines and 15 to 18 rays; caudal fin forked; pectoral fin with 16 to 18 rays; pelvic fin with 1 spine and 6 rays. Scales spinoid and moderately large; lateral line with 32 to 37 pored scales; scales completely cover cheek and opercle. **Colour:** body and head brownish grey to violet-brown along dorsal surface, lower sides silvery; dark distal tips to anterior rays in dorsal fin, dark posterior tips of caudal fin.

Similar families occurring in the area

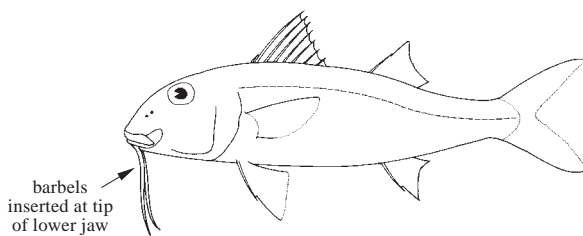
Mullidae (goatfishes): superficially similar due to presence of long chin barbels, but these are located at symphysis of lower jaw; 2 separate dorsal fins; smaller eye and longer snout; most species brightly coloured shallow reef inhabitants.

Size: Maximum size to 400 mm standard length; common to 250 mm.

Habitat, biology, and fisheries: Occurring in tropical and subtropical waters over the outer continental shelf and slope, also found around islands, mostly between depths of 70 to 800 m. Feeds on benthic invertebrates and small fish. Observed swimming with barbels in constant contact with bottom sediments. Taken as bycatch in trawl and hook-and-line fisheries, but never in large quantities. Of relatively minor importance to fisheries in the area, but considered good foodfishes.

Remarks: One genus with 10 species. Most recent review is by Kotlyar (1992).

Distribution: Known from isolated records off Madeira, Canary Islands, Azores, Great Meteor Seamount, Cape Verde Islands, and St Helena Island, but probably more widespread in the area.



Mullidae



Reference

Kotlyar, A.N. 1992. A new species of the genus *Polymixia* (Polymixiidae, Beryciformes) from submarine Kyushu-Palau Ridge and notes on other members of the genus. *Voprosy Ikhtiologii*, 32(6):11–26. [in Russian, English translation in *Journal of Ichthyology*, 1993, 33(3): 30–49]

New Index

B

Beardfishes 1942

C

Chivato de fondo 1942

G

Goatfishes 1943

M

MULLIDAE 1943

P

POLYMIXIIDAE 1942

POLYMIXIIFORMES 1942

Poisson chèvre robuste 1942

Polymixia nobilis 1942**S**

Stout beardfish 1942

N*nobilis, Polymixia* 1942

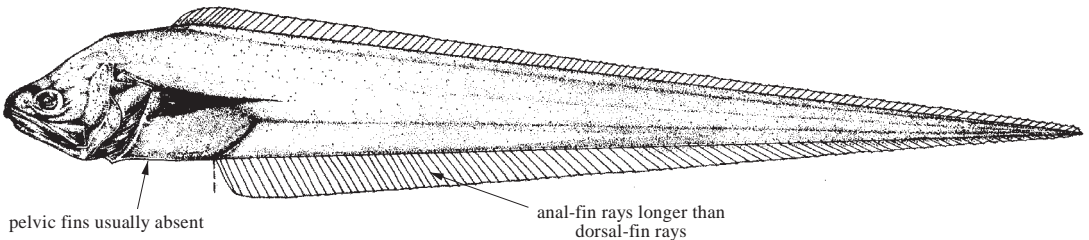
Order OPHIDIIFORMES

CARAPIDAE

Pearlfishes

by J.G. Nielsen, Natural History Museum of Denmark, Zoological Museum, Universitetsparken 15, 2100 Copenhagen, Denmark

Diagnostic characters: Body elongate, compressed to rounded and eel-like. **Scales absent.** **Supramaxilla absent.** **Anal-fin origin advanced, under vertebrae 1 to 13; anal-fin rays longer than opposing dorsal-fin rays; pelvic-fins absent** except for species of *Pyramodon*; caudal-fin absent in most species. Scapula and coracoid fused; upper distal radial of pectoral fins enlarged; hyomandibula with large foramen. **Larvae with highly modified first dorsal-fin ray.** **Colour:** body translucent; often internal pigmentation along posterior part of vertebral column and external pigmentation variable from speckled to solid.

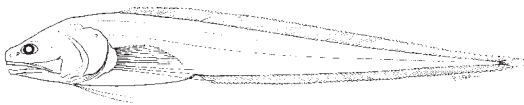


Habitat, biology and fisheries: Distributed in most tropical and temperate seas. Some species have free-living adults but most are commensals in the body cavity of invertebrates, primarily sea cucumbers but also of various molluscs. The pelagic larvae, vexillifers, are characterized by a much prolonged first dorsal-fin ray. The pelagic larvae and the eggs deposited in a floating mass enable long distance dispersal. No interest for fisheries.

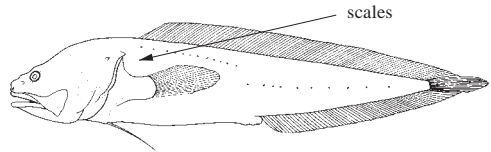
Similar families occurring in the area

Ophidiidae: scales usually present; supramaxilla present; dorsal-fin rays longer or equal in length to opposing anal-fin rays; tip of pectoral-fin rarely reaches anal-fin origin; caudal-fin present, joined to dorsal- and anal-fin.

Bythitidae: scales usually present; supramaxilla present; dorsal-fin rays longer or equal in length to opposing anal-fin rays; caudal-fin present, joined or not to dorsal- and anal-fin; males with distinct intromittent organ; dorsal-fin origin well anterior to anal-fin.

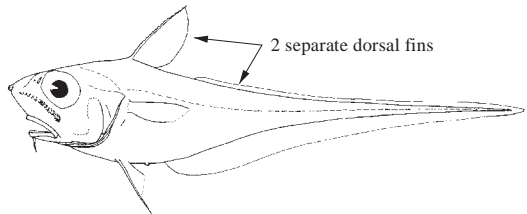


Ophidiidae



Bythitidae

Macrouridae and Steindachneriidae: 2 dorsal fins; pelvic-fin with 5 or more rays, except for *Macrouroides* with none.



Macrouridae

Key to the species of Carapidae occurring in the area

- 1a. Dorsal-fin origin anterior to anal-fin origin ***Snyderidia canina***
 1b. Dorsal-fin origin posterior to anal-fin origin → 2
- 2a. No enlarged fangs; cardiform teeth present ***Carapus acus***
 2b. Upper and lower jaw with 1 to several large fangs; no cardiform teeth. → 3
- 3a. Three to 6 anal-fin rays anterior to dorsal-fin origin ***Echiodon dentatus***
 3b. Ten or 11 anal-fin rays anterior to dorsal-fin origin ***Echiodon dawsoni***

List of species occurring in the area

Carapus acus (Brünnich, 1768). To about 25 cm. Eastern Atlantic Ocean and Mediterranean.

Echiodon dawsoni Williams and Shipp, 1982. To 11 cm. Tropical Atlantic Ocean.

Echiodon dentatus (Cuvier, 1829). To 17 cm. Eastern Atlantic Ocean and Mediterranean.

Snyderidia canina Gilbert, 1905. To 27 cm. Atlantic and Indo-West Pacific Oceans.

References

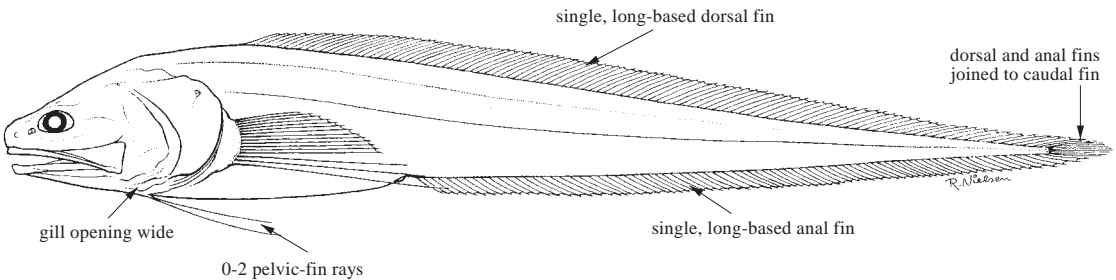
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- Nielsen, J.G., Cohen, D.M., Markle, D.F. & Robins, C.R.** 1999. FAO Species Catalogue. Vol. 18. Ophidiiform fishes of the world (order Ophidiiformes). An annotated and illustrated catalogue of pearlfishes, cusk-eels, brotulas and other ophidiiform fishes known to date. *FAO Fisheries Synopsis*, (125)18: 178 pp.

OPHIDIIDAE

Cusk-eels

by J.G. Nielsen, Natural History Museum of Denmark, Zoological Museum, Universitetsparken 15, 2100 Copenhagen, Denmark

Diagnostic characters: Moderately elongate ophidiiform fishes (size from about 10 to 200 cm). **Anterior nostril placed midway between upper lip and posterior nostril.** Supramaxilla present. Teeth usually small, densely distributed and blunt-tipped. **Very seldom less than 7 long gill rakers on anterior gill arch.** **Basibranchial tooth patches present.** **Dorsal and anal fins long, joined to caudal fin; dorsal-fin rays normally longer than opposing anal-fin rays; pelvic-fin rays 0 to 2.** **Scales present.** A well-developed spine on opercle usually present. **Anus placed posterior to tip of pectoral fin except in species with prolonged pectoral fins.** **Colour:** generally light brown with darker abdomen; some with horizontal or vertical bars and eye spots on dorsal and anal fin.

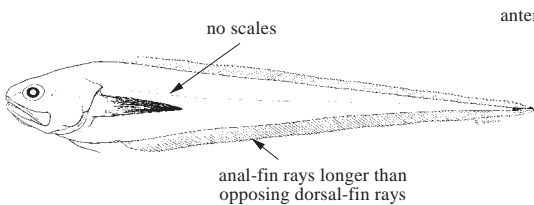


Habitat, biology and fisheries: With the exception of a few species which occur pelagically at great depths, cusk-eels are bottom-living from shallow waters to a depth of 8 370 m, the depth record for fishes; oviparous with pelagic larvae; except for *Brotulotaenia* and *Lamprogrammus* (Fahay and Nielsen 2003) no specialized larval stage; a few species of commercial importance.

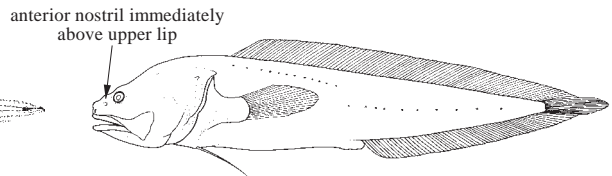
Similar families occurring in the area

Carapidae: scales absent; supramaxilla 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; males with intromittent organ.

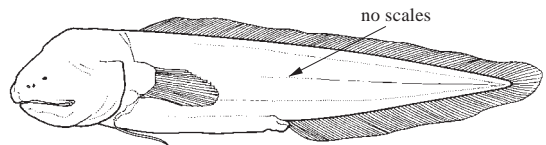


Carapidae



Bythitidae

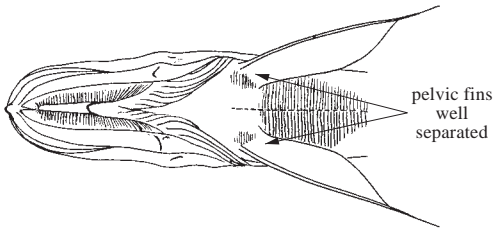
Aphyonidae: no scales; skin loose and gelatinous; eyes small and indistinct.



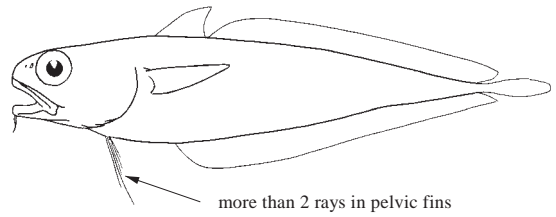
Aphyonidae

Macrouridae: pelvic fins well separated from each other, with more than 2 rays.

Gadidae, Moridae and Phycidae: pelvic fins well separated from each other; dorsal and anal fins not joined to caudal fin.



Macrouridae



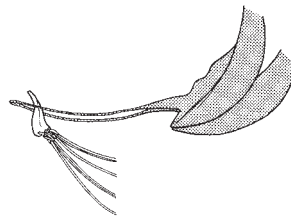
Moridae

Key to subfamilies of Ophidiidae occurring in the area

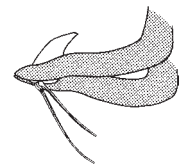
- 1a. Barbels present on snout and chin **Brotulinae**
- 1b. No barbels on snout and chin → 2

- 2a. Scales in form of small non-imbricate prickles **Brotulotaeniinae**
- 2b. Scales cycloid → 3

- 3a. Main body of ventral arm of cleithrum meeting its mate at about level of preopercle, but a slender, elongate filament of bone extends anteriorly to pelvic-fins (Fig. 1a) which are inserted beneath eye; median basibranchial tooth patches present or absent **Ophidiinae**



a) **Ophidiinae**



b) **Neobythitinae**

Fig. 1 ventral arm of cleithrum

- 3b. Ventral arm of cleithrum meeting its mate and terminating at about level of preopercle or farther anteriorly, but the anteriorly directed bony filaments are absent (Fig.1b); pelvic-fin insertion variable in position but most often well posterior to eye, fin absent in a few species; 1 or more basibranchial tooth patches (except absent in *Apagesoma* spp. and in *Barathrites iris*) **Neobythitinae**

Key to species of Brotulotaeniinae occurring in the area

- 1a. Head length 3.2 to 4.5 in standard length; dorsal-fin rays 79 to 91; anal-fin rays 58 to 72 ***Brotulotaenia brevicauda***
- 1b. Head length 5.3 to 9.9 in standard length; dorsal-fin rays 113 to 134; anal-fin rays 91 to 108 → 2
- 2a. Head length 5.3 to 8.5 in standard length; dorsal-fin rays 119 to 134; anal-fin rays 98 to 108 ***Brotulotaenia crassa***
- 2b. Head length 9.2 to 9.9 in standard length; dorsal-fin rays 113 to 115; anal-fin rays 91 to 94 ***Brotulotaenia nigra***

Key to species of Ophidiinae occurring in the area

- 1a. Two pelvic-fin rays equal in length or nearly so; top of head with large scales
 *Parophidion vassali*
- 1b. Two pelvic-fin rays unequal in length; head entirely naked → 2
- 2a. Anterior gill arch with 4 long rakers; 24 to 26 pectoral-fin rays *Ophidion lozanoi*
- 2b. Anterior gill arch with 5 or 6 long rakers; 21 or 22 pectoral-fin rays *Ophidion barbatum*

Key to species of Neobythitinae occurring in the area

Note: A revision is needed for separating the four *Porogadus* spp.

- 1a. Pelvic fins placed below or slightly behind eyes; snout with prominent bifid spine
 *Acanthonus armatus*
- 1b. Pelvic fins placed below preopercle or absent; snout without spine → 2
- 2a. Pelvic fins with 2 short, fleshy rays in each. *Thalassobathia pelagica*
- 2b. Pelvic fins absent or with 1 or 2 filamentous rays in each → 3
- 3a. Pelvic fins absent or rudimentary, rays shorter than orbit (*Lamprogrammus*) → 4
- 3b. Pelvic fins present, each with 1 or 2 well-developed rays → 6
- 4a. Maxilla free, not sheathed posterodorsally. *Lamprogrammus brunswigi*
- 4b. Maxilla sheathed posterodorsally → 5
- 5a. Body elongate, depth at anus 10.0 to 11.7 in standard length . . *Lamprogrammus shcherbachevi*
- 5b. Body shorter, depth at anus 5.2 to 8.0 in standard length *Lamprogrammus exutus*
- 6a. Head much less than one half preanal length → 7
- 6b. Head about one half preanal length → 8
- 7a. Pectoral fins as long as head; median basibranchial tooth patches 0 or 1 *Barathrites iris*
- 7b. Pectoral fins half as long as head; median basibranchial tooth patches 2 . . *Spectrunculus grandis*
- 8a. Long rakers on anterior gill arch 4 or fewer *Luciobrotula nolfi*
- 8b. Long rakers on anterior gill arch 5 or more → 9
- 9a. Opercular spine absent or weak → 10
- 9b. Opercular spine strong and narrow, sometimes hidden under skin → 18
- 10a. Pectoral-fin rays 10 or 11 *Abyssobrotula galatheae*
- 10b. Pectoral-fin rays 15 or more → 11
- 11a. Lower pectoral-fin rays free *Bathyonus laticeps*
- 11b. Lower pectoral-fin rays not free → 12
- 12a. Soft watery body; anterior nostril swollen *Apagesoma delosommatus*
- 12b. Body not soft; anterior nostril not swollen → 13

- 13a. Head not inflated, often with spines; body long and slender with 3 lateral lines; 14 to 20 pectoral-fin rays ***Porogadus* spp.**
- 13b. Head inflated, without spines; body rather slender with 1 indistinct lateral line; 21 to 29 pectoral-fin rays (***Bassozetus***) → 14

- 14a. No basibranchial tooth patches; vomer usually edentate ***Bassozetus levistomatus***
- 14b. One well-developed basibranchial tooth patch; vomer with teeth → 15

- 15a. Scales small, more than 25 in a transverse row anterior dorsally from anus (Fig. 2a) ***Bassozetus normalis***
- 15b. Scales large, less than 25 in a transverse row anterior dorsally from anus (Fig. 2b) → 16

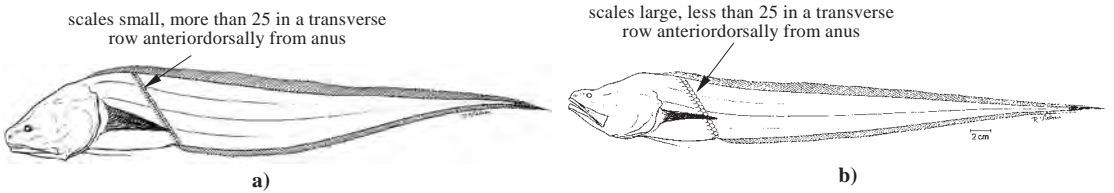


Fig. 2

- 16a. Long rakers on anterior gill arch 11 to 14; preanal 34 to 40% standard length ***Bassozetus compressus***
- 16b. Long rakers on anterior gill arch 15 to 20; preanal 28 to 34% standard length → 17

- 17a. Distance between bases of pelvic fins and anal fin 15.0 to 19.0% standard length; 12 to 14 precaudal vertebrae ***Bassozetus taenia***
- 17b. Distance between bases of pelvic fins and anal fin 23.5% standard length; precaudal vertebrae 16 ***Bassozetus onceroccephalus***

- 18a. Snout long, broad and depressed; 3 lateral lines ***Penopus microphthalmus***
- 18b. Snout not broad and depressed; 1 lateral line → 19

- 19a. Pectoral fins with lower rays free; pelvic fins with 2 rays in each → 20
- 19b. Pectoral fins entire; pelvic fins with 1 or 2 rays in each → 23

- 20a. Eye diameter much less than half snout length; pelvic-fin rays flattened distally (***Holcomycteronus***) → 21
- 20b. Eye diameter equal to or longer than half snout length; pelvic-fin rays filamentous (***Dicrolene***) → 22


- 21a. Pectoral-fin rays 15 or 16; otolith subcircular ***Holcomycteronus profundissimus***
- 21b. Pectoral-fin rays 20; otolith elongate ***Holcomycteronus squamosus***

- 22a. One supraorbital and 3 preopercle spines all strong ***Dicrolene intronigra***
- 22b. No supraorbital and preopercle spines ***Dicrolene pallidus***

- 23a. Opercle with 2 backward-directed spines *Benthocometes robustus*
 23b. Opercle with 1 backward-directed spine → 24

- 22a. Eye diameter longer than snout; distinct lateral line; 2 median basibranchial tooth patches *Selachophidium guentheri*
 22b. Eye diameter equal to or shorter than snout; lateral line not distinct; 1 median basibranchial tooth patch *Monomitopus metriostoma*

List of species occurring in the area

The symbol  is given when species accounts are included.

Subfamily BROTULINAE

 *Brotula barbata* (Bloch and Schneider, 1801).

Subfamily BROTULOTAENIIDAE

Brotulotaenia brevicauda Cohen, 1974. To about 35 cm. Tropical Atlantic and Indian Oceans.

Brotulotaenia crassa Parr, 1934. To about 85 cm. Atlantic and Indian Oceans.

Brotulotaenia nigra Parr, 1933. To about 30 cm. Tropical Atlantic Ocean.

Subfamily OPHIDIINAE

Ophidion barbatum Linnaeus, 1758. To about 25 cm. From England to Senegal and in the Mediterranean.

Ophidion lozanoi Matallanas, 1990. To 14 cm. From Spain to Senegal.

Parophidion vassali (Risso, 1810). To about 25 cm. Western Mediterranean and neighbouring Atlantic Ocean.

Subfamily NEOBYTHITINAE

Abyssobrotula galathea Nielsen, 1977. To 18 cm. Circumtropical.

Acanthonus armatus Günther, 1878. To 38 cm. Circumtropical.

Apagesoma delosommatus (Hureau, Staiger and Nielsen, 1979). To about 60 cm. Tropical Atlantic Ocean.

Barathrites iris Zugmayer, 1911. To about 50 cm. Probably circumtropical.

Bassozetus compressus (Günther, 1878). To 62 cm. Atlantic Ocean and off the Philippines.

Bassozetus levistomatus Machida, 1989. To about 80 cm. Circumtropical.

Bassozetus normalis Gill, 1883. To 28 cm. Atlantic Ocean.

Bassozetus oncercephalus (Vaillant, 1888). To 23 cm. Off Cape Verde Islands.

Bassozetus taenia (Günther, 1887). To about 25 cm. Tropical North Atlantic Ocean.

Bathyonus laticeps (Günther, 1878). To about 20 cm. Tropical northeastern Atlantic Ocean.

Benthocometes robustus (Goode and Bean, 1886). To 12 cm. Tropical Atlantic Ocean and Mediterranean.

Dicrolene introniger Goode and Bean, 1883. To 22 cm. On both sides of tropical Atlantic Ocean.

Dicrolene pallidus Hureau and Nielsen, 1981. To 17 cm. Off Namibia.

Holcomycteronus profundissimus (Roule, 1913). To about 25 cm. Probably circumtropical.

Holcomycteronus squamosus (Roule, 1916). To 27 cm. On both sides of tropical Atlantic Ocean.

- Lamprogrammus brunswigi* (Brauer, 1906). To about 95 cm. Circumtropical.
- Lamprogrammus exutus* Nybelin and Poll, 1958. To 46 cm. Off tropical West Africa.
- Lamprogrammus niger* Alcock, 1891. To 61 cm. Circumtropical.
- Lamprogrammus shcherbachevi* Cohen and Rohr, 1993. To about 200 cm. Probably circumglobal.
- Luciobrotula corethromycter* Cohen, 1964. To about 50 cm. Tropical Atlantic Ocean.
- Luciobrotula nolfi* Cohen, 1981. To about 60 cm. Eastern tropical Atlantic Ocean.
- Monomitopus metriostoma* (Vaillant, 1888). To about 25 cm. From Portugal to Angola.
- Penopus microphthalmus* (Vaillant, 1888). To about 25 cm. Central Atlantic Ocean and off Cape Town.
- Porogadus miles* Goode and Bean, 1885. To about 30 cm. Cosmopolitan.
- Porogadus nudus* Vaillant, 1888. To about 20 cm. Eastern Atlantic Ocean.
- Porogadus subarmatus* Vaillant, 1888. To about 20 cm. Off Cape Verde islands.
- Porogadus abyssalis* Nybelin, 1957. To 21 cm. Central Atlantic Ocean.
- Selachophidium guentheri* Gilchrist, 1903. To about 30 cm. Off southern Africa from Angola to Mozambique.
- Spectrunculus grandis* (Günther, 1877). To about 130 cm. Cosmopolitan.
- Thalassobathia pelagica* Cohen, 1963. Up to 30 cm. Atlantic Ocean and Bering Sea.

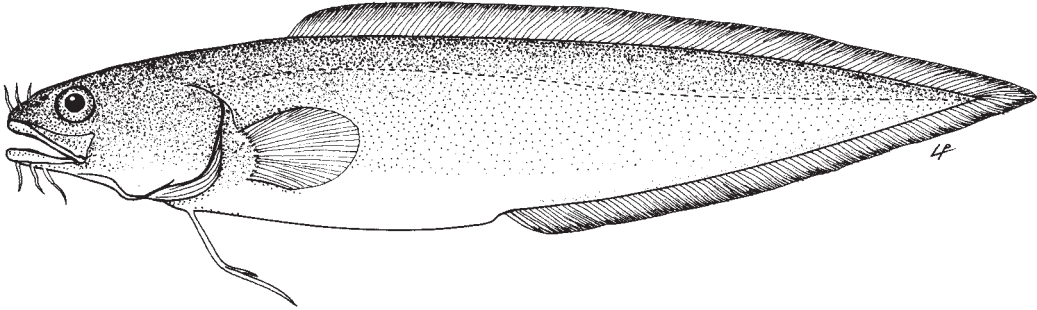
References

- Fahay, M.P. & Nielsen, J.G.** 2003. Ontogenetic evidence supporting a relationship between *Brotulotaenia* and *Lamprogrammus* (Ophidiiformes: Ophidiidae) based on the morphology of exterilium and rubaniform larvae. *Ichthyological Research*, (2003), 50: 209–220.
- Nielsen, J.G., Cohen, D.M., Markle, D.F. & Robins, C.R.** 1999. FAO Species Catalogue. Vol. 18. Ophidiiform fishes of the world (order Ophidiiformes). An annotated and illustrated catalogue of pearlfishes, cusk-eels, brotulas and other ophidiiform fishes known to date. *FAO Fisheries Synopsis*, (125)18: 178 pp.
- Nielsen, J.G., Møller & Jespersen, Å.** 2010. Reassignment of the genus *Thalassobathia* from Bythitidae to Ophidiidae (Teleostei, Ophidiiformes) based on the first reported males. *Cybium* 2010, 34(2): 224–226.

Brotula barbata (Bloch and Schneider, 1801)

Frequent synonyms / misidentifications: None / None.

FAO names: En – Bearded brotula; Fr – Brotula barb e; Sp – Br tula de barbas.



Diagnostic characters: Barbels present on snout (6) and chin (6). Developed rakers on anterior gill arch 4 or fewer; pelvic fins each with 2 rays, inserted at about level of opercle, well behind eye; body completely covered with small, imbricate, cycloid scales. **Colour:** brownish.

Size: Maximum length about 1 m.

Habitat, biology, and fisheries: Adults live on or near the bottom down to 650 m and juveniles common on reefs. Small silvery specimens are taken far out at sea in surface waters.

Distribution: In tropical parts of both the eastern and western Atlantic Ocean.

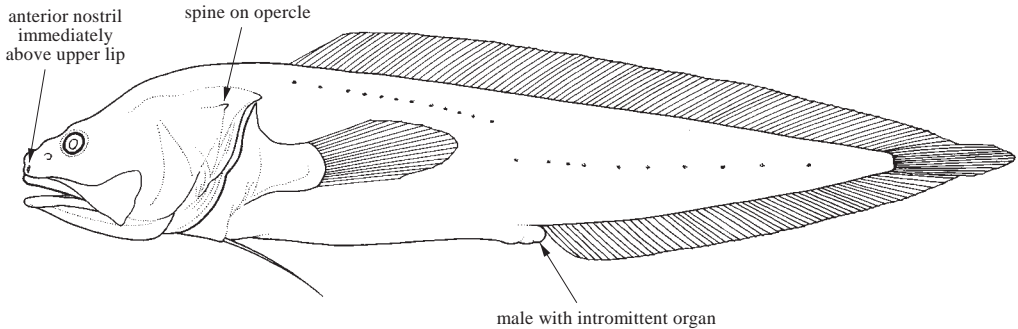


BYTHITIDAE

Viviparous brotulas

by J.G. Nielsen, Natural History Museum of Denmark, Zoological Museum, Universitetsparken 15, 2100 Copenhagen, Denmark

Diagnostic characters: Body of varying shapes (length to 66 cm in the area). Eyes distinct. **Anterior nostril immediately above upper lip** (except for *Dinematichthys*). **Basibranchial tooth patches absent. Seldom more than 7 long gill rakers on anterior gill arch.** Dorsal and anal fins long and joined to or free from caudal fin; dorsal-fin rays normally longer than corresponding anal-fin rays; pelvic-fin rays 0 to 2. **Scales present in all but a few species;** opercle with well-developed spine; **males with intromittent organ.** **Colour:** most often unicoloured brown, occasionally red or yellow without distinct markings.

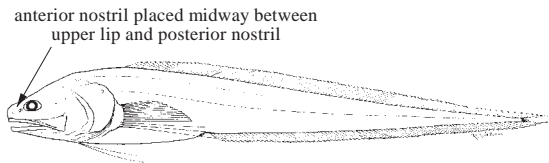


Habitat, biology and fisheries: Occur in freshwater caves and in shallow water marine caves down to about 2 000 m. Viviparous; no importance to fisheries.

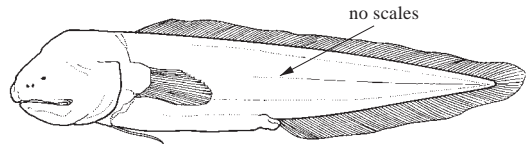
Similar families occurring in the area

Ophidiidae: anterior nostril placed midway between upper lip and posterior nostril; rarely less than 7 long gill rakers on anterior gill arch.

Aphyonidae: no scales; skin loose and gelatinous; eyes small or indistinct.

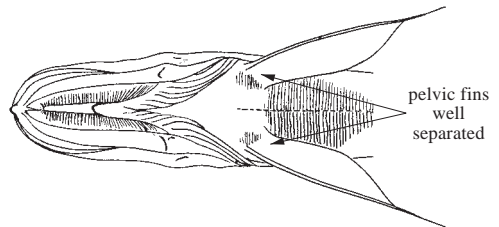


Ophidiidae



Aphyonidae

Gadidae, Macrouridae, Moridae, Phycidae and Steindachneriidae: pelvic fins well separated from each other.



Macrouridae

Key to the species of Bythitidae occurring in the area

- 1a. Pelvic fins absent; preopercle with several sharp, pointed spines at lower angle . . . ***Bellottia apoda***
 1b. Pelvic fins present; no sharp spines on preopercle → 2
- 2a. Palatine teeth present; head depressed → 3
 2b. Palatine teeth absent; head not depressed → 6
- 3a. Jaw teeth granular; depressed snout; adults large, to 66 cm → 4
 3b. Some or all jaw teeth separate and sharp-pointed; less depressed snout; adults small
 (to about 25 cm) → 5
- 4a. Dorsal-fin rays 139, anal-fin rays 100; length of snout 33% head length
 ***Cataetyx chthamalorhynchus***
 4b. Dorsal-fin rays 98 to 107, anal-fin rays 73 to 83; length of snout 24 to 26% head length
 ***Cataetyx laticeps***
- 5a. Dorsal-fin rays 109 to 111, anal-fin rays 79 to 83, pectoral-fin rays 30 to 32 ***Cataetyx alleni***
 5b. Dorsal-fin rays 114 to 121, anal-fin rays 86 to 93, pectoral-fin rays 25 to 28 ***Cataetyx bruuni***
- 6a. Origin of dorsal fin above basis of pectoral fin; 82 to 92 dorsal-fin rays, 23 to 25
 pectoral-fin rays ***Grammonus longhursti***
 6b. Origin of dorsal fin above middle pectoral fin; 68 to 74 dorsal-fin rays, 18 or 19
 pectoral-fin rays ***Grammonus ater***

List of species occurring in the area

Bellottia apoda Giglioli, 1883. To 7 cm. Subtropical eastern North Atlantic Ocean and Mediterranean.

Cataetyx alleni (Byrne, 1906). To about 25 cm. Temperate eastern North Atlantic Ocean and western Mediterranean.

Cataetyx bruuni (Nielsen and Nybelin, 1963). To about 25 cm. Tropical eastern Atlantic Ocean.

Cataetyx chthamalorhynchus Cohen, 1981. To 36 cm. Temperate southeastern Atlantic Ocean.

Cataetyx laticeps Koefoed, 1927. To about 66 cm. Subtropical and southeastern Atlantic Ocean and western Mediterranean.

Grammonus ater (Risso, 1810). To 12 cm. Western Mediterranean.

Grammonus longhursti (Cohen, 1964). To 11 cm. Tropical eastern Atlantic Ocean.

Reference

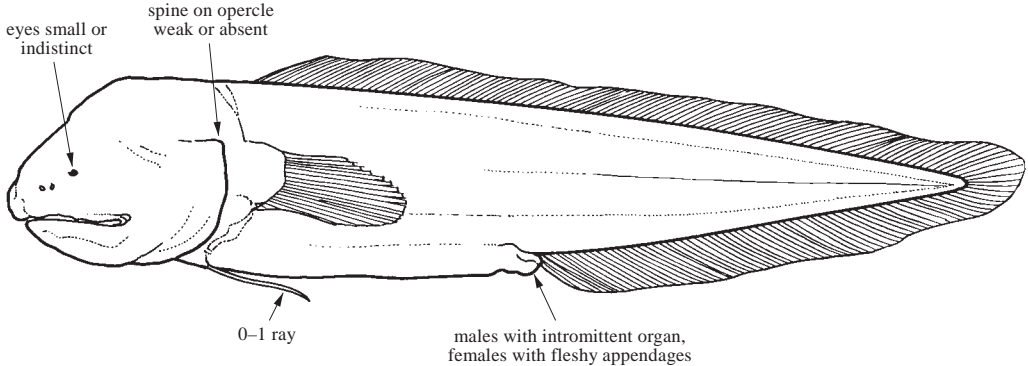
- Nielsen, J.G., Cohen, D.M., Markle, D.F. & Robins, C.R. 1999. FAO Species Catalogue. Vol. 18. Ophidiiform fishes of the world (order Ophidiiformes). An annotated and illustrated catalogue of pearlfishes, cusk-eels, brotulas and other ophidiiform fishes known to date. *FAO Fisheries Synopsis*, (125)18: 178 p.

APHYONIDAE

Aphyonids

by J.G. Nielsen, Natural History Museum of Denmark, Zoological Museum, Universitetsparken 15, 2100 Copenhagen, Denmark

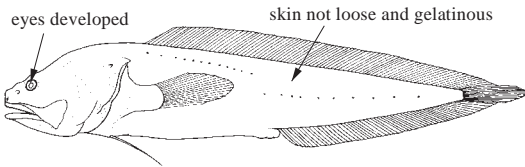
Diagnostic characters: Elongate fishes (size from 5 to 25 cm) with long dorsal- and anal-fin bases joined to caudal fin. Skin loose, transparent, and gelatinous. Scales absent. Eyes poorly developed or not visible. Basibranchial tooth patches absent. Long gill rakers on anterior gill arch present or absent. Swimbladder absent. Viviparous, males and often females with variously developed genital appendages. Pelvic fin with 0 or 1 ray. Colour: brownish to whitish, often with dark abdomen.



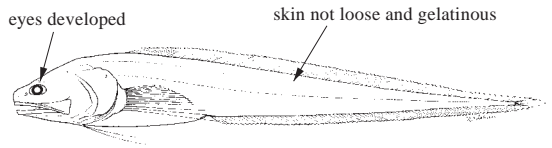
Habitat, biology and fisheries: Rarely caught fishes that occur near the bottom at depths between about 250 and 5 600 m. Found at lower latitudes in all oceans. Viviparous with relatively few, large eggs, and consequently large larvae. Except for larvae of *Barathronus*, aphyonid larvae most probably remain near the bottom. No importance to fisheries.

Similar families occurring in the area

Bythitidae and Ophidiidae: eyes developed, skin not loose and gelatinous, scales present.

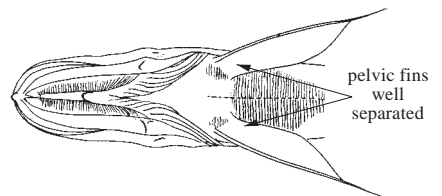


Bythitidae



Ophidiidae

Gadidae, Moridae and Phycidae: pelvic fins well separated from each other, dorsal and anal fins not joined to caudal fin.



Macrouridae

Key to species of Aphyonidae occurring in the area

- 1a. Anterior gill arch with 23 to 35 developed rakers; caudal-fin rays 9 or 10; adults with hour-glass shaped vertebral centra (***Barathronus***) → 2
- 1b. Anterior gill arch with 0 to 14 developed rakers; caudal-fin rays 6 to 8; adults with rectangular shaped vertebral centra in lateral view → 3
- 2a. Vomer with 11 and dentaries with 8 to 10 fangs on each ***Barathronus multidentis***
- 2b. Vomer with 1 or 2 and dentaries with 3 or 4 fangs on each ***Barathronus parfaiti***
- 3a. Pectoral-fin peduncle much longer than wide (***Sciadonus***) → 4
- 3b. Pectoral-fin peduncle as long as wide → 5
- 4a. Skin transparent, no pigmentation; dorsal-fin rays 88 to 107 ***Sciadonus galathea***
- 4b. Numerous black pigment-spots; dorsal-fin rays 68 to 79 ***Sciadonus jonassoni***
- 5a. Pectoral-fin rays 23 to 27; oblique mouth ends in front of vestigial eye ***Nybelinella erikssoni***
- 5b. Pectoral-fin rays 13 to 19; mouth almost horizontal ending well behind eye (***Aphyonus***) → 6
- 6a. Dorsal-fin rays 93 to 116; predorsal length 28 to 31% standard length ***Aphyonus gelatinosus***
- 6b. Dorsal-fin rays 72 to 86; predorsal length 40 to 44% standard length ***Aphyonus rassi***

List of species of Aphyonidae occurring in the area

Aphyonus gelatinosus Günther, 1878. To about 25 cm. Circumtropical.

Aphyonus rassi Nielsen, 1975. To 6 cm. Tropical Atlantic Ocean.

Barathronus parfaiti (Vaillant, 1888). To about 10 cm. Eastern North Atlantic Ocean.

Barathronus multidentis Nielsen, 1984. To 8 cm. On both sides of subtropical North Atlantic Ocean.

Nybelinella erikssoni (Nybelin, 1957). To about 10 cm. Atlantic and southwestern Indian Oceans.

Sciadonus galathea (Nielsen, 1969). To 9 cm. Atlantic and Pacific Oceans.

Sciadonus jonassoni Nybelin, 1957. To 6 cm. Atlantic Ocean.

References

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New Index

A

- APHYONIDAE** 1955
APHYONIDAE 1946,1953
 Aphyonids 1955

B

- BYTHITIDAE** 1953
Barathronus 1955
 Bearded brotula 1952
Brotula barbata 1952
 Brotula barbé 1952
Brotulotaenia 1946
 Brótula de barbas 1952
BYTHITIDAE 1944,1946,1955

C

- CARAPIDAE** 1944
CARAPIDAE 1946
 Cusk-eels 1946

D

- Dinematichthys* 1953

G

- GADIDAE** 1947,1953,1955

L

- Lamprogrammus* 1946

M

- MACROURIDAE** 1944,1947,1953
Macrouroides 1944
MORIDAE 1947,1953,1955

O

- OPHIDIIDAE** 1946
 OPHIDIIFORMES 1944
OPHIDIIDAE 1944,1953,1955

P

- Pearlfishes 1944
PHYCIDAE 1947,1953,1955
Pyramodon 1944

S

- STEINDACHNERIIDAE** 1944,1953

V

- Viviparous brotulas 1953

B

- barbata, Brotula* 1952

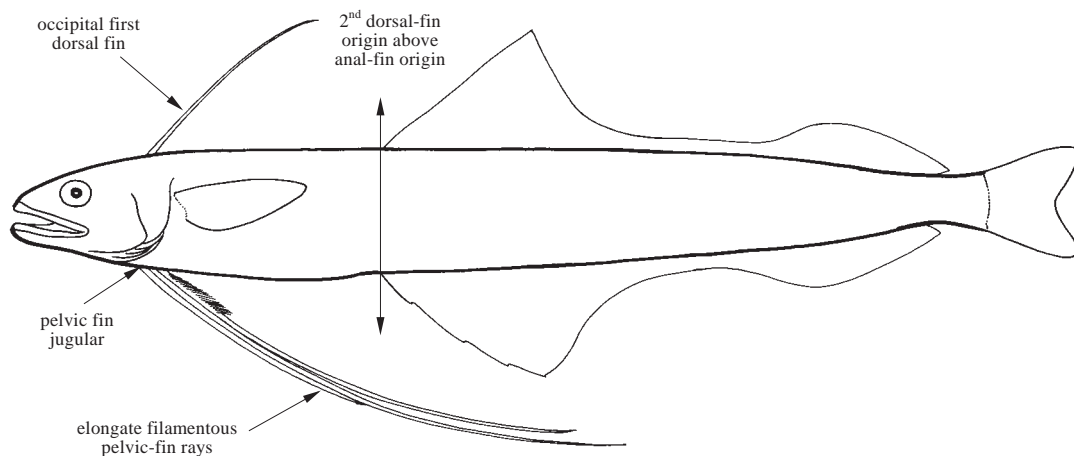
Order GADIFORMES

BREGMACEROTIDAE

Codlets

by A.S. Harold and R.K. Johnson, Grice Marine Laboratory, Department of Biology,
College of Charleston, Charleston, SC, USA

Diagnostic characters: Small body size, reaching a little over 10 cm total length, more commonly 5 to 6 cm. **Body moderately elongate with body depth about 8 to 10 times in standard length, slightly compressed to somewhat tubular.** Head small, about 15 to 20% of standard length. Eye small, between about one-fourth and one-third of head length. Snout short, its length about equal to eye diameter. Mouth terminal, moderate in size, angle of jaw below posterior portion of eye. **Two dorsal fins, the first a single elongate flexible ray near the back of the head (occipital position) extending back to near leading edge of second dorsal fin and fitting into a predorsal groove when depressed; the second dorsal fin long-based, extending from anterior of midbody to near the caudal fin;** rays of middle portion of second dorsal short compared to rays of anterior and posterior portions of second dorsal fin, producing a marked concavity in outline of fin margin. **Anal fin of similar base length and outline to second dorsal fin, with its origin directly below that of second dorsal fin.** Second dorsal and anal fins, each with 40 to 70 soft rays; caudal fin slightly forked; pectoral fin short, with 16 to 23 rays; **pelvic fin in jugular position with 4 short branched and 3 elongate filamentous rays, the longest extending back to about the middle of the anal fin.** Caudal fin distinctly separate from dorsal and anal fins. Adipose fin absent. Scales small, about 60 to 80 in longitudinal series; **lateral line located dorsally, on either side of first dorsal-fin groove.** **Colour:** variable, ranging from pale overall with dark dorsal counter-shading sometimes with a thin dark stripe along the upper flank to dark and minutely speckled with dark pigment over most of the body; silvery pigment occasionally present on side.



Habitat, biology, and fisheries: Epipelagic and mesopelagic in coastal and oceanic areas. Bregmacerotids comprise the only gadiform family limited to tropical and subtropical waters. Widely distributed in tropics and subtropics of Atlantic, Pacific, and Indian Oceans but most concentrated near land masses. Of no commercial importance in eastern central Atlantic. Some inshore species of the family are harvested commercially in the Indo-West Pacific. Some species are locally important as forage for commercially significant fishes. Larvae are often among the 10 most abundant families represented in larval fish surveys in both coastal and offshore tropical and subtropical waters.

Remarks: Two named species and another undescribed species are reported for the area. Previous accounts of the family have reported *Bregmaceros mccllellandi* from the Atlantic but we have established that the species is restricted to the Indo-West Pacific region (Torii *et al.*, 2003). The Atlantic species previously identified as *B. mccllellandi* is new and will be described elsewhere.

Similar families occurring in the area

None. The Bregmacerotidae are distinct in the presence of the elongate single dorsal-fin ray on top of the head, and the long filamentous pelvic-fin rays inserted under the head.

List of species occurring in the area

Bregmaceros atlanticus Goode and Bean, 1886. To 6 cm. Tropical to subtropical Atlantic.

Bregmaceros cantori Millikin and Houde, 1984. To 6 cm. Tropical to subtropical Atlantic.

Bregmaceros neonectabanus Masuda, Ozawa and Tabeta, 1986. To 6 cm. Tropical to subtropical SE Atlantic and Indo-West Pacific.

Bregmaceros n. sp. To 8 cm. Circumglobal, tropical to subtropical.

References

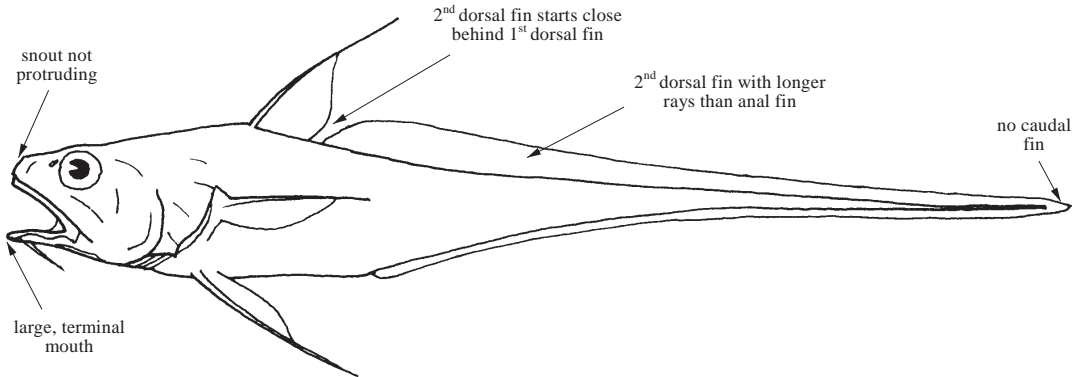
- Masuda, S., Ozawa, T. & Tabeta, O.** 1986. *Bregmaceros neonectabanus*, a new species of the family Bregmacerotidae, Gadiformes. *Japanese Journal of Ichthyology*, 32: 392–399.
- Milliken, D.M. & Houde, E.D.** 1984. A new species of Bregmacerotidae (Pisces), *Bregmaceros cantori*, from the western Atlantic Ocean. *Bulletin of Marine Science*, 35: 11–19.
- Saksena, V.P. & Richards, W.J.** 1986. A new species of gadiform fish, *Bregmaceros houdei*, from the western north Atlantic. *Bulletin of Marine Science*, 38: 285–292.
- Torii, A., Harold, A.S., Ozawa, T. & Iwatsuki, Y.** 2003. Redescription of *Bregmaceros maclellandi* Thompson, 1840 (Gadiformes; Bregmacerotidae). *Ichthyological Research*, 50: 129–139.

BATHYGADIDAE

Bathygadids

by T. Iwamoto, California Academy of Sciences, San Francisco, CA, USA

Diagnostic characters: Medium-sized to about 60 cm, commonly 30 to 40 cm, with elongated, laterally flattened body that tapers to a point. **Snout not protruding. Mouth large, essentially terminal.** Jaw teeth all small, in bands; no teeth on roof of mouth. Chin barbel absent, rudimentary, or long. Seven branchiostegal rays. **Outer (lateral) series of gill rakers on first arch long, slender; first gill arch not restricted dorsally and ventrally by opercular membrane. Two dorsal fins; first dorsal fin short-based with slightly to greatly elongated flexible spinous ray, second dorsal fin long-based, starting close behind first dorsal and extending to tip of tail, confluent with low, long-based anal fin; no caudal fin;** pelvic fins well developed, with 8 to 10 soft rays. Scales deciduous, lacking spinules on exposed field. No light organ. Retia mirabilia and gas glands in swimbladder, 2 or 4 each. **Colour:** variously dark to pale; belly usually dark.



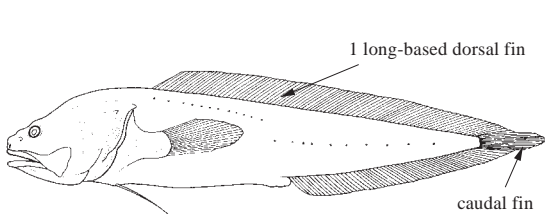
Habitat, biology, and fisheries: Benthopelagic over continental slope in 300 to more than 2 700 m. Almost nothing known of life history. Feeds primarily on swimming crustaceans, fish, and cephalopods. Some species taken in fairly large quantities in bycatch of deep-water bottom trawlers, but none currently utilized.

Remarks: Bathygadids are currently considered as a subfamily (Bathygadinae) of Macrouridae by Eschmeyer's Catalog of Fishes. Family designations made by the author at the time of writing have been retained for the sake of organization.

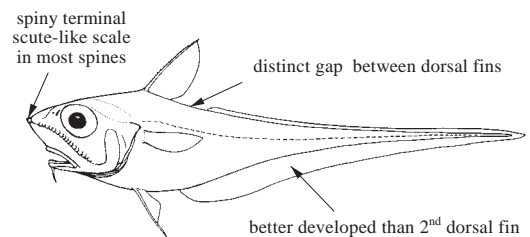
Similar families occurring in the area

Bythitidae: 1 long dorsal fin; a small caudal fin; pelvic-fin rays 0 to 2; anterior nostril immediately above upper lip; males with intromittent organ.

Macrouridae: 2 dorsal fins separated by a distinct gap; anal-fin rays generally much longer than second dorsal-fin rays; outer (lateral) series of gill rakers on first arch short, tubercular; first gill arch restricted dorsally and ventrally by opercular membrane; snout slightly to greatly protruding, tipped in most with a stout, spiny, modified scale; scales in most species covered with spinules.



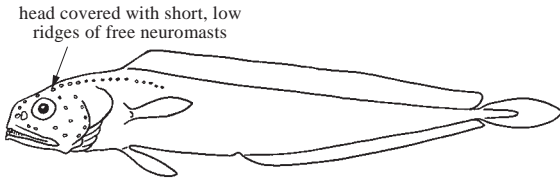
Bythitidae



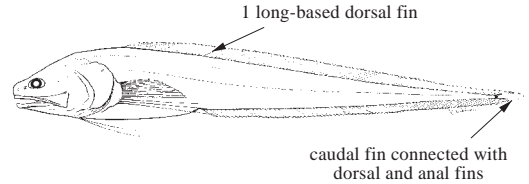
Macrouridae

Melanonidae: dorsal and anal fins separated from caudal fin; head covered with short, low ridges of free neuromasts; head pores large, prominent.

Ophidiidae: 1 long dorsal fin without elevated rays; pelvic-fin rays 0 to 2; dorsal and anal fins joined to a small caudal fin.



Melanonidae



Ophidiidae

Key to the species of Bathygadidae occurring in the area

- 1a. Chin barbel long (Fig. 1a); greatly elongated rays in pectoral and pelvic fins . . . (*Gadomus*) → 2
- 1b. Chin barbel very small or absent (Fig. 1b); no greatly elongated rays in pectoral and pelvic fins (*Bathygadus*) → 4
- 2a. Two elongated rays in pelvic fin; pectoral-fin rays 22 to 25 (Fig. 2) *Gadomus arcuatus*
- 2b. One elongated ray in pelvic fin; pectoral-fin rays 14 to 20 → 3

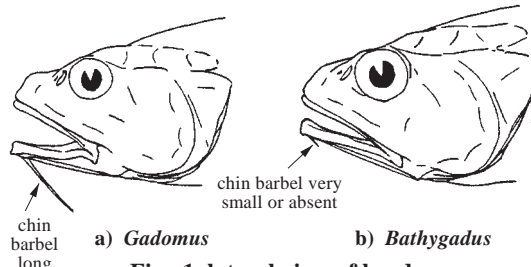


Fig. 1 lateral view of head

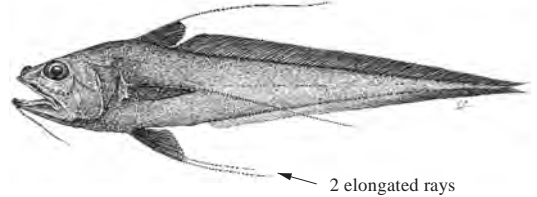


Fig. 2 *Gadomus arcuatus*

- 3a. First dorsal and pelvic fins with a greatly elongated ray, each much longer than head length; gill rakers on lower limb of first arch 27 to 31; pectoral-fin rays 14 to 16 (Fig. 3) *Gadomus longifilis*
- 3b. No greatly elongated ray in first dorsal and pelvic fins; gill rakers on lower limb of first arch 20 to 21; pectoral-fin rays 18 to 20 (Fig. 4) *Gadomus dispar*

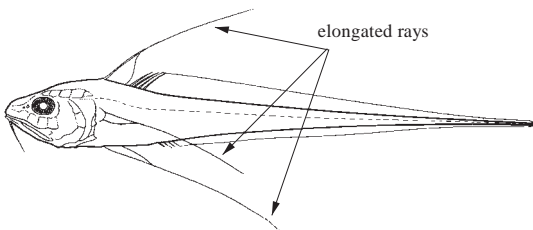


Fig. 3 *Gadomus longifilis*

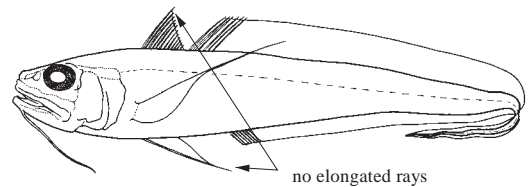


Fig. 4 *Gadomus dispar*

- 4a. A very small barbel usually present on chin; body integument rather thick, scale pockets prominent; body colour light reddish blue; gill filaments pale (Fig. 5) . . . ***Bathygadus macrops***
- 4b. No barbel on chin; body integument thin, scale pockets easily torn and somewhat inconspicuous; body colour creamish; gill filaments dusky or pale → 5

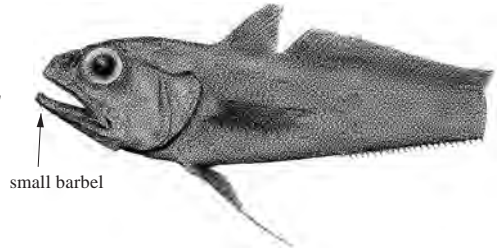


Fig. 5 *Bathygadus macrops*

- 5a. Pelvic-fin rays 8; gill filaments dusky; orbit 4 or fewer times into head length, 0.9 to 1.3 times into interorbital width (Fig. 6) ***Bathygadus melanobranchus***
- 5b. Pelvic-fin rays 9; gill filaments pale; orbit 4 or more times into head length, 1.3 to 2.9 times into interorbital width (Fig. 7) ***Bathygadus favosus***

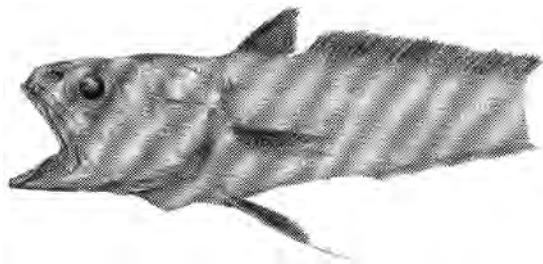


Fig. 6 *Bathygadus melanobranchus*

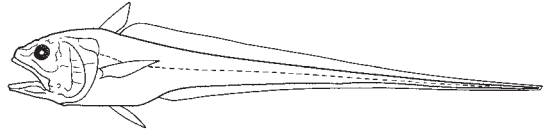





Fig. 7 *Bathygadus favosus*


List of species occurring in the area

The symbol  is given when species accounts are included.

 *Bathygadus favosus* Goode and Bean, 1886. To 45 cm. Widespread in E Atlantic from Morocco and Madeira south to South Africa; also Areas 21, 31 and southwest Indian Ocean; depths 750 to 2 750 m.

 *Bathygadus macrops* Goode and Bean, 1885.

 *Bathygadus melanobranchus* Vaillant, 1888.

 *Gadomus arcuatus* (Goode and Bean, 1886).

Gadomus dispar (Vaillant, 1888). To at least 30 cm. Off Morocco; also known from Caribbean Sea; depths 550 to 1 100 m.

Gadomus longifilis (Goode and Bean, 1885). To 30 cm. Azores, Madeira, Portugal to Gabon; also known from Gulf of Mexico, Caribbean Sea; depths 650 to more than 1 600 m.

References

Cohen, D.M., Inada, T., Iwamoto, T. & Scialabba, N. 1990. FAO species catalogue. Vol. 10. Gadiform fishes of the world (order Gadiformes). An annotated and illustrated catalogue of cods, hakes, grenadiers and other gadiform fishes known to date. *FAO Fisheries Synopsis*, (125) Vol.10: 442 p.

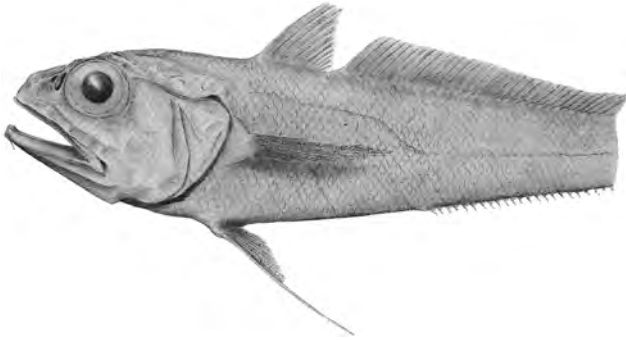
Geistdoerfer, P. 1984. Macrouridae. In P.J.P. Whitehead, M.-L. Bauchot, J.-C. Hureau, J. Nielsen & E. Tortonese, eds. *Fishes of the northeastern Atlantic and the Mediterranean*, volume 2. Paris, UNESCO, pp. 644–676.

Marshall, N.B. 1973. Family Macrouridae. In D.M.Cohen, ed. *Fishes of the western North Atlantic. Memoirs of the Sears Foundation for Marine Research*, (1)Pt.6: 698 p.

***Bathygadus macrops* Goode and Bean, 1885**

En – Bullseye grenadier.

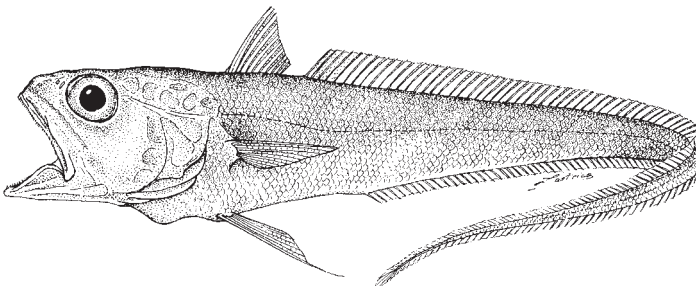
Maximum size to about 50 cm total length. Common in upper slope depths from 240 to 980 m, usually in 300 to 700 m. Of no known importance to fisheries. Gulf of Guinea from Liberia to Angola; also known from Gulf of Mexico and Caribbean Sea.



***Bathygadus melanobranchus* Vaillant, 1888**

En – Vaillant's grenadier.

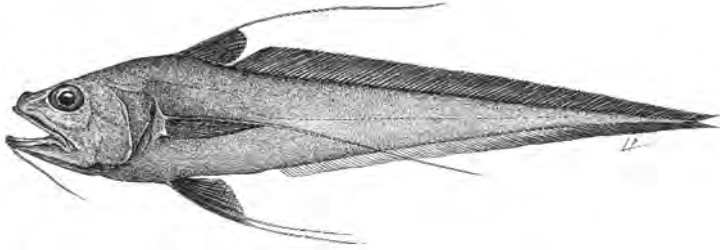
Maximum size to greater than 40 cm total length. One of the more common grenadiers in upper slope depths off northwestern Africa; depth range from about 400 to 1 700 m (usually 800 to 1 400 m). Feeds primarily on pelagic animals including mysids, copepods, and chaetognaths. Of no importance to fisheries. Eastern Atlantic from south of Ireland to Angola, and questionably Namibia and South Africa; also known from Gulf of Mexico, Caribbean, Guyana, and Suriname.



Gadomus arcuatus (Goode and Bean, 1886)

En – Doublethread grenadier.

Maximum size to about 60 cm total length. Depth range from 600 to 1 400 m. Of no importance to fisheries, but often attains considerable size and in places found in relatively large numbers. Eastern Atlantic off northwest African coast from Morocco to Senegal and probably into the Gulf of Guinea to Gabon; also known from tropical western Atlantic.

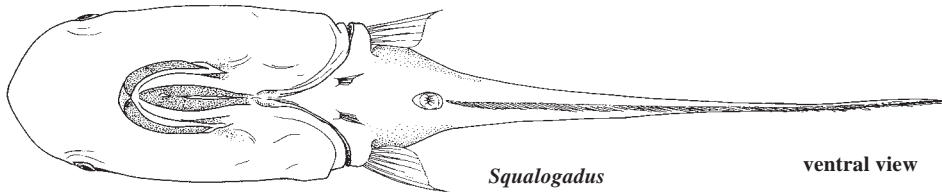
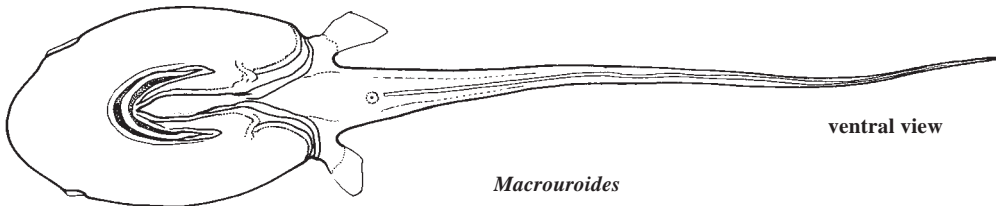
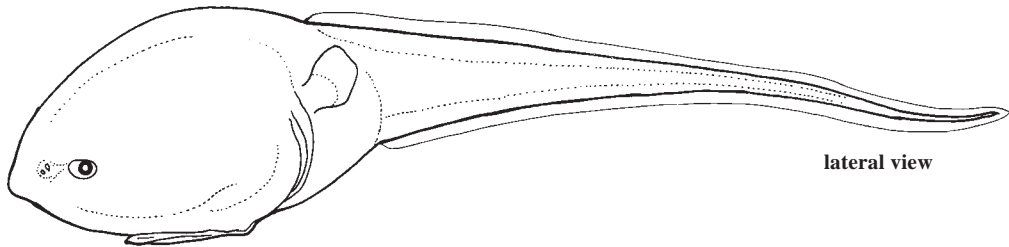


MACROUROIDIDAE

Macrouroids

by T. Iwamoto, California Academy of Sciences, San Francisco, CA, USA

Diagnostic characters: Head enormous, soft, rounded; trunk short, body tapering posteriorly to long, slender tail. Orbit tiny, 10 or more times into head length; mouth underslung; no chin barbel. **Lateral gill rakers on first arch long and slender, greater than 20 on lower limb. One long-based, short-rayed dorsal fin extending to end of tail; anal fin similarly long-based and short-rayed; no caudal fin; pelvic fins widely separated, small, short, weakly developed, with 5 or 6 soft rays (*Squalogadus*) or absent (*Macrouroides*).** Scales covered with small, needle-like spinules. **Colour:** overall dark brown to black; fins black.

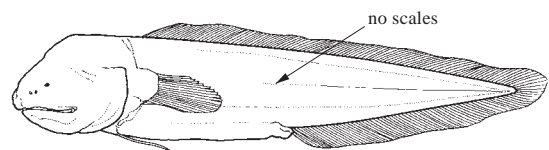


Habitat, biology, and fisheries: Benthopelagic to bathypelagic in middle- to deep-slope waters. Circumglobal in tropical to warm-temperate waters, but so far not known off eastern Pacific or northeastern Atlantic coasts. Little known of biology. No fisheries, although sometimes taken in large quantities in deep water trawl hauls.

Remarks: Macrouroids are currently considered as a subfamily (Macrouroidinae) of Macrouridae by Eschmeyer's Catalog of Fishes. Family designations made by the author at the time of writing have been retained for the sake of organization. Macrouroididae includes 2 species in 2 genera.

Similar families occurring in the area

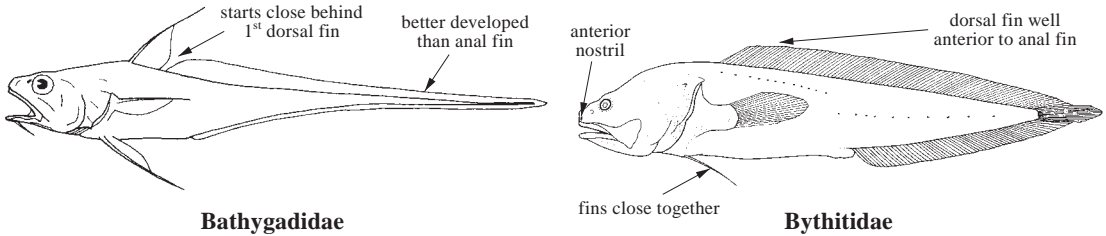
Aphyonidae: eyes small or indistinct; scales absent; pelvic fins placed close together, with 0 or 1 ray.



Aphyonidae

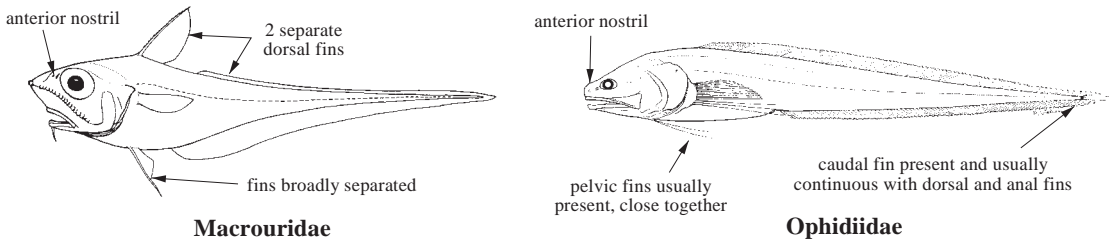
Bathygadidae: head normal, cod-like; scales without spinules; gill rakers long, slender, numerous, greater than 15 on lower limb of first arch; 2 separate dorsal fins, second ray of first dorsal fin a flexible spine and slightly to extremely prolonged; pelvic fins large, with 8 to 10 rays.

Bythitidae: small scales lacking spinules; anterior nostril immediately above upper lip; less than 8 developed gill rakers on first gill arch; pelvic fins placed close together, with 0 to 2 rays; males with intromittent organ; caudal fin developed, often conjoined with dorsal and anal fins.



Macrouridae: scales of variable sizes, usually with spinules; nostrils close to orbit; 2 separate dorsal fins, the first short-based and high, with second ray a flexible spine; anal fin usually with much longer rays than second dorsal fin; gill rakers all tubercular; pelvic fins well separated.

Ophidiidae: scales small, lacking spinules; pelvic fins close together, each with 0 to 2 slender rays; 1 or more tooth patches usually present on floor of mouth (basibranchial teeth); caudal fin developed, often joined with dorsal and anal fins.



Key to the species of Macrouroididae occurring in the area

- 1a. Pelvic fins small with 5 or 6 rays ***Squalogadus modificatus***
- 1b. Pelvic fins absent ***Macrouroides inflaticeps***

List of species occurring in the area

Macrouroides inflaticeps Smith and Radcliffe, 1912. To 46 cm, common to 25 cm. Circumglobal in tropical waters; bathypelagic at depths from about 1 000 m to greater than 3 000 m.

Squalogadus modificatus Gilbert and Hubbs, 1916. To 35 cm, common to 25 cm. Mid-Atlantic Ridge, off Sierra Leone, and off Ascension Island. Broadly distributed in Atlantic, Indian Ocean, and western Pacific in bathypelagic, bathyal and eurybathyal depths to greater than 1 700 m.

References

Cohen, D.M., Inada, T., Iwamoto, T. & Scialabba, N. 1990. FAO species catalogue. Vol. 10. Gadiform fishes of the world (order Gadiformes). An annotated and illustrated catalogue of cods, hakes, grenadiers and other gadiform fishes known to date. *FAO Fisheries Synopsis*, (125) Vol.10: 442 p.

Marshall, N.B. 1973. Family Macrouridae. *In* Fishes of the western North Atlantic, edited by D.M.Cohen. *Memoirs of the Sears Foundation for Marine Research*, (1)Pt.6: 698 p.

Marshall, N.B. & Tåning, Å. 1966. The bathypelagic macrourid fish, *Macrouroides inflaticeps* Smith and Radcliffe. *Dana Report*, 69: 1–5, pl. 1.

TRACHYRINCIDAE

Trachyrincids

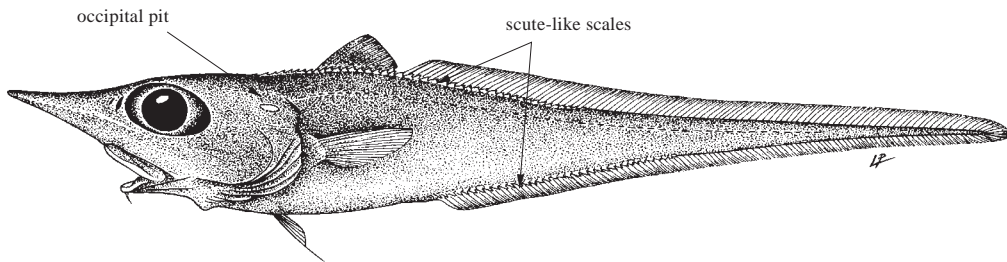
by T. Iwamoto, California Academy of Sciences, San Francisco, CA, USA

A single species occurring in the area.

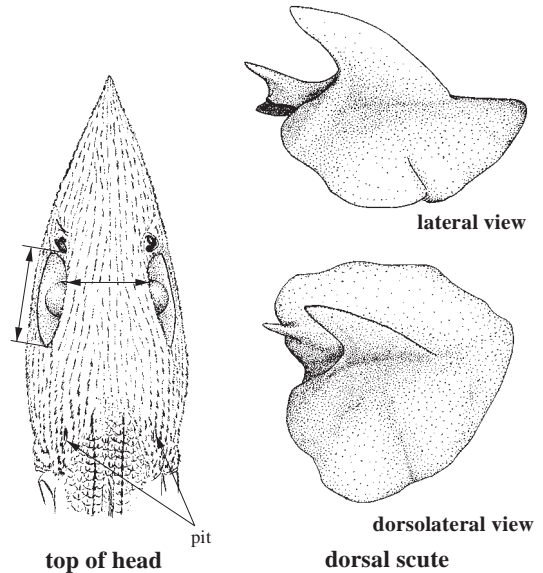
Trachyrincus scabrus (Rafinesque, 1810)

Frequent synonyms / misidentifications: *Trachyrincus anonyne* Giorna, 1809; *Lepidoleprus trachyrincus* Risso, 1810 / *Trachyrincus longirostris* (Günther, 1878).

FAO names: En – Roughsnout grenadier.



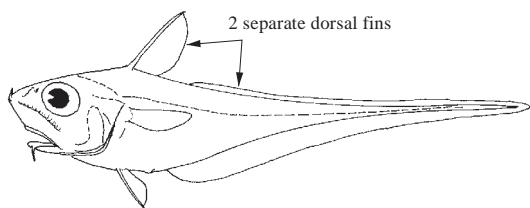
Diagnostic characters: Body elongate, tapering posteriorly to long, slender tail. Head broad, somewhat depressed. Orbit relatively large, much greater than interorbital width, more than 1.7 times into snout length. Snout long, pointed, scaly. Mouth underslung. Teeth uniformly small, in broad band in premaxilla, moderately wide band in dentary. Small chin barbel present. **Occipital pit present. Lateral gill rakers on first arch much longer than wide, slender and pointed at angle of gill arch, becoming much shorter towards either end of arch.** Two dorsal fins, first short-based and elevated, the second long-based, beginning close behind first and much better developed than long-based anal fin; a tiny caudal fin conjoined with dorsal and anal fins; pelvic fin small, with 6 or (usually) 7 rays. Scales covered with stout, coarse spinules; **large, heavy scutes armed with a stout keel-like spine aligned along bases of dorsal and anal fins; the scute keel usually smoothly blade-like, without multicuspoid tips.** **Colour:** overall greyish brown.



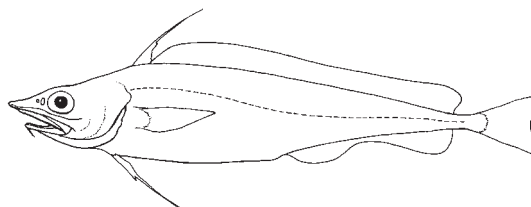
Similar families occurring in the area

Macrouridae: 2 dorsal fins separated by a distinct gap, the first dorsal fin short-based and high, with second ray a flexible spine; anal fin usually with much longer rays than second dorsal fin; gill rakers all tubercular. No occipital pit.

Moridae: a small but distinct caudal fin, separated from dorsal and anal fins by a narrow caudal peduncle; anal fin well developed, about as high as second dorsal fin. No enlarged scales, none with spinules. No occipital pit.



Macrouridae



Moridae

Size: To more than 55 cm.

Habitat, biology, and fisheries: Benthopelagic in midslope waters; depth range about 300 to 1 700 m. Feeds on benthic and pelagic organisms; off northwest Africa crustaceans, polychaetes, fish, and squid dominate diet, with polychaetes and gastropods a minor component of diet. No known fishery, but often caught in large quantities by deepwater trawlers. In New Zealand waters, one species of *Trachyrincus* highly esteemed as food.

Distribution: Mediterranean and eastern Atlantic, from Irish Slope to Namibia.

Remarks: Trachyrincids are currently considered as a subfamily (Trachyrincinae) of Macrouridae by Eschmeyer's Catalog of Fishes. Family designations made by the author at the time of writing have been retained for the sake of organization. *Trachyrincus longirostris* (Günther, 1878), a common species of Australia and New Zealand, has been recorded (possibly erroneously) from southern Africa. It has not been adequately distinguished from *T. scabrus*.



References

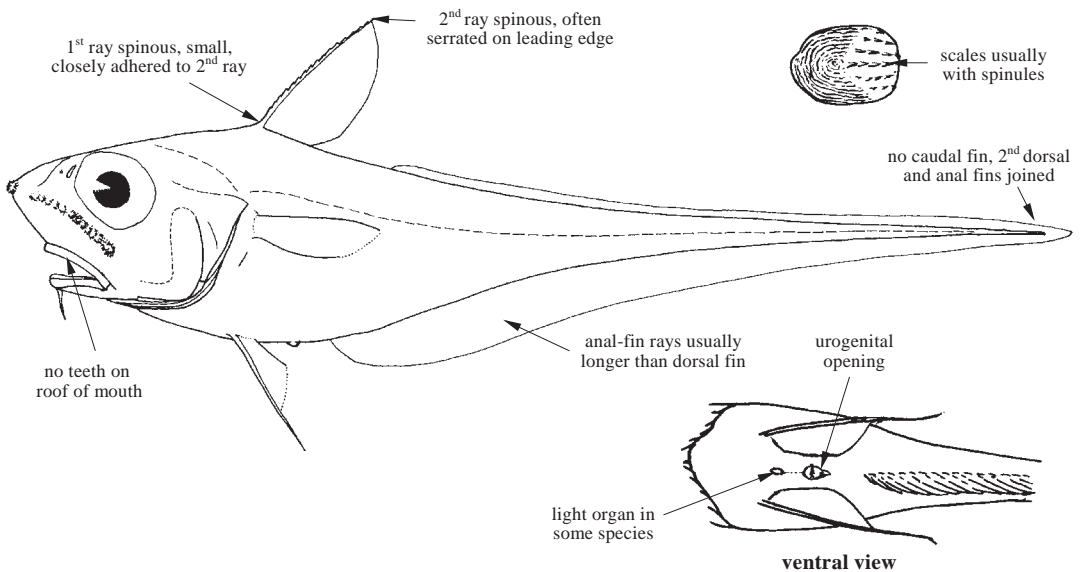
- Cohen, D.M., Inada, T., Iwamoto, T. & Scialabba, N.** 1990. FAO species catalogue. Vol. 10. Gadiform fishes of the world (order Gadiformes). An annotated and illustrated catalogue of cods, hakes, grenadiers and other gadiform fishes known to date. *FAO Fisheries Synopsis*, (125)Vol.10: 442 p.
- Geistdoerfer, P.** 1984. Macrouridae. In P.J.P. Whitehead, M.-L. Bauchot, J.-C. Hureau, J. Nielsen & E. Tortonese, eds. *Fishes of the northeastern Atlantic and the Mediterranean*. Paris, UNESCO, pp. 644–676.
- Merrett, N.R. & Marshall, N.B.** 1981. Observations on the ecology of deep-sea bottom-living fishes collected off northwest Africa (08°–27°N). *Progress in Oceanography*, 9: 185–244.

MACROURIDAE

Grenadiers (Rattails)

by T. Iwamoto, California Academy of Sciences, San Francisco, CA, USA

Diagnostic characters: Small to medium-sized (to about 120 cm in area, commonly between 20 and 60 cm) with laterally compressed body and long, strap-like tail tapering to a slender point. Eye large, 20 to 40% or more of head length; snout in most species prominent, protruding; mouth small to moderately large, jaws subterminal to inferior. Chin barbel present in most species. Jaw teeth well developed, of variable size and arrangement; **no basibranchial, vomerine, or palatine teeth**. Branchiostegal rays 6 or 7 (8 in some individuals of one species). **Gill rakers tubercular; outer gill slit greatly restricted by opercular membrane** connecting to upper and lower arms of first gill arch. **Two dorsal fins, the first short-based and high, with second ray spinous; second dorsal fin long-based, confluent with anal fin at end of tail; anal fin usually with much longer rays than second dorsal fin; no caudal fin;** pelvic fins in most species situated below pectoral-fin origin, 7 to 14 rays in species from the eastern central Atlantic area. Exposed field of scales in almost all species covered with spinules; many with modified, thick, spiny scales at tip of snout and over ridges of head. **Colour:** variably brown, black, grey, bluish, often silvery along sides of head and body.

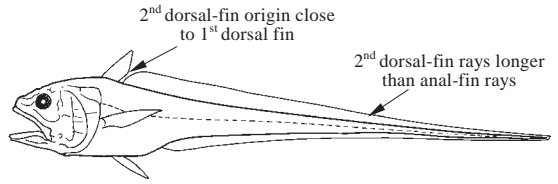


Habitat, biology, and fisheries: Benthopelagic fishes on continental slope and rise, in about 250 to more than 4 000 m (a few species pelagic). Food predominantly bottom invertebrates, free-swimming crustaceans, fish and cephalopods. Spawning probably prolonged in most species, eggs often of multiple sizes in ovaries; eggs and larvae pelagic, young develop rapidly and descend to bottom. Little known of biology of species from area. A few species in cold-temperate waters attain large size and form important commercial fisheries; many species taken as bycatch of deepwater trawlers and rendered into fishmeal. No catches are reported in FAO statistics.

Remarks: Family often treated as including 4 subfamilies (Macrourinae, Macrouroidinae, Bathygadinae and Trachyrincinae), which are here treated as distinct families.

Similar families occurring in the area

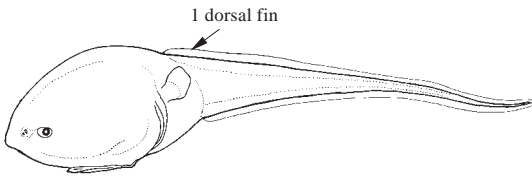
Bathygadidae: no protruding snout; mouth large, essentially terminal; 2 dorsal fins, without a distinct gap between; rays of second dorsal fin much higher than opposites of anal fin; upper and lower arms of first gill arch not broadly connected to operculum; chin barbel present or absent; outer gill rakers slender, lath-like.



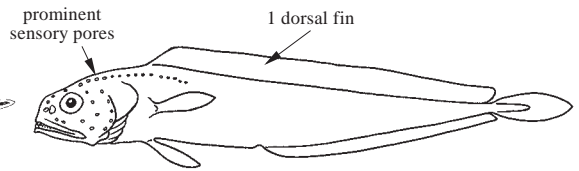
Bathygadidae

Macrouroididae: 1 long-based, short-rayed dorsal fin; pelvic fin small with 5 or 6 rays, or absent; mucous chambers of head enormously developed, giving inflated, rounded shape to head; upper and lower arms of first gill arch not broadly connected to operculum; chin barbel absent; outer gill rakers slender, lath-like.

Melanonidae: 1 long-based dorsal fin (anterior section sometimes appearing as separate fin) and anal fin, each separated from caudal fin; prominent sensory pores and ridge-like rows of free neuromasts on head; teeth on vomer and palatines.



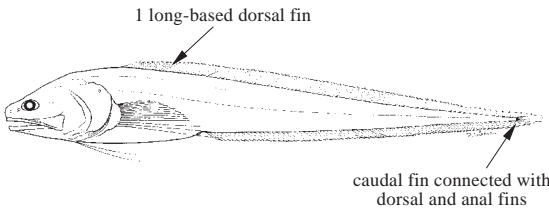
Macrouroididae



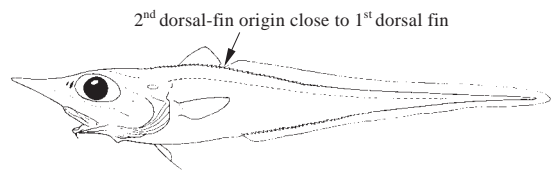
Melanonidae

Ophidiidae: 1 long-based dorsal fin; caudal fin connected with dorsal and anal fins; bases of pelvic fins close together, without a broad scaled space between.

Trachyrincidae: 2 dorsal fins, without a distinct gap between; rays of second dorsal higher than opposites of anal fin; occipital pit present; a row of heavy spiny scutes along dorsal and anal fins; upper and lower arms of first gill arch not broadly connected to operculum; chin barbel present; gill rakers slender, lath-like.



Ophidiidae



Trachyrincidae

Key to species of Macrouridae occurring in the area (species marked with an asterisk not currently recorded from area but may be present)

- 1a. Long spinous ray of first dorsal fin smooth (Fig. 1a) → **2**
- 1b. Long spinous ray of first dorsal fin serrated along leading edge (Fig.1b) (weak or much reduced serrations in some) → **13**

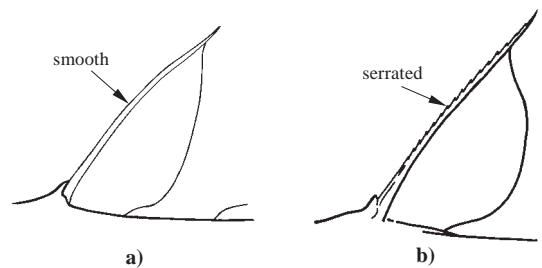
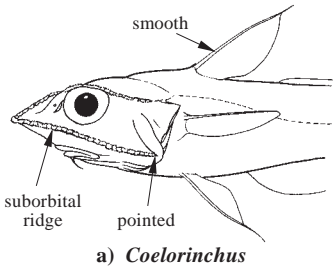
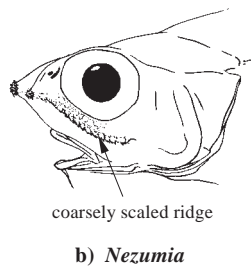


Fig. 1 first dorsal fin

- 2a. Suborbital ridge formed by stout, coarsely modified scales extending from snout tip to preopercle angle, terminating in a sharp point (Fig. 2a); 6 branchiostegal rays. **(Coelorinchus) → 3**
- 2b. Suborbital ridge, if present, not continuous from snout tip to angle of preopercle and not terminating in a sharp point (Fig. 2b); 7 branchiostegal rays (Fig. 3). → 8



a) *Coelorinchus*



b) *Nezumia*

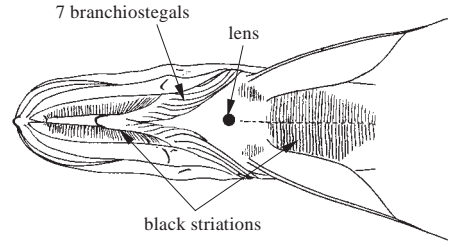
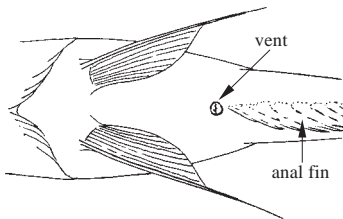
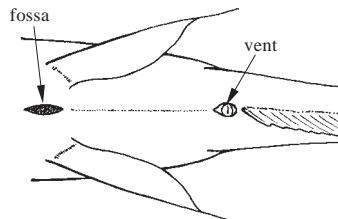


Fig. 3

- 3a. No black fossa on chest or belly (Fig. 4a); snout slender, sharply pointed → 4
- 3b. A prominent black fossa on chest or belly (Fig. 4b); snout moderately pointed to rather blunt → 5



a) *Coelorinchus*



b) *Nezumia*

Fig. 4

- 4a. A prominent eye ring present (Fig. 5); body scales with a prominent median keel composed of stout overlapping spinules, with 3 to 7 smaller shorter rows on either side (Fig. 5a) ***Coelorinchus labiatus* (Fig. 5)**
- 4b. No black eye ring present (Fig. 6); body scales with as many as 16 parallel rows of uniformly small, conical spinules (Fig. 6b). ***Coelorinchus karrerae* (Fig. 6)**

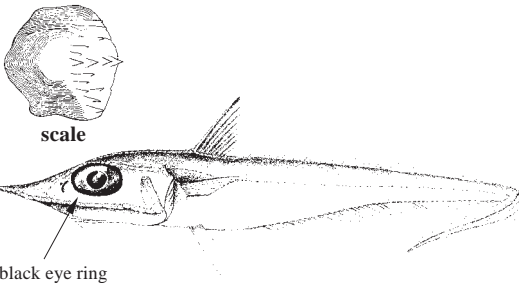


Fig. 5 *Coelorinchus labiatus*

(after Vaillant, 1888)

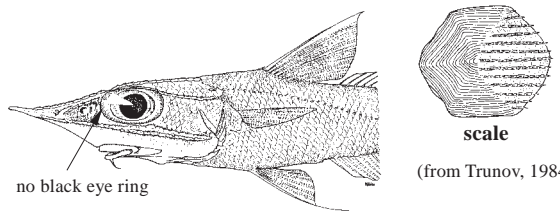


Fig. 6 *Coelorinchus karrerae*

(from Trunov, 1984)

- 5a. Black fossa of light organ on belly, close to anus
. . . ***Coelorinchus simorhynchus* (Fig. 7)**
- 5b. Black fossa on chest, far removed from anus → 6

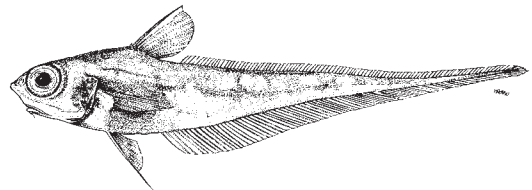


Fig. 7 *Coelorinchus simorhynchus*

- 6a. Tip of snout armed with a prominent, 3-pronged scute (Fig. 8a); length of snout (35 to 41% of head length) usually greater than diameter of orbit (30 to 35% of head length) ***Coelorinchus geronimo* (Fig. 9)**
- 6b. Tip of snout with a blunt spiny scute (Fig. 8b); length of snout (29 to 35% of head length) usually less than diameter of orbit (34 to 40% of head length) → 7

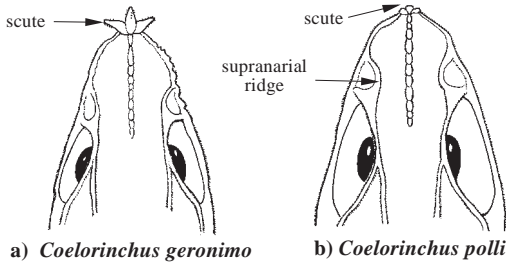


Fig. 8

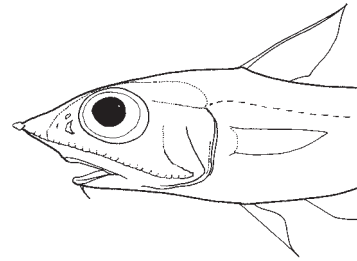
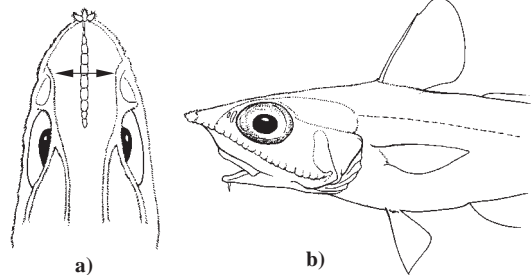


Fig. 9 *Coelorinchus geronimo*

- 7a. Length of ventral fossa greater than 0.5 of pupil diameter; upper surface of snout scaly and opaque; least distance between supranarial ridges (Fig. 10a) 19 to 24% of head length . . . ***Coelorinchus caelorhincus* (Fig. 10b)**



(from Marshall and Iwamoto, 1973)

Fig. 10 *Coelorinchus caelorhincus*

- 7b. Length of ventral fossa about 0.5 of pupil diameter; upper leading edge with broadly naked and translucent areas (Fig. 11); least distance between supranarial ridges 16 to 19% of head length . . . ***Coelorinchus polli* (Fig. 12)**

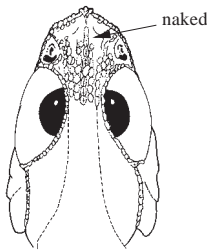


Fig. 11

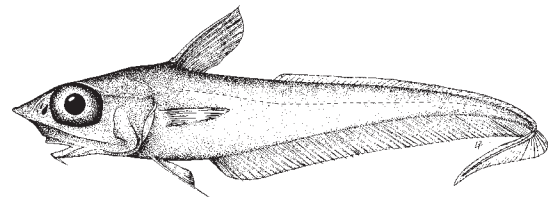


Fig. 12 *Coelorinchus polli*

(after Marshall and Iwamoto, 1973)

- 8a. Ventral striae (fine parallel black lines over a silvery ground) present on abdomen, chest, shoulder girdle, and on gular membrane (Fig. 3); 2 lens-like organs on median-ventral line, 1 on chest, the other immediately before anus ***Hymenocephalus italicus* (Fig. 13)**

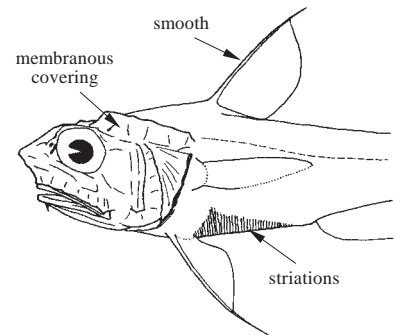


Fig. 13 *Hymenocephalus italicus*

- 8b. No ventral striae; no lens-like organs on chest and belly → 9

9a. No chin barbel; large open pores of head canals; lateral-line scales abruptly end below interspace between dorsal fins ***Odontomacrus murrayi* (Fig. 14)**

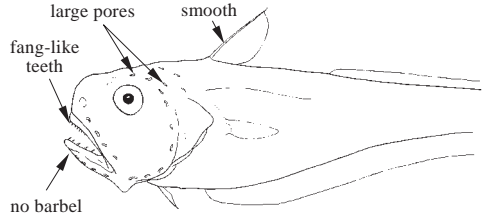


Fig. 14 *Odontomacrus murrayi*

9b. Chin barbel present; no large open pores on head; lateral line complete to end of tail . . . → 10

10a. Head massive, inflated, soft; orbit small, its diameter 2 or more times into interorbital space → 11

10b. Head not especially massive or inflated; orbit diameter less than twice into interorbital space → 12

11a. Snout fully scaled except for a narrow naked strip midventrally; scales non-imbricate (not overlapping), in mosaic pattern, a few large erect spinules on each scale ***Echinomacrus mollis* (Fig. 15)**

11b. Snout broadly naked above and below (Fig. 16); scales small, imbricate, covered with small conical spines aligned in parallel rows ***Kumba dentoni** (Fig. 16)**

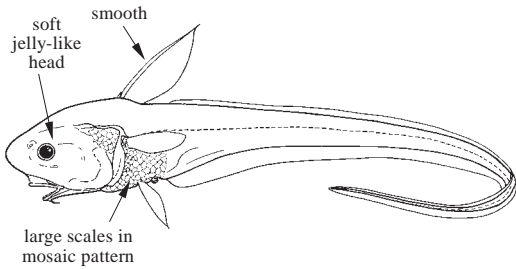


Fig. 15 *Echinomacrus mollis*

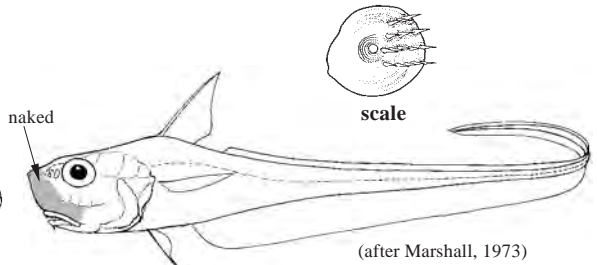


Fig. 16 *Kumba dentoni*

12a. Teeth in lower jaw large, prominent, in 1 row; pelvic fins under pectoral-fin base; ground colour greyish to silvery ***Malacocephalus laevis* (Fig. 17)**

12b. Teeth in lower jaw relatively small, arrayed in a band; pelvic fins under first dorsal fin, well behind base of pectoral fin; ground colour dark brown to black overall ***Trachonurus sulcatus* (Fig. 18)**

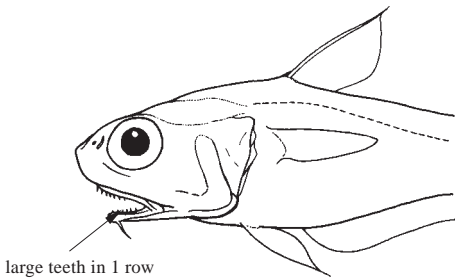


Fig. 17 *Malacocephalus laevis*

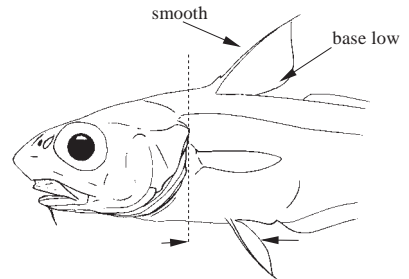


Fig. 18 *Trachonurus sulcatus*

13a. Ventral striae (magnification necessary);
2 lens-like organs on median-ventral line,
1 on chest, the other immediately before
anus ***Hymenogadus gracilis* (Fig. 19)**

13b. No ventral striae; no lens-like organs on
chest and belly → 14

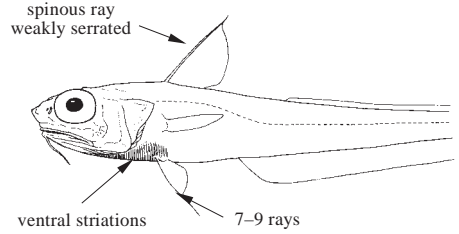


Fig. 19 *Hymenogadus gracilis*

14a. Anus in the middle of black broad naked
area (the periproct), the posterior border
of which may abut (Fig. 20a), or is far
anterior to (Fig. 20b), the anal fin;
branchiostegal rays 7 → 15

14b. Anus immediately before anal fin, without a broad periproct (Fig. 20c); branchiostegal
rays 6. ***Coryphaenoides* → 29**

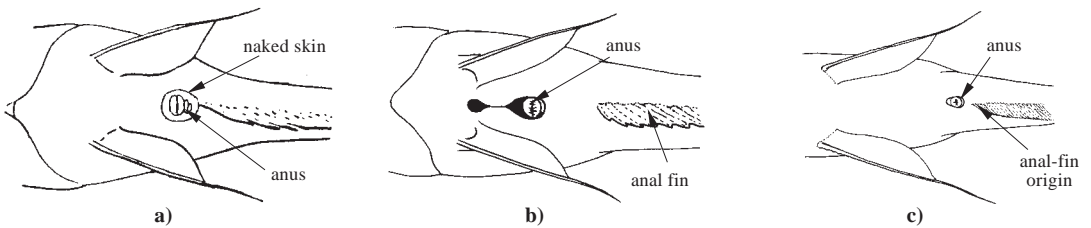


Fig. 20

15a. Head large, inflated, soft (Fig. 21); scales along base of second dorsal fin enlarged
(Fig. 22) ***Cetonurus* → 16**

15b. Head not especially large and inflated; no enlarged scales along base of second dorsal fin. → 17

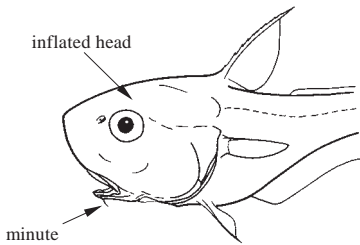


Fig. 21

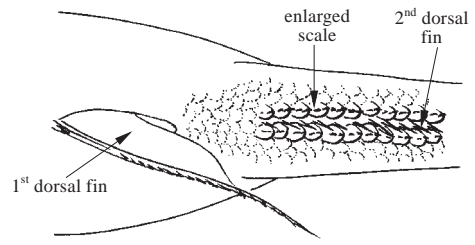


Fig. 22

16a. A broad naked margin along base of anal fin; orbit diameter 18 to 23% of head length;
scale rows below origin of second dorsal fin 9 to 13. ***Cetonurus crassiceps* (Fig. 23)**

16b. No broad naked margin along base of anal fin; orbit diameter 21 to 32% of head length;
scale rows below origin of second dorsal fin 10 to 19 (usually 14 or 15)
. ***Cetonurus globiceps* (Fig. 24)**

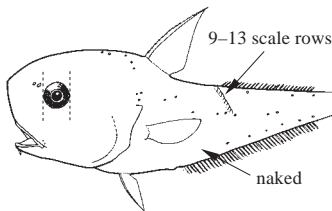


Fig. 23 *Cetonurus crassiceps*

(after Sagonoi and Shcherbacher, 1985)

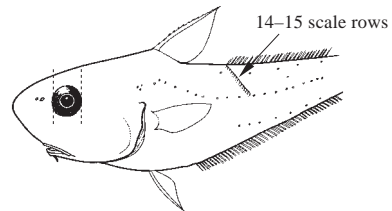


Fig. 24 *Cetonurus globiceps*

(after Sagonoi and Shcherbacher, 1985)

- 17a. Chin barbel absent; scales of head elongated, with spinules longitudinally aligned giving striated pattern to head surfaces **Mesobius berryi (Fig. 25)**
- 17b. Chin barbel present; scales of head not elongated; no striated pattern on head surfaces → 18

- 18a. Snout rounded, not protruding beyond mouth in adults, entirely naked; scales on head and front of body without spinules or ridges; maxilla reaches only to vertical through front of orbit in adults; second spinous ray of first dorsal fin notable large and broad **Haplomacrourus nudirostris* (Fig. 26)**
- 18b. Snout angular, protruding beyond mouth, naked to variously covered with scales; almost all scales with spinules or ridges; maxilla usually extends well posterior to vertical through front of orbit; second spinous ray of first dorsal fin not especially large and broad → 19

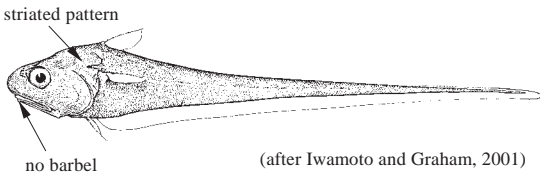


Fig. 25 *Mesobius berryi*

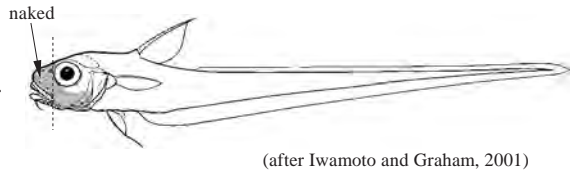


Fig. 26 *Haplomacrourus nudirostris*

- 19a. Almost all of snout and underside of head naked, without coarse tubercular scales at snout tip and lateral angles or on suborbital shelf; olfactory organs huge, length of posterior nostril about one-half of orbit diameter . . **Macrosmia phalacra (Fig. 27)**

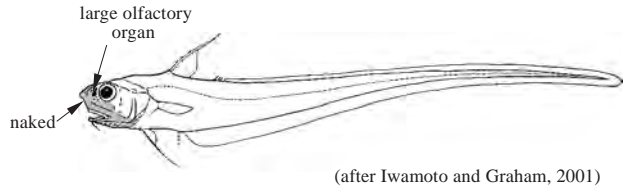


Fig. 27 *Macrosmia phalacra*

- 19b. Snout variously naked to completely scaled, with or without coarse tubercular scales; olfactory organs of normal size, posterior nostril much less than half of orbit diameter → 20

- 20a. One or 2 rows of modified, coarsely spinulated scales under orbit, forming a stout shelf and usually a sharp, rough ridge (Fig. 28); teeth in lower jaw in a narrow to broad band → 21
- 20b. Scales under orbit all small, forming a smooth and rounded surface; teeth in lower jaw in a single row **Malacocephalus occidentalis (Fig. 29)**

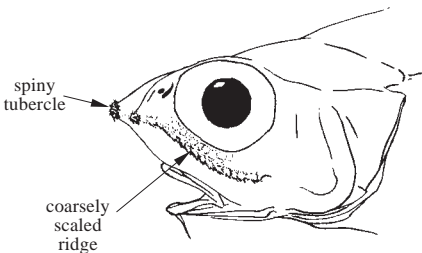


Fig. 28 *Nezumia*

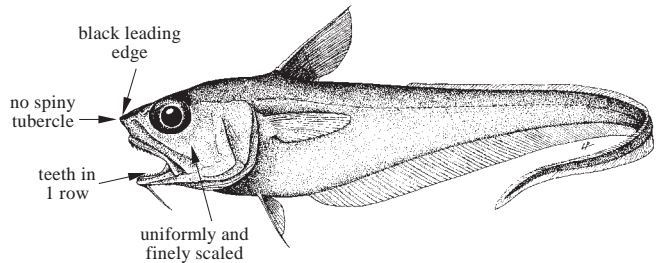
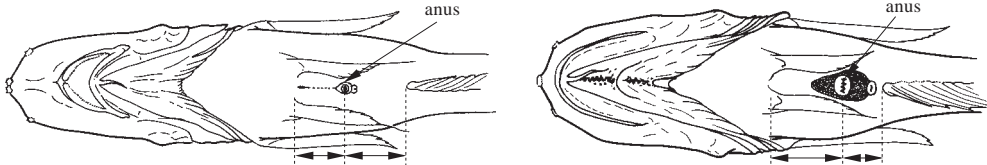


Fig. 29 *Malacocephalus occidentalis*

- 21a. Anus closer to pelvic-fin insertions than to anal fin (Fig. 30a); snout pointed and protruding beyond mouth; origin of pelvic fin under base of pectoral fin; origin of anal fin under posterior one-third of first dorsal fin (Fig. 31) **Nezumia** → 22
- 21b. Anus closer to anal fin than to pelvic fins (Fig. 30b); snout short, blunt, high, and scarcely protruding beyond mouth; origin of pelvic fin under preopercle; origin of anal fin under origin of first dorsal fin **Sphagemacrus hirundo** (Fig. 32)



a) *Nezumia* Fig. 30 b) *Sphagemacrus*
 (after Iwamoto and Graham, 2001)

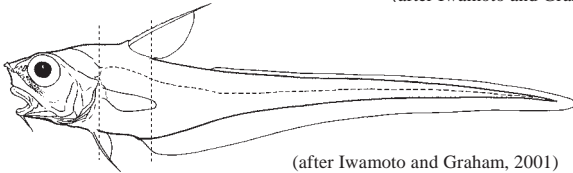


Fig. 31 *Nezumia* sp.
 (after Iwamoto and Graham, 2001)

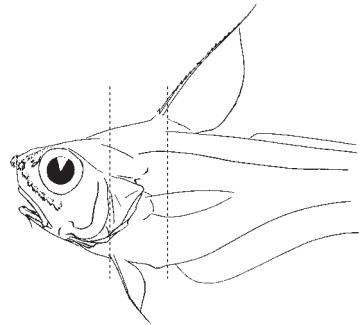
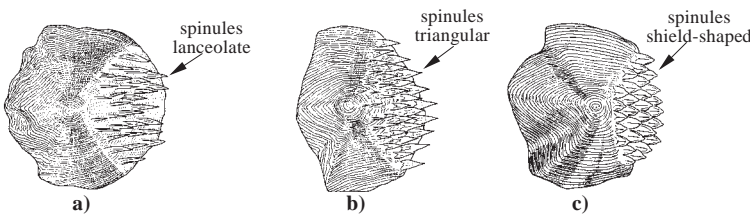


Fig. 32 *Sphagemacrus hirundo*

- 22a. Pelvic-fin rays 11 to 13; scales covered with conical to slightly lanceolate spinules in discrete, slightly convergent rows (Fig. 33a). → 23
- 22b. Pelvic-fin rays 7 to 10; scales covered with conical to broadly shield-shaped (Fig. 33b and c) spinules in parallel to widely convergent or divergent rows → 24



a) b) c)
 Fig. 33
 (after Parr, 1946)



Fig. 34 scale of *Nezumia duodecim*
 (after Iwamoto, 1970)

- 23a. Pelvic-fin rays 11 or 12 (rarely 13); chin barbel 8 to 16% of head length; snout pointed and protruding beyond mouth; body scales (Fig. 34) deciduous, sparsely covered with short conical spinules in 6 to 9 parallel rows **Nezumia duodecim** (Fig. 35)
- 23b. Pelvic-fin rays 13; chin barbel 17 to 23% of head length; snout blunt; scarcely protruding beyond mouth; body scales adherent, densely covered with conical to slightly lanceolate spinules in somewhat convergent rows **Nezumia longebarbata** (Fig. 36)

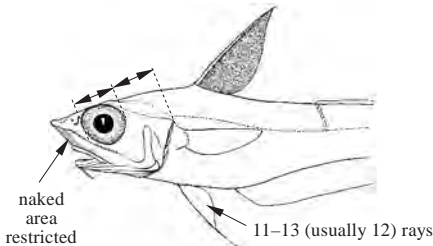


Fig. 35 *Nezumia duodecim*
 (after Iwamoto, 1970)

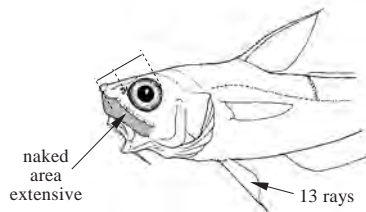


Fig. 36 *Nezumia longebarbata*
 (after Marshall and Iwamoto, 1973)

24a. Lateral series of gill rakers on second arch 13 to 17 *Nezumia micronychodon* (Fig. 37)

24b. Lateral series of gill rakers on second arch about 10 total → 25

25a. First dorsal fin pale to light dusky overall, with a prominent black distal blotch or membrane between serrated spinous ray and first segmented ray black → 26

25b. First dorsal fin dark dusky to black overall → 28

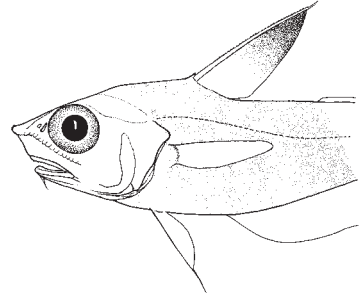


Fig. 37 *Nezumia micronychodon*

26a. First dorsal fin with serrated spinous ray and membrane between that and first segmented ray black, remainder of fin pale or light dusky; pelvic-fin rays 7 *Nezumia bairdii** (Fig. 38)

26b. First dorsal fin with prominent black distal blotch; pelvic-fin rays 8 to 10 . . . → 27

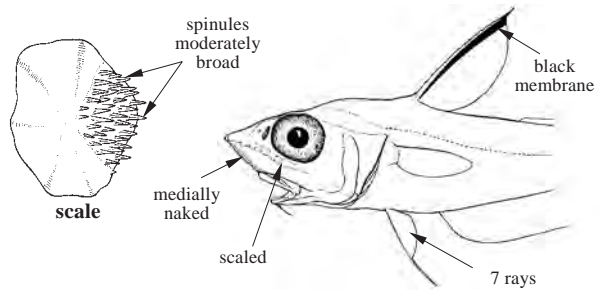


Fig. 38 *Nezumia bairdii*

27a. Orbit diameter 40 to 42%, snout 25 to 27% of head length . . . *Nezumia milleri* (Fig. 39)

27b. Orbit diameter 29 to 36%, snout 27 to 34% of head length . . . *Nezumia aequalis* (Fig. 40)

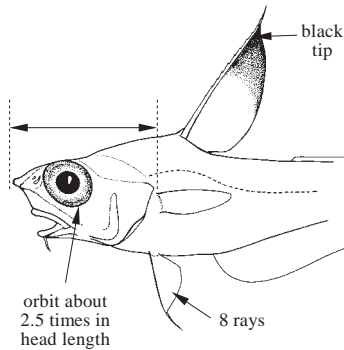


Fig. 39 *Nezumia milleri*
(after Iwamoto, 1973)

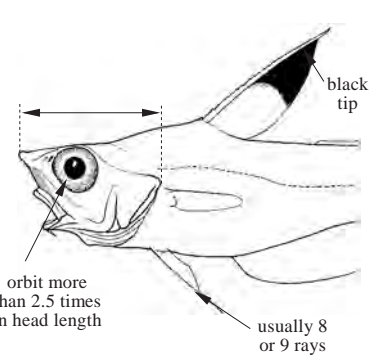


Fig. 40 *Nezumia aequalis*

28a. Spinules on body scales needle-like . . . *Nezumia sclerorhynchus* (Fig. 41)

28b. Spinules on body scales narrowly leaf-shaped to triangular *Nezumia africana* (Fig. 42)

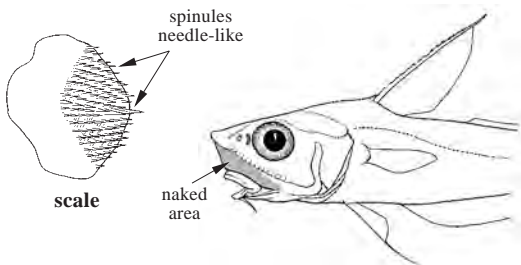


Fig. 41 *Nezumia sclerorhynchus*
(after Marshall and Iwamoto in Marshall, 1973)

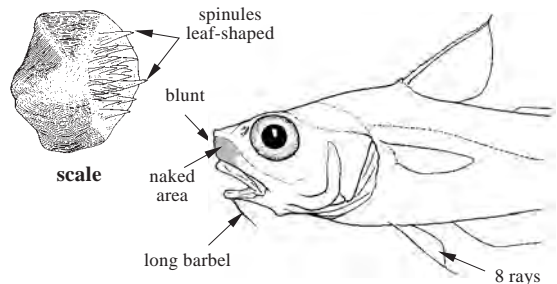


Fig. 42 *Nezumia africana*
(after Iwamoto, 1970)

- 29a. Teeth in upper jaw in 1 or 2 rows *Coryphaenoides (Nematonurus) armatus* (Fig. 43)
- 29b. Teeth in upper jaw in more than 2 rows → 30

- 30a. Teeth in lower jaw in 1 row *Coryphaenoides (Chalinura)* → 31
- 30b. Teeth in lower jaw in 2 or more rows → 34

- 31a. Pelvic fin with 12 to 14 rays; gill rakers on inner side of first arch 14 to 16 total *Coryphaenoides (Chalinura) mediterraneus* (Fig. 44)
- 31b. Pelvic fin with 8 to 10 (usually 8 or 9) rays; gill rakers on inner side of first arch 12 to 14 total → 32

- 32a. Head broad, interorbital space 30% or more of head length; snout high, length from tip of snout to upper margin of lips greater than 15% of head length *Coryphaenoides (Chalinura) brevibarbis* (Fig. 45)
- 32b. Head compressed; interorbital space less than 30% of head length; snout low, length from tip to upper margin of lips less than 15% of head length → 33

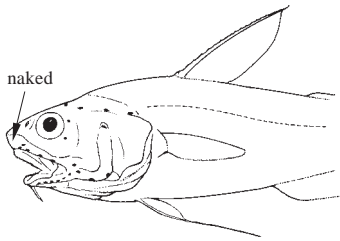


Fig. 43 *Coryphaenoides armatus*

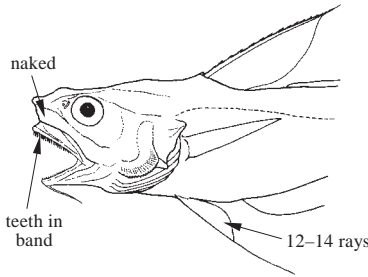


Fig. 44 *Coryphaenoides mediterraneus*

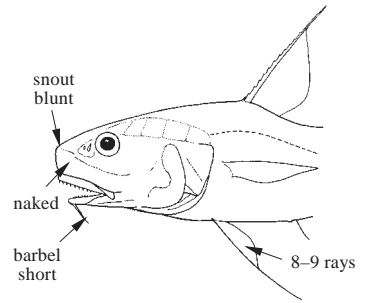


Fig. 45 *Coryphaenoides brevibarbis*
(after Marshall, 1973)

- 33a. Length of barbel 16 to 23% of head length, about equal to horizontal diameter of orbit; first dorsal fin with 2 spines and 8 to 10 rays . . . *Coryphaenoides (Chalinura) leptolepis* (Fig. 46)
- 33b. Length of barbel 5 to 9% of head length, about half horizontal diameter of orbit; first dorsal fin with 2 spines and 7 or 8 rays . . . *Coryphaenoides (Chalinura) profundicolus* (Fig. 47)

- 34a. Inner gill rakers on first arch 18 to 20 total . *Coryphaenoides (Coryphaenoides) rupestris* (Fig. 48)
- 34b. Inner gill rakers on first arch less than 15 total → 35

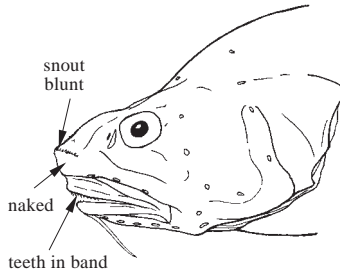


Fig. 46 *Coryphaenoides leptolepis*

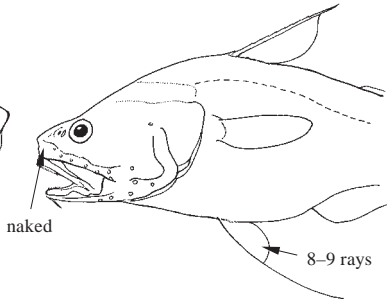


Fig. 47 *Coryphaenoides profundicolus*
(after Nybelin, 1957)

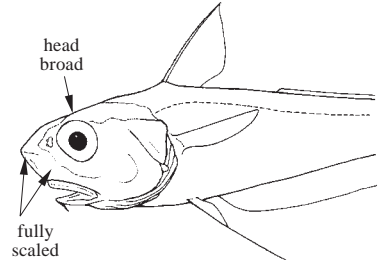


Fig. 48 *Coryphaenoides rupestris*

- 35a.** Upper jaw extends to or beyond vertical through posterior edge of orbit (Fig. 49a) → **36**
35b. Upper jaw ends well short of vertical through posterior edge of orbit (Fig. 49b) → **39**

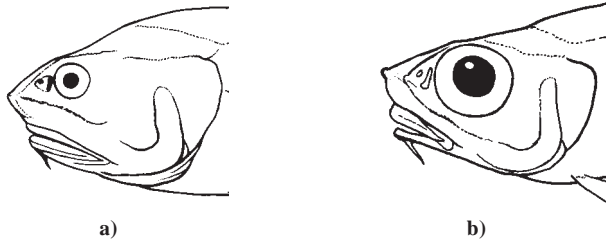


Fig. 49

- 36a.** Pelvic-fin rays 8 (rarely 7 or 9); if pelvic-fin rays 9, interorbital width 16 to 20% of head length → **37**
36b. Pelvic-fin rays 9 to 11; interorbital width 27 to 39% of head length → **38**

- 37a.** Outer pelvic ray much longer than head length
 ***Coryphaenoides (Coryphaenoides) thelestomus* (Fig. 50)**
37b. Outer pelvic rays much shorter than head length
 ***Coryphaenoides (Coryphaenoides) dossenus* (Fig. 51)**

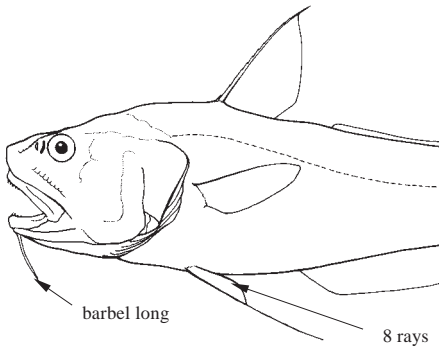


Fig. 50 *Coryphaenoides thelestomus*
 (after Maul, 1951)

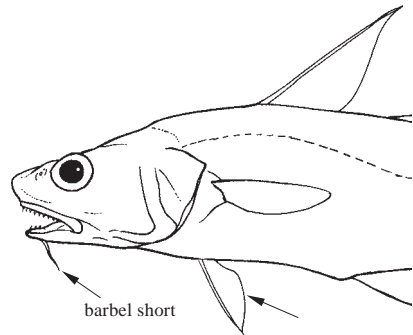


Fig. 51 *Coryphaenoides dossenus*

- 38a.** Snout acutely pointed; underside of snout naked . . . ***Coryphaenoides (Lionurus) carapinus* (Fig. 52)**
38b. Snout bluntly pointed to rounded; snout fully scaled
 ***Coryphaenoides (Coryphaenoides) rudis* (Fig. 53)**

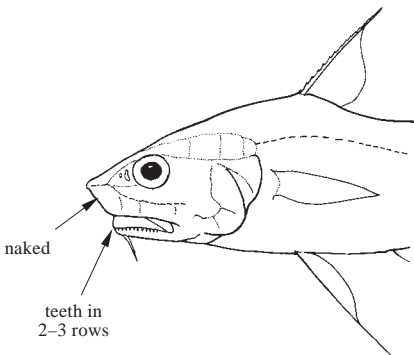


Fig. 52 *Coryphaenoides carapinus*

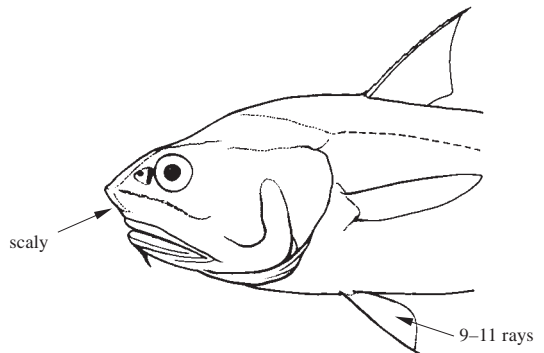


Fig. 53 *Coryphaenoides rudis*

39a. Suborbital shelf fully covered with stout, modified scales (ventral surfaces of suborbital region naked or fully scaled); chin barbel moderately long, 11 to 15% of head length → 40

39b. A row of modified scales along lower margin of suborbital shelf, naked above and below (Fig. 54); chin barbel short, 6 to 10% of head length → 41

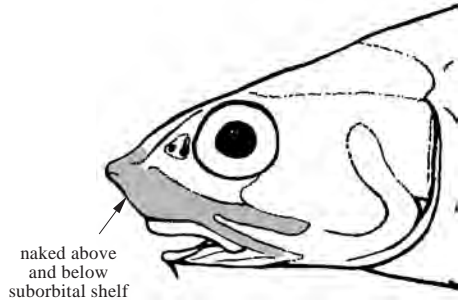


Fig. 54

40a. Pelvic fin with 7 or 8 (rarely 9) rays; underside of snout naked; snout pointed and protruding; preoral length 21 to 25% of head length *Coryphaenoides (Coryphaenoides) guentheri* (Fig. 55)

40b. Pelvic fin with 9 or 10 rays; snout fully scaled; snout blunt, barely protruding beyond jaws; preoral length 14 to 15% of head length. . . *Coryphaenoides (Coryphaenoides) zaniophorus* (Fig. 56)

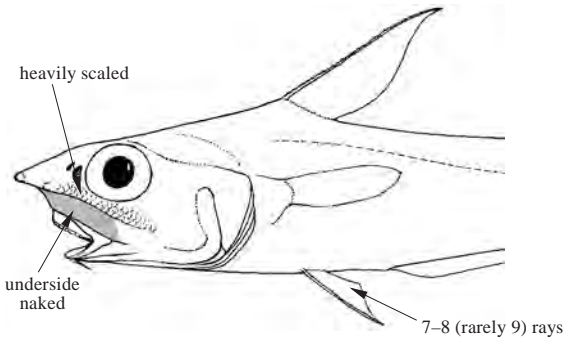


Fig. 55 *Coryphaenoides guentheri* (after Günther, 1887)

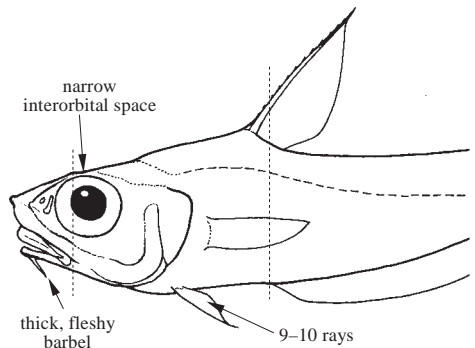


Fig. 56 *Coryphaenoides zaniophorus*

41a. Inner gill rakers on first arch 9 or 10 total; distance from orbit to angle of preopercle 44 to 51%, least suborbital width 13 to 16% of head length *Coryphaenoides (Coryphaenoides) marshalli* (Fig. 57)

41b. Inner gill rakers on first arch 10 to 12; distance orbit to angle of preopercle 37 to 41%, least suborbital width 9 to 11% of head length *Coryphaenoides (Coryphaenoides) paramarshalli* (Fig. 58)

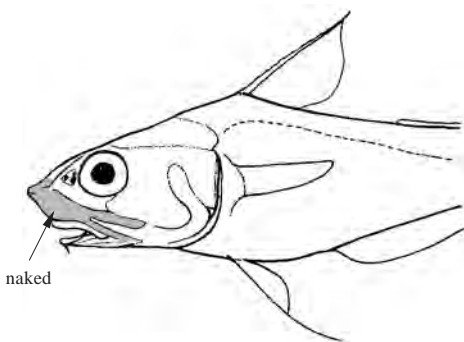


Fig. 57 *Coryphaenoides marshalli* (after Iwamoto, 1970)

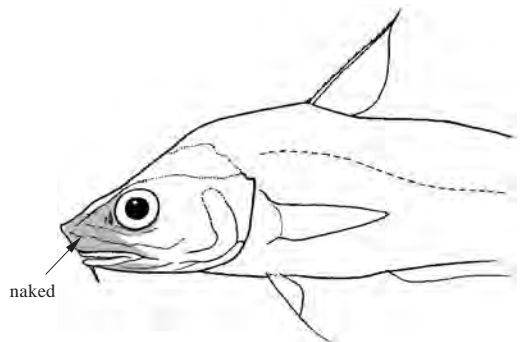









Fig. 58 *Coryphaenoides paramarshalli* (after Merrett, 1983)

List of species occurring in the area

The symbol  is given when species accounts are included.

-  *Coelorinchus caelorhincus* (Risso, 1810).
-  *Coelorinchus geronimo* Marshall and Iwamoto, 1973.
-  *Coelorinchus labiatus* Koehler, 1896.
Coelorinchus polli Marshall and Iwamoto, 1973. To about 27 cm. Angola to Namibia.
Coelorinchus simorhynchus Iwamoto and Anderson, 1994. To about 46 cm. Southern Angola to South Africa
- Cetonurus crassiceps* (Günther, 1878). To >44 cm. Circumglobal; oceanic in Atlantic (Mid-Atlantic Ridge W of Sierra Leone; seamounts and ridges in South Atlantic).
- Cetonurus globiceps* (Vaillant in Filhol, 1884). To >51 cm. Tropical circumglobal.
- Coryphaenoides armatus* (Hector, 1875). To 90 cm. Circumglobal.
- Coryphaenoides brevibarbis* (Goode and Bean, 1896). To 42 cm. North Atlantic; Denmark Strait; Ireland to Mauritania, also North America N of Latitude 40°N.
- Coryphaenoides carapinus* Goode and Bean, 1883. To 35 cm. North Atlantic.
- Coryphaenoides dossenus* McMillan, 1999. To >85 cm. Angola to southern Africa, Indian Ocean, to southwestern Pacific.
- Coryphaenoides guentheri* (Vaillant, 1888). To >50 cm. Denmark Strait; off Ireland to Mauritania; Mediterranean.
- Coryphaenoides leptolepis* Günther, 1877. To >64 cm. North and South Atlantic, E North Pacific.
- Coryphaenoides marshalli* Iwamoto, 1970. To >50 cm. Gulf of Guinea to northern Angola.
- Coryphaenoides mediterraneus* (Giglioli, 1893). To about 75 cm. Denmark Strait to Mauritania and Mediterranean; also Gulf of Mexico, SE 27.
- Coryphaenoides paramarshalli* Merrett, 1983. To >46 cm. Cape Blanc to northern Angola.
- Coryphaenoides profundicolus* (Nybelin, 1957). To 77 cm. British Isles to Madeira.
- Coryphaenoides rudis* Günther, 1878. To 125 cm. Circumglobal.
- Coryphaenoides rupestris* Gunnerus, 1765. To >100 cm. North Atlantic, Norway to Mauritania, also western Atlantic south to about 36°N (and perhaps to 23°N).
- Coryphaenoides thelestomus* Maul, 1951. To 1 m. Canaries, Madeira.
- Coryphaenoides zaniophorus* (Vaillant, 1888). To >40 cm. North Atlantic; in E Atlantic from off Ireland, Gulf of Guinea, to northern Angola.
- Echinomacrus mollis* Roule, 1916. To >40 cm. NE Atlantic, 27.
- Hymenogadus gracilis* (Gilbert and Hubbs, 1920). To 13 cm. Circumglobal; tropical W Atlantic, Morocco and Mauritania.
- Hymenocephalus italicus* Giglioli, 1884. To 20 cm. Tropical and temperate N and Central Atlantic, E Atlantic from Portugal south to northern Angola; also in Mediterranean.
- Macrosmia phalacra* Merrett, Sazonov and Shcherbachev, 1983. To about 22 cm. Canaries; also known from mid-Indian Ocean and SW Pacific off Vanuatu.
-  *Malacocephalus laevis* (Lowe, 1843).
-  *Malacocephalus occidentalis* Goode and Bean, 1885.
- Mesobius berryi* Hubbs and Iwamoto, 1977. To about 42 cm. Mid-Atlantic Ridge NS of Ascension Island; also tropical to subtropical eastern and central Pacific and Indian oceans.
-  *Nezumia aequalis* (Günther, 1878).
- Nezumia africana* (Iwamoto, 1970). To about 30 cm. Liberia (throughout Gulf of Guinea) to Angola.
-  *Nezumia duodecim* Iwamoto, 1970.
- Nezumia longebarbata* (Roule and Angel, 1933). To 41 cm. Madeira, also N Gulf of Mexico (W31), E coast US (SE 21).

- *Nezumia micronychodon* Iwamoto, 1970.
Nezumia milleri Iwamoto, 1973. To 21 cm. Northern Angola.
Nezumia sclerorhynchus (Valenciennes, 1838). To 42 cm. Widespread in North Atlantic, from Azores, Madeira, Morocco, Mauritania, and Mediterranean; also western Atlantic N of Florida Strait.
- Odontomacrus murrayi* Norman, 1939. To 60 cm. Widespread in mid-waters of eastern Atlantic from 35°N to South Africa; also in Indian Ocean, SW Pacific, and Japan.
- Sphagemacrus hirundo* (Collett, 1896). To about 26 cm. Mid-Atlantic Ridge (about 43°N, 29°W), Gulf of Cadiz, Azores, Morocco, Madeira to Cape Verde Islands.
- Trachonurus sulcatus* (Goode and Bean, 1885). To about 50 cm. Widespread N Atlantic.

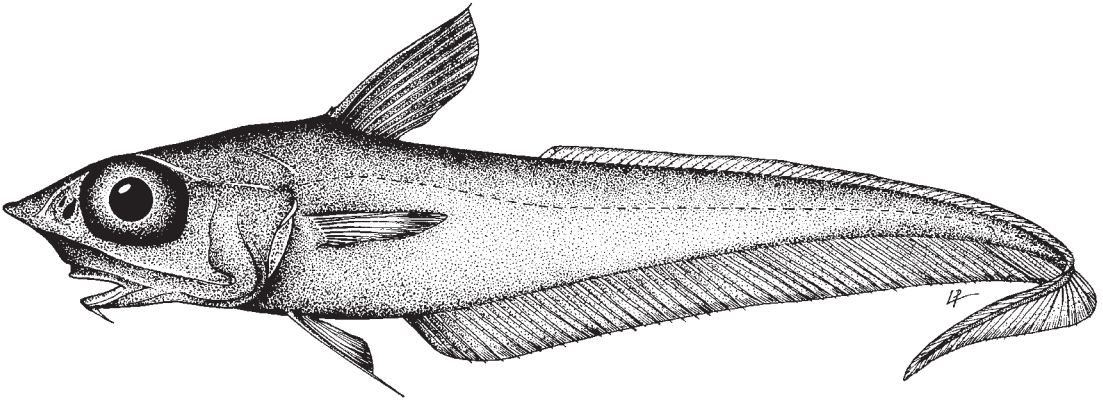
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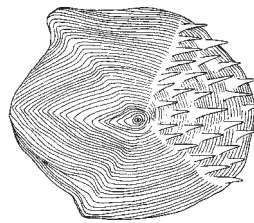
***Coelorinchus caelorhincus* (Risso, 1810)**

Frequent synonyms / misidentifications: *Macrurus atlanticus* Lowe, 1839; *M. (Coelorhynchus) coelorhynchus* Günther, 1887; *Coelorhynchus atlanticus* Goode and Bean, 1896; *C. laville* Risso, 1809 / *Macrourus rupestris* (not of Bloch) Lowe, 1839.

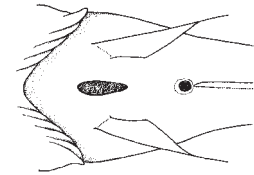
FAO names: **En** – Hollowsnout grenadier (AFS: Saddled grenadier); **Fr** – Grenadier raton; **Sp** – Granadero tristán.



Diagnostic characters: Body with short trunk and long tapered tail ending in a point. Head rather broad and short, length about 5 times in total length; **orbits large, one-third or more of head length; snout short, 30 to 35% of head length**, acutely pointed in lateral view, broadly pointed in dorsal view and tipped with a small, **trifid terminal scute**; mouth small, inferior, restricted at angle of protrusible jaws; upper jaw extending to below middle third of orbit; **short chin barbel**. Teeth all small, in broad bands, the upper band not extending full length of mouth opening. Stout, coarsely scaly ridge running from tip of snout to posterior angle of preopercle and **ending in a sharp point**. Branchiostegal rays 6; gill membranes broadly restricted across isthmus. Gill rakers tubercular, none on lateral side of gill arch, 8 to 10 on mesial side; first gill slit greatly restricted. First dorsal fin high, short-based, with a spike-like first ray followed by a long, smooth spinous second ray and 8 or 9 segmented rays; second dorsal fin low, beginning well behind first dorsal, confluent with much higher anal fin; pectoral fin with 17 to 20 rays, its origin slightly anterior to that of first dorsal fin and about on same vertical as narrow-based pelvic fins, which have 7 rays, the outermost slightly prolonged. **Scales on body of moderate size, uniformly covered with small, fine, somewhat-reclined spinules arrayed in slightly divergent rows**; ridges of head stout, strengthened with coarse spiny scales; **underside of snout and suborbital scaly** except for narrow median swath under snout; **narrow crescent-shaped naked strip on dorsal surface of snout behind leading edge on each side**. **A prominent black oval naked fossa of light organ on chest; anus immediately before anal fin.** **Colour:** fresh, somewhat greyish with silvery reflections on ventral surfaces of body and cheeks, but bluish or violet over abdomen and blackish on ventral surfaces around vent and light organ; dorsal fins dusky, anal fin pale basally with black margin distally; pectoral fins dusky, pelvic fins black with outer ray pale.



scale



ventral view of body

Size: To about 40 cm; commonly to 30 cm total length.

Habitat, biology, and fisheries: Benthopelagic; common in upper slope depths of about 200 to 500 m, although shallowest record is 140 m, deepest 633 m. Feeds primarily on benthic invertebrates, including polychaete worms, gammarids, copepods, mysids, euphausiids, shrimps, and gastropods. Swimbladder long, oval, with blunt anterior end. Often a dominant portion of demersal trawl catches on upper slope; sometimes used for fishmeal, mixed with other fishes, but no separate statistics maintained.

Distribution: Northeastern Atlantic east of the Mid-Atlantic Ridge, from southern Norway to at least the Canary and Cape Verde islands and adjacent mainland Africa (Morocco and possibly Mauritania). Also found in Mediterranean Sea. The closely similar species of *Coelorinchus geronimo* occurs from approximately Mauritania south through the Gulf of Guinea to northern Angola.

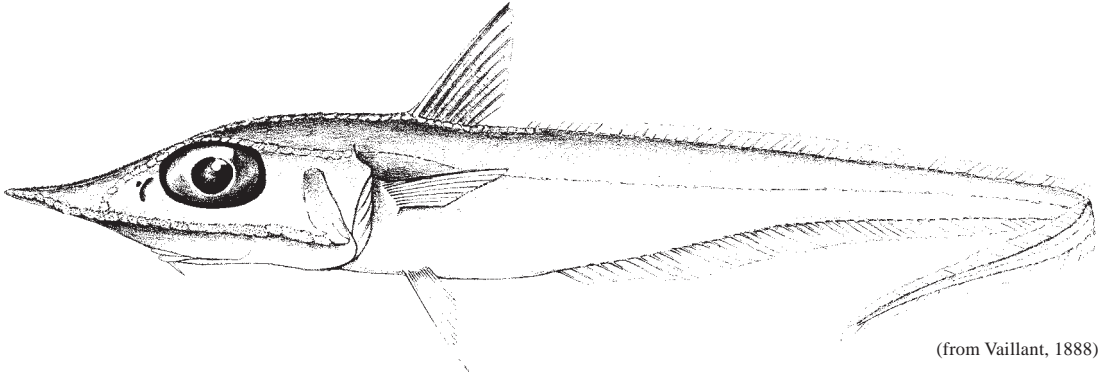
Remarks: *Coelorinchus caelorhincus* was formerly considered as having a number of subspecies, but those are here recognized as full species. Eschmeyer and Bailey in Eschmeyer (1990:70) changed the spelling of the name from *Coelorinchus coelorhincus* (or *Coelorhynchus coelorhynchus*) to *Caelorinchus caelorhincus*, based on their interpretation. Iwamoto (2008: xi) agreed with the “ae” spelling of the species name (i.e., *caelorhincus*) but disagreed with the use of that diphthong in the generic name. He considered “*Coelorinchus*” to be the correct spelling, but accepted that there is room for doubt and agreed that the International Commission on Zoological Nomenclature should be petitioned to fix the spellings of the generic and specific names.



***Coelorinchus labiatus* (Köhler, 1896)**

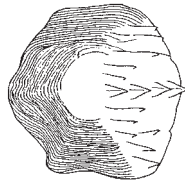
Frequent synonyms / misidentifications: *Coryphaenoides talismani* Collett, 1905 / *Macrurus japonicus* (Temminck and Schlegel, 1842); *Coelorinchus occa* (Goode and Bean, 1885).

FAO names: En – Spearsnouted grenadier.

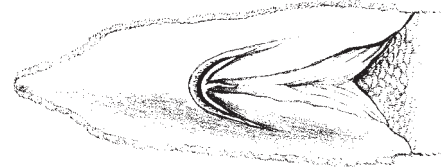


(from Vaillant, 1888)

Diagnostic characters: Body long, low, laterally compressed behind abdomen, tapering to a point. Head rather broad, length about 4.5 times in total length; orbits large, 26 to 28% of head length; snout long and strongly pointed, 45 to 49% of head length; mouth small, inferior, restricted at angle of protrusible jaws; upper jaw extending about to below middle of orbit; teeth all small, in broad bands, the upper band falling well short of end of mouth; a stout, coarsely scaled ridge running from tip of snout to posterior angle of preopercle, ending in a sharp point; a short chin barbel.



scale



underside view of head
(from Vaillant, 1888)

Branchiostegal rays 6; gill membranes broadly restricted across isthmus. Gill rakers tubercular, none on lateral side of first gill arch, 7 or 8 total on mesial side; first gill slit greatly restricted. First dorsal fin high, short-based, with a spike-like first ray followed by a long, smooth spinous second ray and 7 to 9 segmented rays; second dorsal fin low, confluent with much higher anal fin; pectoral fin with 17 to 20 rays, its origin slightly anterior to that of first dorsal fin and about same on vertical as narrow-based pelvic fins, which have 7 rays, the outermost slightly prolonged. Scales on body with overlapping triangular spinules in rows, the median row largest and extending to posterior margin of scale, 3 to 7 smaller, shorter rows on each side; ridges of head stout, strengthened with coarse spiny scales; underside of head naked. No naked fossa of light organ on chest or belly. **Colour:** overall greyish, underside of head pale; a prominent black eye ring; mouth and gill cavities blackish; first dorsal fin uniformly dusky.

Size: To more than 50 cm; commonly to 30 cm total length.

Habitat, biology, and fisheries: Benthopelagic in upper slope depths of about 450 to more than 2 200 m. Feeds primarily on benthic invertebrates. Swimbladder deeply bilobed in anterior end.

Distribution: Northeastern Atlantic east of the Mid-Atlantic Ridge, from the Shetland Islands south to at least the Cape Verde Islands and adjacent mainland Africa. Records of the species from the Mediterranean are probably of *Coelorinchus mediterraneus*, and it is unlikely that *C. labiatus* occurs there.

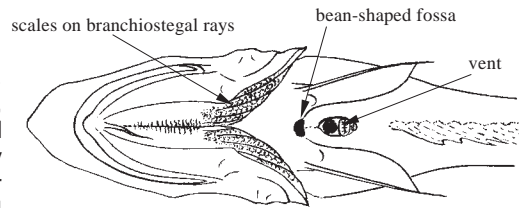
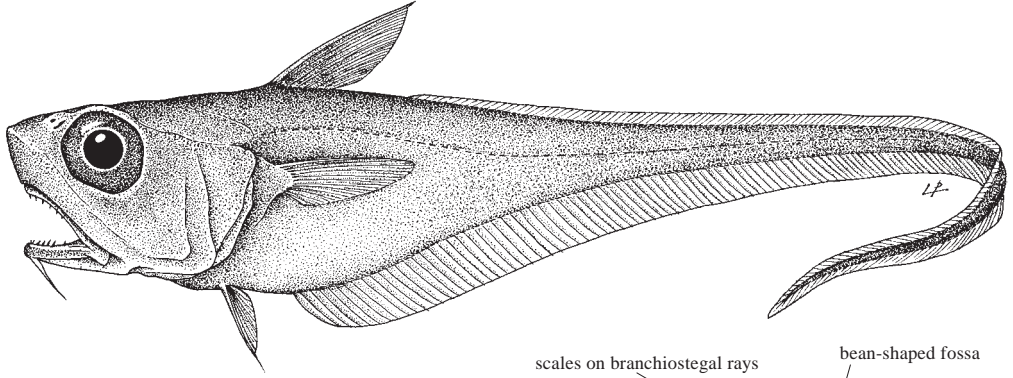
Remarks: *Coelorinchus labiatus* was formerly considered a synonym of *C. occa*, but the two are distinctive, with the latter apparently confined to the western Atlantic.



***Malacocephalus laevis* (Lowe, 1843)**

Frequent synonyms / misidentifications: *Malacocephalus luzonensis* Gilbert and Hubbs, 1920; *M. nipponensis* Gilbert and Hubbs, 1916; *M. hawaiiensis* Gilbert, 1905 / None.

FAO names: **En** – Softhead grenadier; **Fr** – Grenadier barbu; **Sp** – Abámbolo de bajura.



ventral view of head and body

Diagnostic characters: Trunk short, tail long, strap-like. Head length 5 or more times in total length; orbits large, 29 to 36% of head length, greater than least interorbital width; snout short, 26 to 31% of head length, smoothly rounded without a terminal scute; mouth moderate, upper jaw extends to below posterior third of orbit; chin barbel well developed. **Upper jaw teeth in 2 rows, the outer row enlarged, the inner much smaller; lower jaw teeth large, few, in 1 row. No stout, coarsely scaled ridges on head.** Branchiostegal rays 7; gill membranes narrowly attached to isthmus. Gill rakers tubercular, 11 to 14 total on mesial side of first arch; first gill slit restricted. First dorsal fin high, short-based, with a spike-like first ray and a long, **smooth spinous second ray** and usually 11 or 12 segmented rays; second dorsal fin low, confluent with much higher anal fin; pectoral fins usually with 19 or 20 rays; pelvic fins with usually 9 rays, the outermost slightly prolonged. **Scales on body small, covered with minute, fine spinules giving velvety feel to surface; all of head scaly including lower branchiostegal rays. Bean-shaped naked fossa of light organ between pelvic fins, a second shallow fossa anterior to anus, which is broadly separated from anal fin.** **Colour:** fresh, greyish overall with silvery reflections on ventral half of body and sides of head, blackish around anus and gill membranes; first dorsal fin light dusky basally, blackish distally, anal fin pale to dusky with blackish distal margin anteriorly; pectoral fins dusky, pelvic fins black.

Size: To 65 cm; commonly to about 40 cm total length.

Habitat, biology, and fisheries: Benthopelagic; relatively common in upper slope depths from about 200 to more than 1 000 m. Feeds primarily on natant crustaceans, small fishes, and cephalopods. No importance to fisheries, but in some areas, included in catches processed into fishmeal.

Distribution: Circumglobal in tropical and temperate waters. In eastern Atlantic, known from Faeroes and Shetland islands to South Africa.

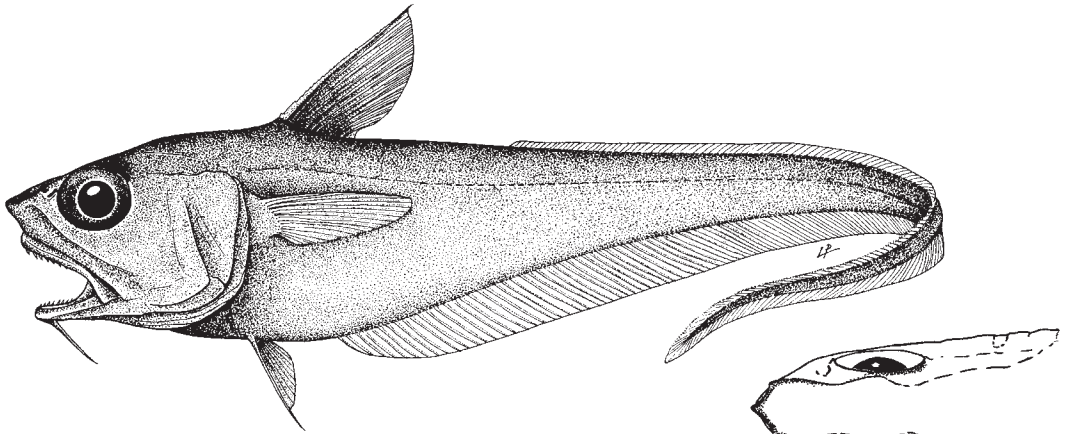
Remarks: Three other species that have at times been recognized as valid are included in the synonymy of *Malacocephalus laevis* because characters used to distinguish them are so weak as to place doubts on their validity. *Malacocephalus laevis* is apparently the most widely distributed of all grenadiers; its wide distribution may be accounted for by its distinctive, presumably long-lived pelagic juvenile that may attain more than 30 cm in total length.



***Malacocephalus occidentalis* Goode and Bean, 1885**

Frequent synonyms / misidentifications: *Coryphaenoides sublaevis* Vaillant, 1888; *Chalinura occidentalis* Goode and Bean, 1896; *Lionurus (Nezumia) occidentalis* Gilbert and Hubbs, 1916; *Ventrifossa occidentalis* Gilbert and Hubbs, 1920 / *Macruroplus violaceus* (Zugmayer, 1911).

FAO names: En – Western softhead grenadier; Fr – Grenadier scie; Sp – Abámolo.



Diagnostic characters: Trunk short, tail long, strap-like. Head length 5 or more times in total length; orbits large, 31 to 35% of head length; **interorbital narrow**, its width 23 to 27% of head length; **snout narrow**, weakly pointed, 26 to 31% of head length, without a terminal scute; mouth moderate, upper jaw extends to below posterior third of orbit; chin barbel well developed. **Upper jaw teeth in a broad band, outer row enlarged**, inner teeth much smaller; **lower jaw teeth in 1 row. No stout, coarsely scaled ridges on head.** Branchiostegal rays 7; gill membranes narrowly attached to isthmus. Gill rakers tubercular, 9 to 15 total on mesial side of first arch. First dorsal fin high, short-based, with a spike-like first ray, long, **serrated spinous second ray**, and 10 to 13 segmented rays; second dorsal fin low, confluent with much higher anal fin; pectoral fins usually with 23 to 26 rays; pelvic fins with usually 8 rays, the outermost slightly prolonged. **Scales on body small, covered with minute, fine spinules giving velvety feel to surface; entire head scaly including lower branchiostegal rays. An oval naked fossa of light organ between pelvic fins, a second shallow fossa anterior to anus, which is well removed from anal fin.** **Colour:** fresh, greyish overall with silvery reflections on ventral half to two-thirds of body and sides of head, blackish around anus and gill membranes, lips and leading edge of snout; first dorsal fin light dusky to pale, blackish distally; anal fin pale to dusky with blackish distal margin anteriorly; pectoral and pelvic fins black.

Size: To more than 45 cm; commonly to 35 cm total length.

Habitat, biology, and fisheries: Benthopelagic; relatively common on upper continental slope from about 200 to 600 m. Feeds primarily on natant crustaceans, small fishes, and cephalopods. No importance to fisheries, but in some areas, included in catches processed into fishmeal.

Distribution: Widespread in tropical to subtropical waters of Atlantic. In eastern Atlantic, known from Canaries to Angola and in western Mediterranean Sea. More widely distributed in western Atlantic, where it is known from off Georges Banks (approx. 42°N) to southern Brazil.

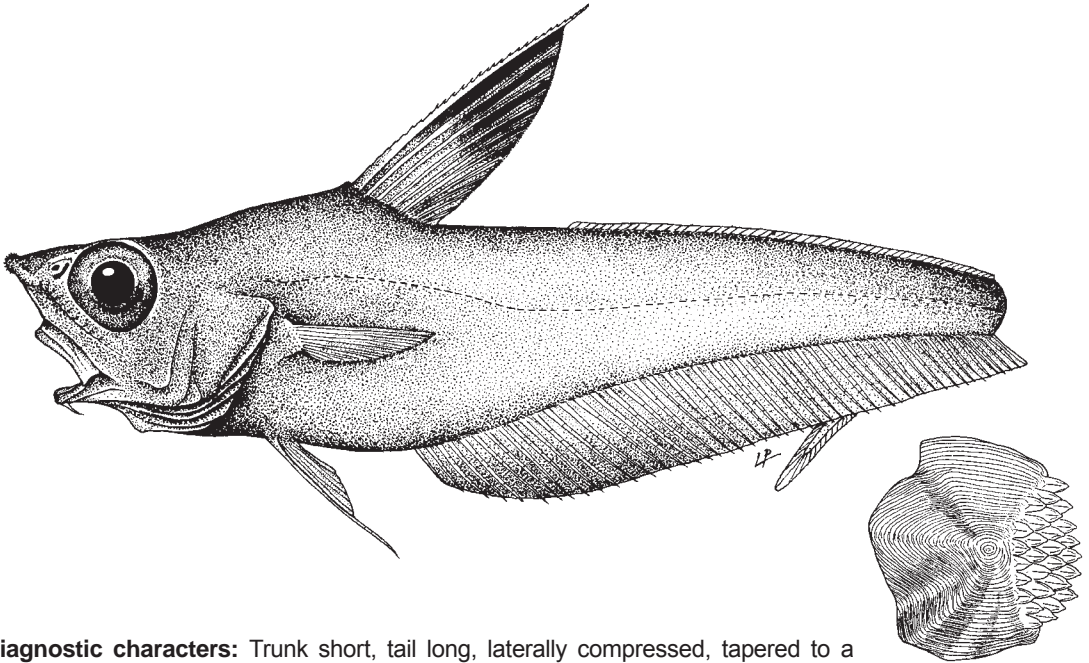
Remarks: *Malacocephalus occidentalis* has been included within the genus *Ventrifossa*, and in some characters it bridges the gap between that genus and *Malacocephalus*. The characteristic light organ and associated fossae, the single row of enlarged teeth on the dentary, the scaly branchiostegals, and the small, finely spinulated scales suggest a closer relationship with *Malacocephalus*.



***Nezumia aequalis* (Günther, 1878)**

Frequent synonyms / misidentifications: *Macrurus serratus* Lowe, 1843 (nomen dubium); *M. smiliophorus* Vaillant, 1888; *Nezumia hildebrandi* Parr, 1946 / None.

FAO names: En – Common Atlantic grenadier; Fr – Grenadier lisse; Sp – Granadero liso.



scale

Diagnostic characters: Trunk short, tail long, laterally compressed, tapered to a point. Head short, length 5 or more times in total length; **orbits large, 29 to 36% of head length; snout short, 28 to 32% of head length**, acutely pointed, tipped with a small, bifid terminal scute; mouth small, inferior, restricted at angle of protrusible jaws; upper jaw extends to below midorbit; **short chin barbel**. Teeth in bands, upper band with an outer row of slightly enlarged teeth; stout coarse ridge under orbit formed of 2 rows of thick, modified scales, not extending onto preopercle. Branchiostegal rays 7; gill membranes broadly restricted across isthmus. Gill rakers tubercular, usually 10 or 11 total on mesial side of first arch, 9 to 11 on lateral side of second arch; first gill slit greatly restricted. First dorsal fin high, short-based, with spike-like first ray, long, serrated spinous second ray and usually 10 or 11 segmented rays; second dorsal fin low, beginning well behind first dorsal fin, confluent at end of tail with much higher anal fin; pectoral fin with 17 to 20 rays, its length 60 to 72% of head length; pelvic fins with 8 (usually) or 9 rays, outermost ray slightly prolonged. **Scales on body of moderate size, covered with broadly lanceolate to shield-shaped spinules**; ridges of head marked with coarse spiny scales; **underside of head scaly except for broad median strip under snout. Small naked fossa of light organ between pelvic fins; anus in middle of a black oval naked area, well separated from anal fin.** **Colour:** fresh, somewhat bluish or violet overall, swarthy to blackish on ventral surfaces of head and abdomen, and some faint silvery reflections; first dorsal fin pale to light dusky with prominent black blotch on distal end, anal fin pale to dusky with blackish margin anteriorly; pectoral fins dusky, pelvic fins black with outer ray pale.

Size: To about 30 cm; commonly to about 25 cm total length.

Habitat, biology, and fisheries: Benthopelagic; common in upper slope depths from about 200 to more than 1 000 m. Feeds primarily on benthic invertebrates, including polychaete worms, copepods, isopods, ostracods, and mysids. Often taken in demersal trawl catches on upper slope; sometimes used for fishmeal, mixed with other fishes, but no separate statistics maintained.

Distribution: In northeastern Atlantic known from off Iceland and Great Britain south along European and African coasts to around Mauritania. Populations south of Mauritania through Gulf of Guinea and Angola may represent another species, but this has not been adequately investigated. Also known from western North Atlantic and in Mediterranean Sea.

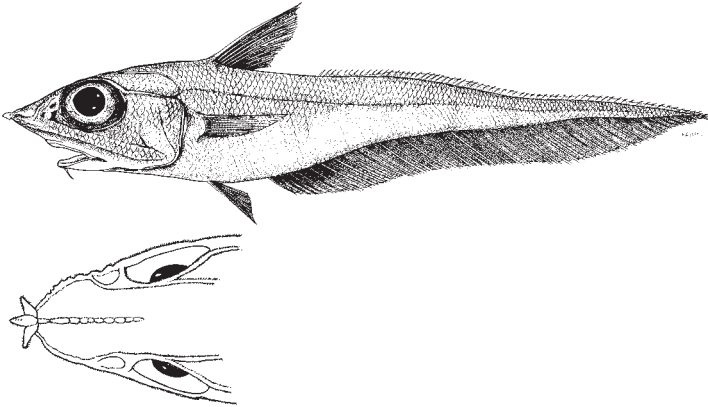
Remarks: Some populational differences were observed by Marshall and Iwamoto (1973: 635–644), but they recognized no subspecies. Closer study, possibly using molecular methods, may alter our taxonomic concept of this widespread taxon. *Nezumia hildebrandi* formerly used for western North Atlantic population.



***Coelorinchus geronimo* Marshall and Iwamoto, 1973**

En – Threeprong grenadier.

Maximum size about 27 cm. The second most common grenadier (after *Hymenocephalus italicus*) in the Gulf of Guinea. Of no known importance to fisheries. Côte d'Ivoire to northern Angola in about 180 to 500 m (most common in 300 to 400 m).



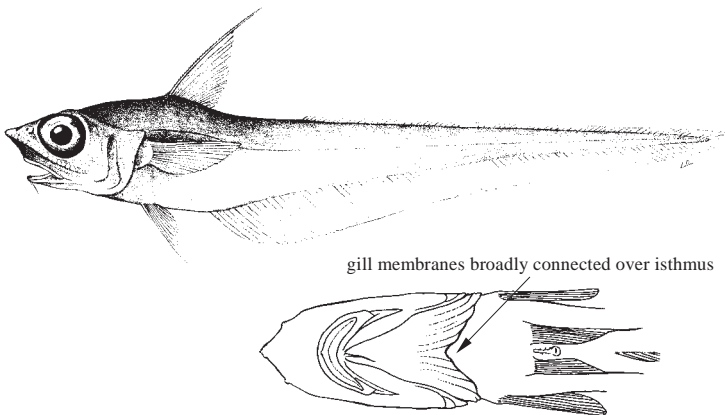
dorsal view of head



***Nezumia duodecim* Iwamoto, 1970**

En – Twelve-rayed grenadier.

Maximum size about 25 cm. A common grenadier in upper- to midslope depths. Often captured with *Nezumia micronychodon*, *N. africana*, and *N. aequalis* in the Gulf of Guinea and Angola, where they can be readily separated when freshly captured by *N. duodecim* having the highest pelvic-fin ray count (11 or 12) of the 4 species and highly deciduous scales; *N. africana* having strongly adherent scales and white buccal cavity; *N. aequalis* having adherent scales and distinctly black-blotched distal part of first dorsal fin (proximal clear portion often orange); and *N. micronychodon* having the highest gill raker count (13 to 17 in lateral series of second arch) of the 4, and gill membrane least restricted across isthmus. Diet a mix of benthic and pelagic organisms, largely polychaetes and copepods, but also some fish and crustaceans. Of no importance to fisheries. Western Sahara to Angola in 329 to 1 261 m (most common in 500 to 600 m).



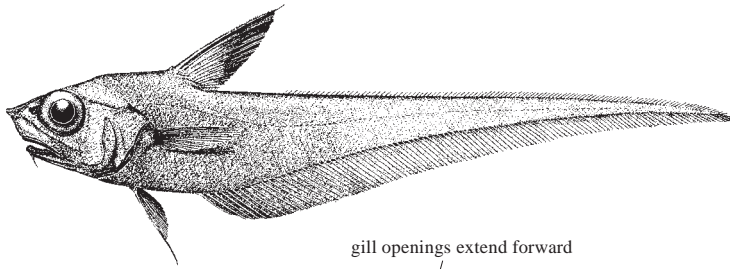
ventral view of head



***Nezumia micronychodon* Iwamoto, 1970**

En – Smalltooth grenadier.

Maximum size about 35 cm. Fairly common grenadier in upper- to mid-slope depths. Size-related changes in head shape notable. Diet in smaller individuals mostly epibenthic organisms, largely crustaceans and copepods; larger individuals feed primarily on infaunal organisms, especially polychaetes, crustaceans, and some molluscs. Of no importance to fisheries. Western Sahara to False Bay, South Africa in 366 to 1 620 m (most common in 500 to 600 m).



gill openings extend forward



ventral view

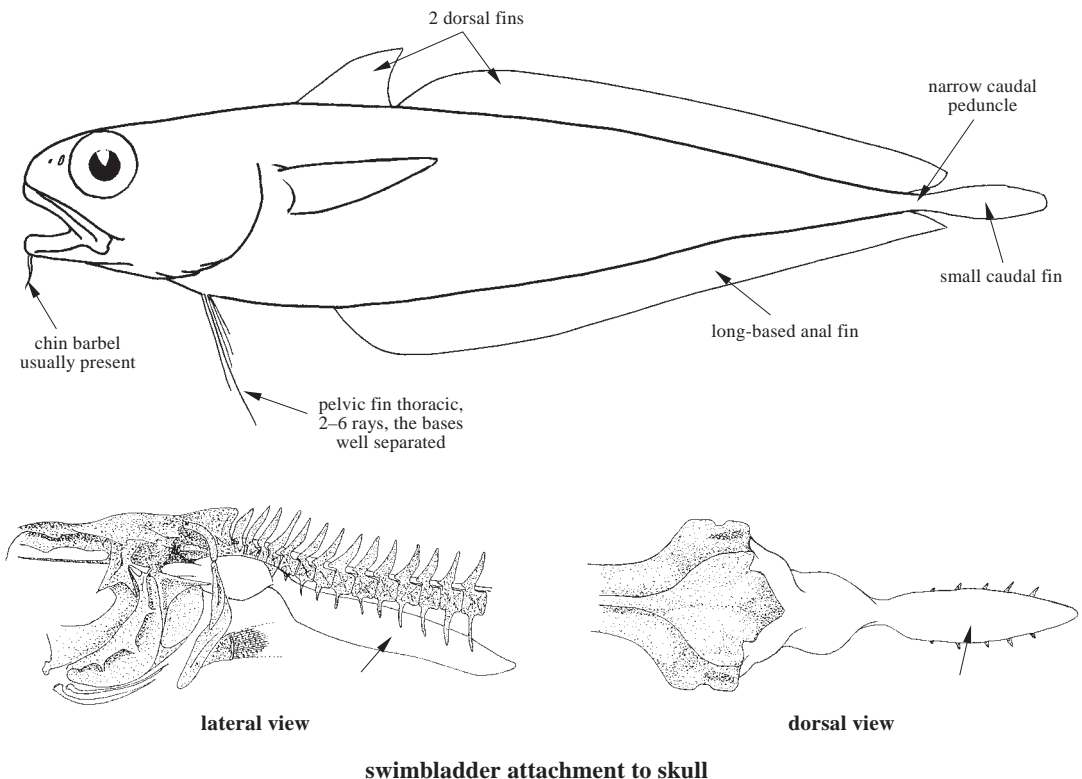


MORIDAE

Moras

by T. Iwamoto, California Academy of Sciences, San Francisco, CA and D.M. Cohen, Bodega Bay, CA, USA

Diagnostic characters: Small to medium-sized (to about 65 cm, usually 20 to 30 cm) fishes. Body elongated, oval to round in front of abdomen, more laterally flattened behind, tapering to a **narrow caudal peduncle**. Top of head lacking V-shaped ridge. Mouth large, jaws extending to below mid-orbit or beyond, slightly to moderately inferior; eye large, about 3 or 4 times in head length; **teeth few or lacking on roof of mouth**. **Two dorsal fins**, the first short-based, the second long-based, its length more than half total length; anal fin long-based, its length half of, or longer than, that of second dorsal fin; **pelvic fins thoracic, small, with 2 to 6 rays, the bases well separated**; **caudal fin relatively small, margin rounded to slightly forked, separated from dorsal and anal fins**. Spine on top of first vertebra tightly connected to a narrow crest at rear of skull. **Swimbladder with 2 anterior projections that attach to back of skull**. **Abdominal light organ in some species**, seen externally as small, black naked fossa anterior to vent. **Colour:** brown, black to pinkish with violet, bluish or blackish abdomen and underside of head; some with silvery pigment over sides of head and body.



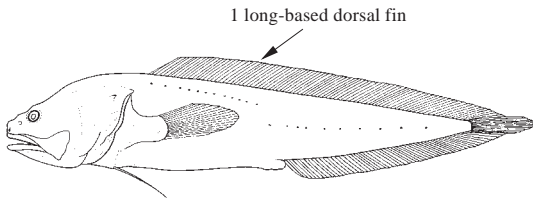
swimbladder attachment to skull

Habitat, biology, and fisheries: Species in area benthopelagic in waters of continental shelf and slope in 40 to 3 000 m, commonly between 100 and 600 m. Little known of life history of most species. Food includes bottom invertebrates, swimming crustaceans, small cephalopods, and small fish. Most morids in area too small, occur too deep, or found in concentrations too sparse to be of major commercial interest, but a few species in other parts of the world are commercially exploited by trawl and longline gear.

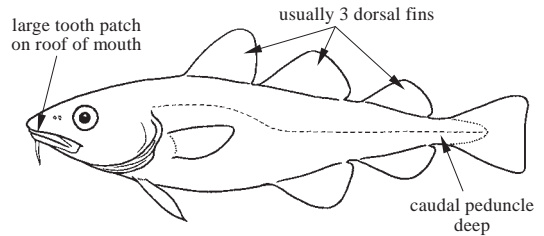
Similar families occurring in the area

Bythitidae: 1 long-based dorsal fin; anterior nostril immediately above upper lip in most; viviparous, males with an external intromittent organ.

Gadidae: usually 3 dorsal fins and 2 anal fins, caudal fin large, truncate to forked, caudal peduncle deep; large tooth patch on roof of mouth (vomer); no light organ; chin barbel in most species.



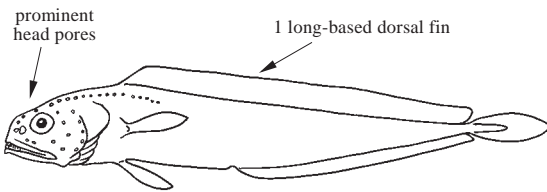
Bythitidae



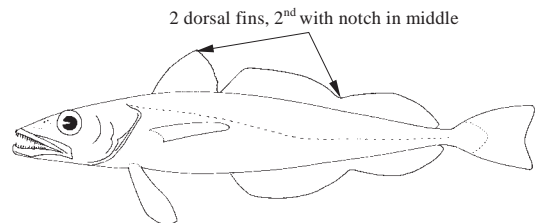
Gadidae

Melanonidae: 1 long-based dorsal fin, sometimes with an anterior lobe that may appear to be a separate fin; mesopelagic or bathypelagic; large, prominent head pores; free neuromasts in short longitudinal ridges cover extensive surfaces of head; no chin barbel; no light organ.

Merlucciidae: 2 dorsal fins, 1 anal fin, the second dorsal and anal fins similar in size and shape, with notch in middle; V-shaped crest on top of head; no chin barbel.



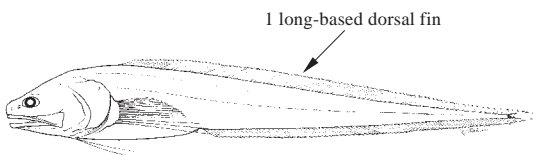
Melanonidae



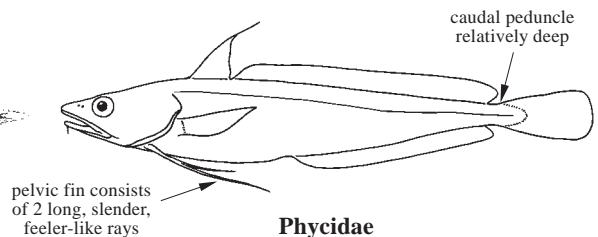
Merlucciidae

Ophidiidae: 1 long-based dorsal fin; caudal fin connected with dorsal and anal fins; pelvic fins with 0 to 2 rays, the bases close together, without a broad-scaled space between.

Phycidae: 2 dorsal fins; teeth on vomer well developed; no connection of swimbladder to back of skull; caudal peduncle relatively deep; pelvic fin consists of 2 long, slender, feeler-like rays, the longest extending close to or beyond vent; no light organ.



Ophidiidae



Phycidae

Key to the species of Moridae occurring in the area

- 1a. Snout spade-shaped when viewed from above (Fig. 1) *Antimora rostrata*
- 1b. Snout rounded when viewed from above → 2

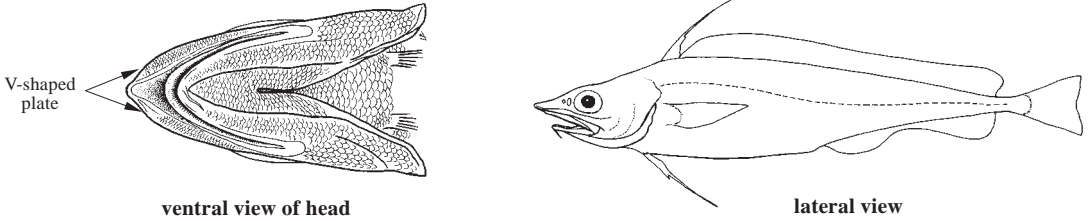


Fig. 1 *Antimora rostrata*

- 2a. Chin barbel absent → 3
- 2b. Chin barbel present → 5

- 3a. Anal fin notably indented, sometimes appearing as 2 fins, its origin well behind vertical through origin of second dorsal fin; caudal fin forked; lower jaw stout, longer than upper *Halargyreus johnsonii* (Fig. 2)

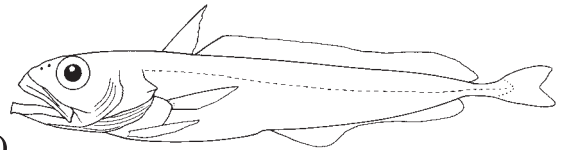
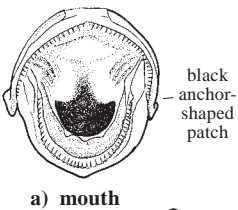


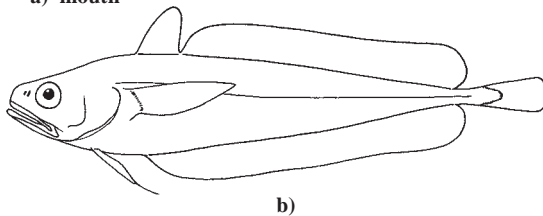
Fig. 2 *Halargyreus johnsonii*

- 3b. No deep indentation in anal fin, its origin below first dorsal fin; caudal fin with rounded posterior margin; lower jaw shorter than upper (*Gadella*) → 4

- 4a. Prominent black anchor-shaped pigment patch on tongue (Fig. 3a); large canine-like teeth confined to front of mouth *Gadella imberbis* (Fig. 3b)
- 4b. No anchor-shaped pigment patch on tongue; large canine-like teeth interspersed with smaller teeth along most of upper and lower jaws *Gadella maraldi* (Fig. 4)



a) mouth



b)

Fig. 3 *Gadella imberbis*

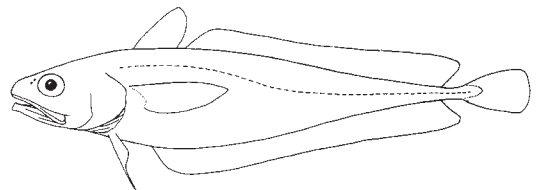


Fig. 4 *Gadella maraldi*

- 5a. A small black fossa of light organ (ADW) on abdomen anterior to anus (Fig. 5) . . . (***Physiculus***) → 6
- 5b. No black fossa on abdomen → 12

- 6a. ADW large, situated at or close behind transverse line connecting pelvic-fin bases (0 to 13% of distance between pelvic and anal fins ["distance V-A"^{1/}], its diameter less than 6.5 times into distance V-A (Fig. 5a) → 7
- 6b. ADW smaller, situated well behind pelvic-fin bases (17 to 40% of distance V-A), its diameter more than 6.5 times into distance V-A. → 8

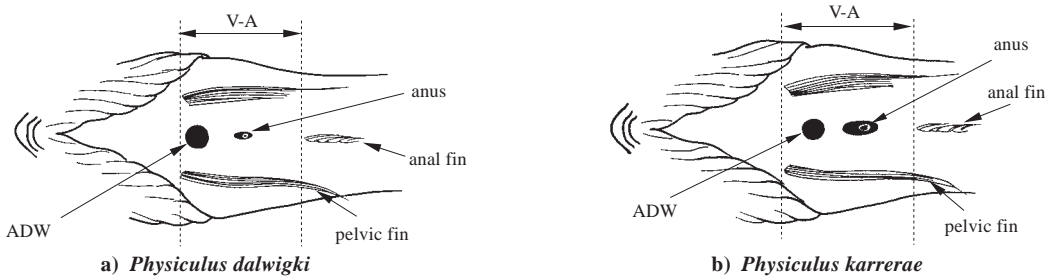


Fig. 5 ventral view

(V-A = pelvic to anal-fin distance; ADW = dermal window of light organ)

- 7a. Anal fin with 66 to 75 rays; second dorsal fin with 63 to 68 rays; scales in lateral series less than 136; ADW situated at or immediately behind transverse line connecting pelvic-fin bases (Fig. 5a) ***Physiculus dalwigki*** (Fig. 6)
- 7b. Anal fin with 72 to 78 rays; second dorsal fin with 68 to 76 rays; scales in lateral series about 137 to 156; ADW situated distinctly behind transverse line connecting pelvic-fin bases (Fig. 5b). ***Physiculus karrerae*** (Fig. 7)

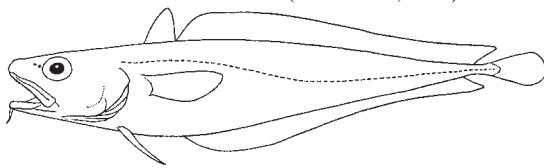
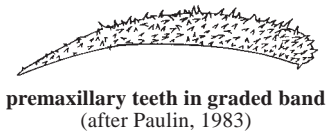


Fig. 6 *Physiculus dalwigki*

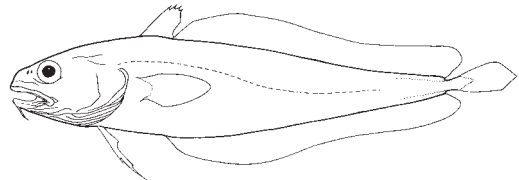


Fig. 7 *Physiculus karrerae*

- 8a. Lateral-line canal continuous to posterior end of second dorsal fin . ***Physiculus helenaensis*** (Fig. 8)
- 8b. Lateral-line canal broken into segments posteriorly, unbroken portion not extending beyond mid-point of second dorsal fin → 9 (Fig. 9)

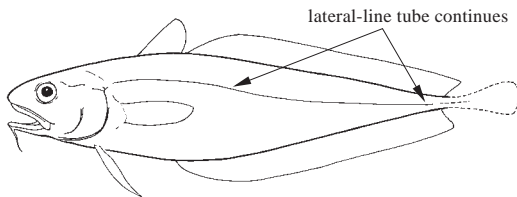
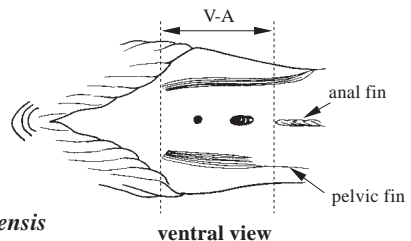


Fig. 8 *Physiculus helenaensis*



^{1/} Equivalent to "InV-an" of Paulin, 1989.

- 9a. Pectoral fin with 28 or 29 rays
 ***Physiculus maslowskii*** (Fig. 9)
- 9b. Pectoral fin with 27 or fewer rays . . → 10
- 10a. Second dorsal fin with 63 to 71 rays; scale rows from base of first dorsal to lateral line 7 or 8 → 11
- 10b. Second dorsal fin with 50 to 62 rays; scale rows from base of first dorsal to lateral line 8 to 14 → 12

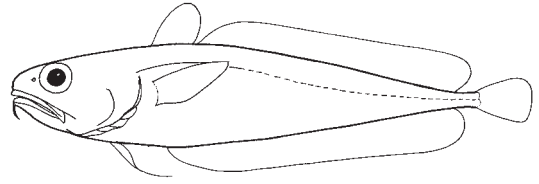


Fig. 9 *Physiculus maslowskii*

- 11a. Anterior half or so of body completely encircled by a broad, bluish black girdle; scales in lateral series 126 to 130 ***Physiculus cyanostrophus*** (Fig. 10)
- 11b. Body not encircled by broad dark band; scales in lateral series about 90 ***Physiculus micro barbata*** (Fig. 11)

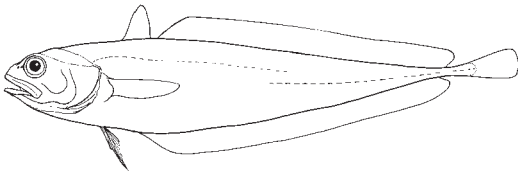


Fig. 10 *Physiculus cyanostrophus*

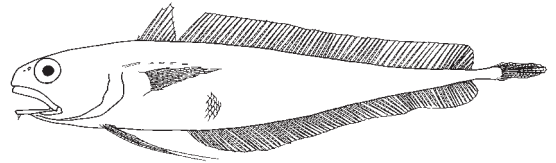


Fig. 11 *Physiculus micro barbata*

- 12a. First dorsal fin with 8 to 10 rays; gill rakers long and sharply tipped; scale rows from base of first dorsal fin to lateral line 9 or 10 ***Physiculus capensis*** (Fig. 12)
- 12b. First dorsal fin with 10 to 12 rays; gill rakers moderately long, blunt tipped; scale rows from base of first dorsal fin to lateral line 10 to 12 ***Physiculus huloti*** (Fig. 13)

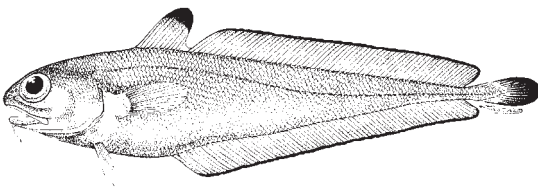
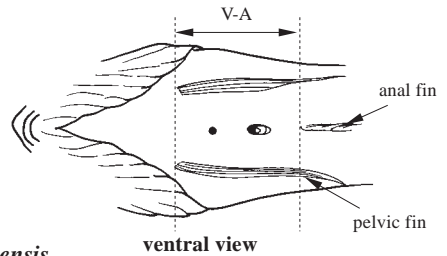


Fig. 12 *Physiculus capensis*



- 13a. Anal fin notably indented, sometimes appearing as 2 fins; pelvic fins with 1 long ray in each → 14
- 13b. Anal fin not notably indented; pelvic fins with 2 long rays in each (***Laemonema***) → 15

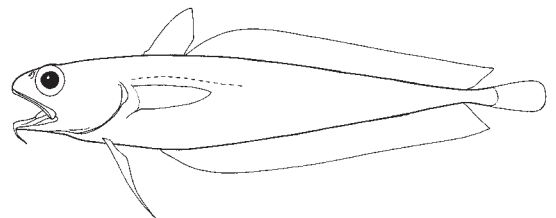


Fig. 13 *Physiculus huloti*

- 14a. Longest ray in first dorsal fin much shorter than head length ***Mora moro*** (Fig. 14)
- 14b. Longest ray in first dorsal fin about equal to or longer than head length
 ***Lepidion guentheri*** (Fig. 15)

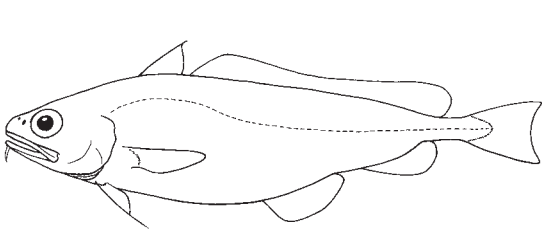


Fig. 14 *Mora moro*

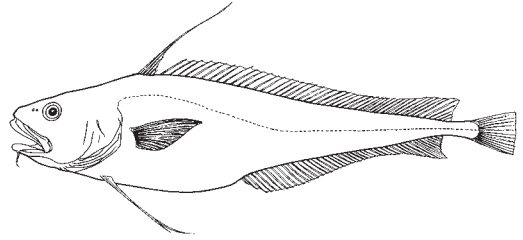


Fig. 15 *Lepidion guentheri*
(from Maul, 1952)

- 15a. Anal fin with 48 to 54 rays, second dorsal fin with 50 to 57 rays; scale rows between first dorsal fin and lateral line 14 to 19 ***Laemonema robustum*** (Fig. 16)

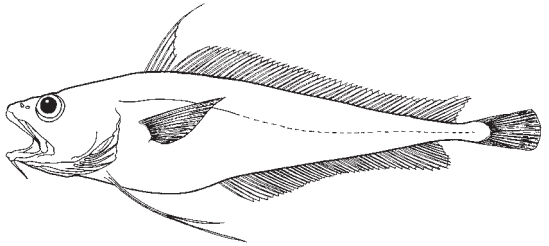


Fig. 16 *Laemonema robustum*
(from Maul, 1952)

- 15b. Anal fin with 57 to 72 rays, second dorsal fin with 58 to 68 rays; scale rows between first dorsal fin and lateral line 12 or fewer → 16

- 16a. Second dorsal fin with 63 to 72 rays; anal fin with 60 to 69 rays; scale rows between first dorsal fin and lateral line 10 to 13; longitudinal scale rows 120 to 140 . ***Laemonema laureysi*** (Fig. 17)
- 16b. Second dorsal fin with 58 to 62 rays; anal fin with 57 to 62 rays; scale rows between first dorsal fin and lateral line 8 or 9; longitudinal scale rows 100 to 111. . . ***Laemonema yarrellii*** (Fig. 18)

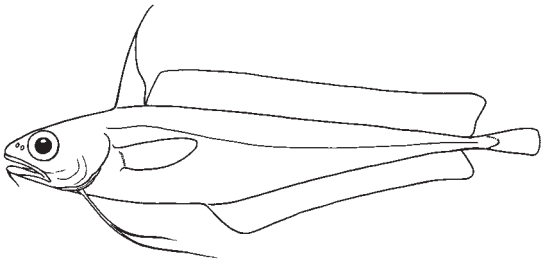


Fig. 17 *Laemonema laureysi*

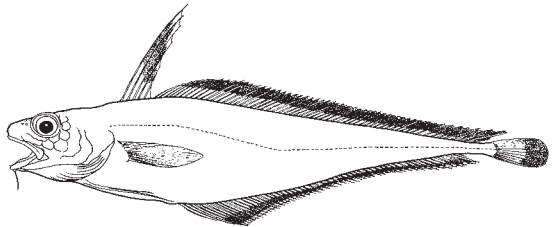



Fig. 18 *Laemonema yarrellii*

List of species occurring in the area

The symbol  is given when species accounts are included.


 *Antimora rostrata* (Günther, 1878).


 *Gadella imberbis* (Vaillant, 1888).

 *Gadella maraldi* (Risso, 1810)

 *Halargyreus johnsonii* Günther, 1862.

 *Laemonema laureysi* Poll, 1953.

 *Laemonema robustum* Johnson, 1862.

 *Laemonema yarrellii* (Lowe, 1838).

 *Lepidion guentheri* (Giglioli, 1880).

 *Mora moro* (Risso, 1810).

Physiculus capensis Gilchrist, 1922. To 18 cm. Guinea Bissau; South Africa from Cape Town (Atlantic) to Durban (Indian Ocean).

Physiculus cyanostrophus Anderson and Tweddle, 2002. To 31 cm TL. Mauritania to northern Angola.

 *Physiculus dalwigki* Kaup, 1858.

Physiculus helenensis Paulin, 1989. To 25 cm. South Atlantic off St Helena.

 *Physiculus huloti* Poll, 1953.

Physiculus karrerae Paulin, 1989. To more than 35 cm. St Helena; also Valdivia Bank (SE Atlantic), Caribbean, Bermuda and Brazil.

Physiculus maslowskii Trunov, 1991. To at least 19 cm. Walvis Ridge west of Angola, Gulf of Guinea (ca. 03°S, 01°E).

Physiculus microbarbata Paulin and Matallanas, 1990. To at least 16 cm. Guinea Bissau.

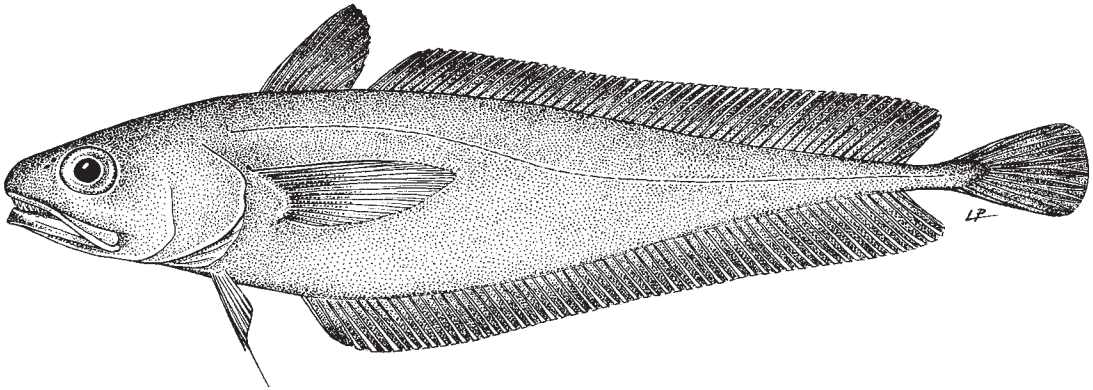
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***Gadella maraldi* (Risso, 1810)**

Frequent synonyms / misidentifications: *Merluccius attenuatus* Cocco, 1829; *Strinsia tinca* (non Rafinesque); *Merluccius ambiguous* Lowe, 1840; *M. uraleptus* (Costa, 1849) / *Brosmiculus imberbis* (non Vaillant, 1888).

FAO names: En – Gadella.



Diagnostic characters: Body fusiform, tapering to narrow caudal peduncle, greatest depth about 4.5 in standard length; head 3.7 to 4.0 times in standard length. Eye moderate, about 4 times in head length, less than interorbital space, about equal to snout length. **Jaw teeth in 2 rows, large, widely spaced teeth interspersed with small teeth; no teeth on palate. Chin barbel absent.** Two dorsal fins close together, the first slightly higher than anterior rays of second dorsal, short-based, with 11 or 12 rays; second dorsal fin long-based, with about 60 rays; **anal fin longer than second dorsal, with 66 or 67 rays;** caudal fin small, posterior margin rounded; **pelvic fins with 7 rays, second ray prolonged, extending slightly past anal-fin origin (shorter in adults).** Scales small, about 8 rows between first dorsal fin and lateral line. **Two small black fossae of light organ on abdomen; 1 immediately before anus, another smaller one close to base of pelvic fins.** **Colour:** light brown overall, bluish black over abdomen; fins dirty white, **distal margins of vertical fins dark brown.**

Size: To about 30 cm standard length.

Habitat, biology, and fisheries: Benthopelagic at depths from 150 to at least 700 m. Spawning occurs in spring; sexual maturity at about 15 cm total length. Taken as bycatch in bottom trawls and bottom longlines; occasionally sold fresh in fish markets but not of significant commercial importance.

Distribution: Iberian Peninsula (and offshore ridges and banks) south to Morocco and probably to Senegal; Azores, Canaries, Madeira; also Mediterranean.

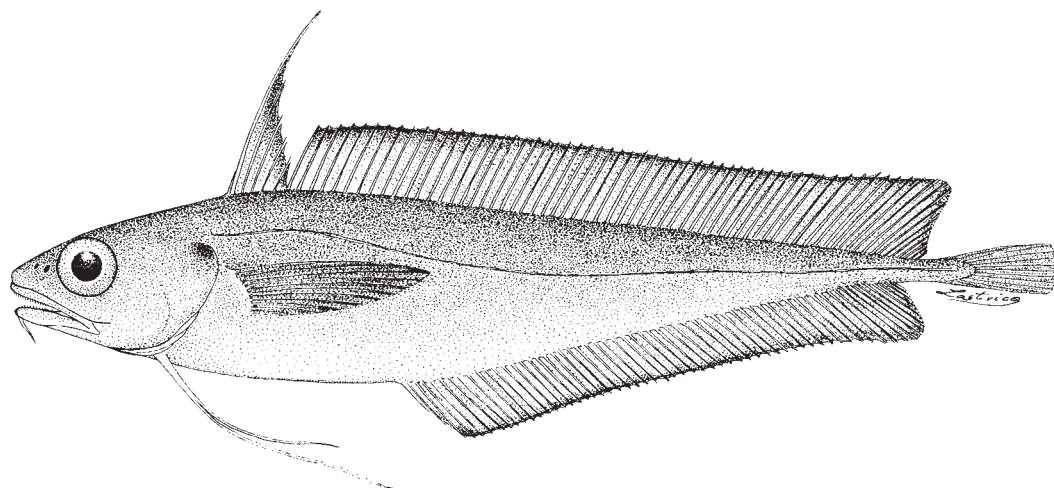
Remarks: Often confused with *Gadella imberbis*, which is found in tropical waters of West Africa where *G. maraldi* probably does not occur.



***Laemonema laureysi* Poll, 1953**

Frequent synonyms / misidentifications: None / None.

FAO names: En – Guinean codling.



Diagnostic characters: Body fusiform, slightly compressed posteriorly, depth about 4.5 to 5.0 times in standard length; caudal peduncle narrow. **Eye large**, 3 to 3.5 times in head length. Lower jaw slightly shorter than upper. Jaw teeth small, in bands; small patch of teeth on vomer. **Small chin barbel present**. Two dorsal fins close together, the first short-based with 5 rays, the first ray a moderately elongated filament; second dorsal fin long-based with 63 to 72 rays; **1 long anal fin, with 60 to 69 rays, shorter than second dorsal**; caudal fin small, rounded; **pelvic fins with 2 long rays, the first extending slightly beyond anal-fin origin**. Scales small, 10 to 12 rows between first dorsal-fin base and lateral line. No light organ. **Colour:** medium to dark grey-brown, lower sides and belly whitish; mouth and gill cavities pale, with heavy peppering proximally; pectoral fin with lowermost rays pale to light dusky; pelvic fins whitish.

Size: To about 30 cm.

Habitat, biology, and fisheries: Benthopelagic on outer continental shelf and upper slope from about 220 to 500 m, most abundant around 300 m over soft bottom. Life history not known. Feeds mostly on fish and decapod crustaceans. Caught in trawls. Locally abundant, but taken only as bycatch.

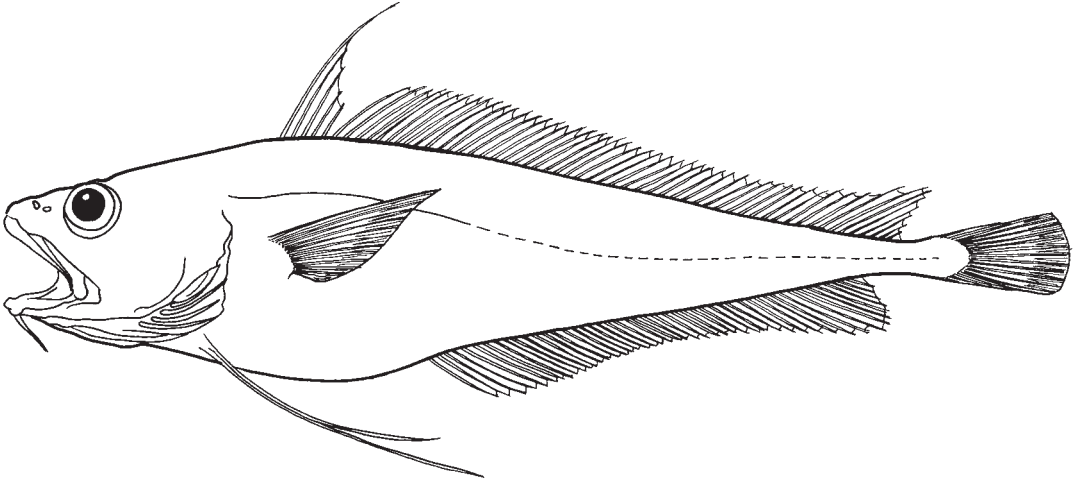
Distribution: West Africa from Senegal (15°N) to northern Namibia (about 18°S).



***Laemonema robustum* Johnson, 1862**

Frequent synonyms / misidentifications: *Haloporphyreus modestum* Franz, 1910 / None.

FAO names: En – Robust codling.



Diagnostic characters: Body stout, greatest depth 3.6 to 4.6 times in standard length, tapering to narrow caudal peduncle; head 3.3 to 4 times in standard length. Eye moderate, about 4 times in head length, slightly greater than interorbital. Jaw teeth small, in bands, outer series slightly enlarged; small patch of teeth on vomer. **Small chin barbel present.** Two dorsal fins close together, the first high and short-based with 5 or 6 rays (first ray small and hidden), **longest ray about as long as or shorter than head length;** second dorsal fin long-based, with 50 to 57 rays; **anal fin long-based with 48 to 54 rays, shorter than second dorsal fin;** caudal fin small, hind margin rounded; **pelvic fins with 2 long rays,** extending slightly past anal-fin origin. Scales small, 14 to 19 rows between first dorsal fin and lateral line. **No light organ. Colour:** dark brown, lighter on belly; mouth and gill cavities whitish to greyish brown; **distal margins of first dorsal, pectoral, and anal fins white, most of anal and caudal fins dark brownish red;** pelvic fins whitish.

Size: To about 35 cm standard length.

Habitat, biology, and fisheries: Benthopelagic at depth from 336 to 1 200 m. Life history not known. Sold fresh in fish markets in Madeira, where fishermen capture it on longlines.

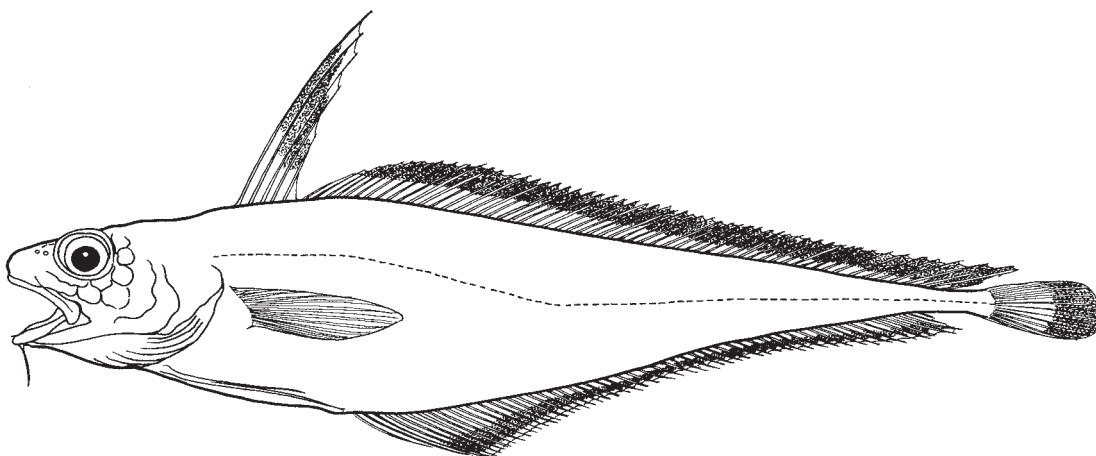
Distribution: Widely distributed off oceanic islands and seamounts of Atlantic and Pacific; in Atlantic, known from off Madeira and St Helena Islands.



Laemonema yarrellii (Lowe, 1838)

Frequent synonyms / misidentifications: *Laemonema curtipes* Bischoff and Maul, 1989 / None.

FAO names: En – Codling.



Diagnostic characters: Body slender, tapering posteriorly to narrow caudal peduncle; head short, about 4.2 to 5.0 times in standard length. **Eye large**, about 3 times in head length, longer than snout and interorbital. Jaw teeth small, in bands; a patch of a few small teeth on vomer. **Small chin barbel present**. Two dorsal fins close together, **the first high and short-based with 6 rays, longest rays about as long as or longer than head length**; second dorsal fin long-based, with 58 to 62 rays; **anal fin long-based with 57 to 62 rays, about equal to second dorsal fin**; caudal fin small, rounded; **pelvic fins with 2 long rays, extending to or falling short of anal fin**. Scales small, 8 or 9 rows between first dorsal fin and lateral line. **No light organ**. **Colour:** light to medium brown, lower sides and belly whitish; mouth and gill cavities whitish; **first and second dorsal fins, anal fin, and caudal fin black on distal margins, proximal parts pale to whitish, sometimes narrow outer margin of dorsal fins whitish**.

Size: To about 20 cm standard length.

Habitat, biology, and fisheries: Benthopelagic at depths from about 220 to 550 m, but may occur deeper. Life history not known.

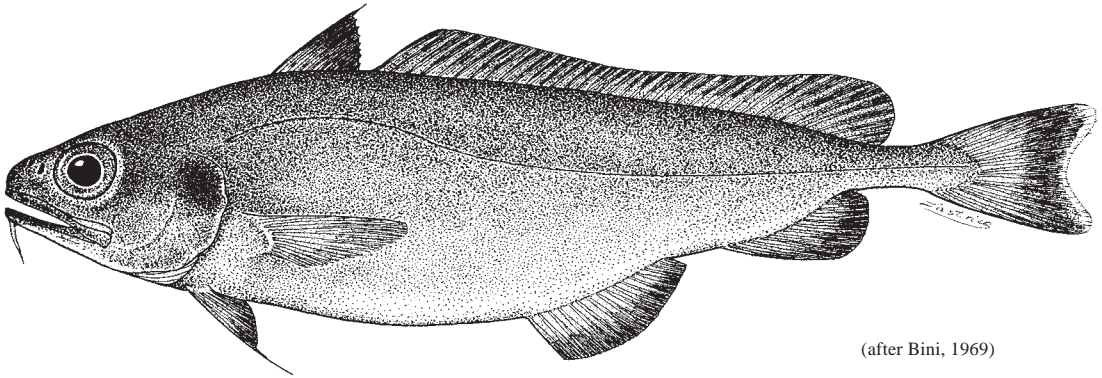
Distribution: Atlantic off Madeira, Seine Seamount, Great Meteor Bank, Guinea Bissau and Angola; also known from Bermuda in western Atlantic in 235 to 1 640 m.



***Mora moro* (Risso, 1810)**

Frequent synonyms / misidentifications: *Mora mediterranea* Risso, 1827; *M. pacifica* Waite, 1914; *M. dannevigii* Whitley, 1948 / None.

FAO names: En – Common mora; Fr – Mora commun; Sp – Mollera moranella.



(after Bini, 1969)

Diagnostic characters: Body fusiform, slightly compressed posteriorly, depth about one-fifth of standard length; caudal peduncle relatively narrow. **Eye large**, 2.5 to 3.25 times in head length. Jaw teeth small, in bands. **Chin barbel present**. Two dorsal fins, the first short-based with 7 to 11 rays, anterior ray slightly elongated but much shorter than head length; second dorsal fin long-based; **anal fin deeply notched, appearing as 2 separate fins**; caudal fin truncate to slightly forked; **pelvic fins with 5 or 6 rays**, 1 or 2 slightly prolonged. Scales small, rows along side of body about 75 to 100. **No ventral light organ**. **Colour:** medium to dark grey-brown, lower sides and belly whitish; mouth and gill cavities black; fins pale brown.

Size: To about 80 cm.

Habitat, biology, and fisheries: Benthopelagic on lower continental shelf and upper slope from less than 500 to about 2 500 m, commonly around 500 to 800 m. Generalized feeder on fish, crustaceans, and cephalopods (squid). Spawning in Mediterranean probably during winter and early spring; eggs and larvae pelagic. Caught in trawls and on longlines. Flesh soft but palatable; marketed fresh; common in fish markets in Madeira; constitutes a small fishery in the area, but no separate statistics maintained.

Distribution: Widespread in temperate waters of eastern North Atlantic (Iceland and Faeroe Islands to northwest African coast), Azores, Madeira, Canaries, and also in western Mediterranean), southern Australia, New Zealand, off Chile (Pacific), and south of Madagascar.

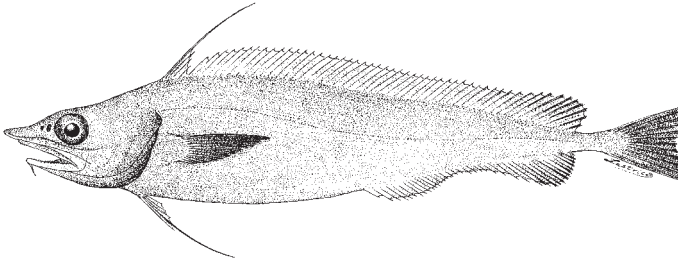
Remarks: The New Zealand and Australian populations have been given separate names (*Mora pacifica* and *M. dannevigii*, respectively) and may be distinct from the Atlantic population.



Antimora rostrata (Günther, 1878)

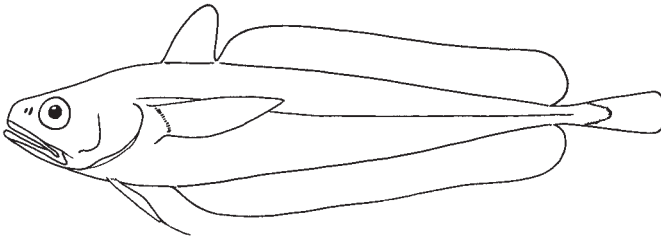
En – Blue antimora; **Fr** – Antimora bleu; **Sp** – Mollera azul.

Maximum size at least 65 cm, commonly to 50 cm; males smaller than females. Benthopelagic over continental slope in about 350 to 3 000 m. Little known of life history; females probably reach maturity at more than 50 cm and occur at greater depths than males. Recorded from the Walvis Ridge. Of no commercial importance, but sometimes taken in bycatch of trawlers fishing deep waters.

***Gadella imberbis*** (Vaillant, 1888)

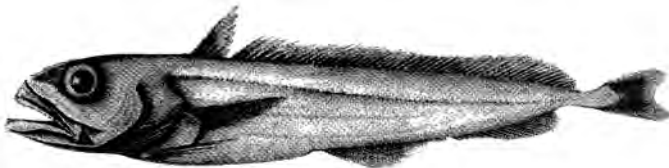
En – Beardless codling; **Fr** – Moro imberbe; **Sp** – Bacaladilla imberbe.

Maximum size 20 to 25 cm total length, commonly to 15 cm. Benthopelagic over continental slope in about 350 to 800 m. Little known of life history; often abundant. Distribution in Atlantic from Cape Verde Islands to Namibia in eastern Atlantic, from Cape Cod to southern Brazil in western Atlantic. Taken as bycatch by deepwater shrimp trawlers in western Atlantic, but not utilized.

***Halargyreus johnsonii*** Günther, 1862

En – Slender codling.

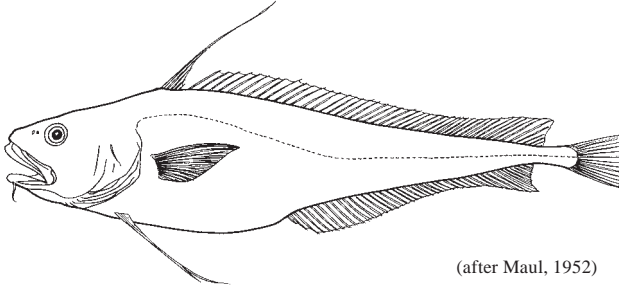
Maximum size to 56 cm total length. Benthopelagic to pelagic over continental slope from 700 to greater than 1 400 m. Little known of biology; feeds on pelagic crustaceans and probably fish and cephalopods. Antitropical in Atlantic and Pacific; in eastern North Atlantic from Iceland south to Morocco and Madeira. Locally abundant but apparently of no commercial interest.



***Lepidion guentheri* (Giglioli, 1880)**

En – Guenther's codling.

Maximum size 81 cm total length. Benthopelagic on island slopes. No information on life history. Distribution eastern North Atlantic off Madeira, Azores, and off Iberian Peninsula. Marketed fresh in Madeira. Uncommon.



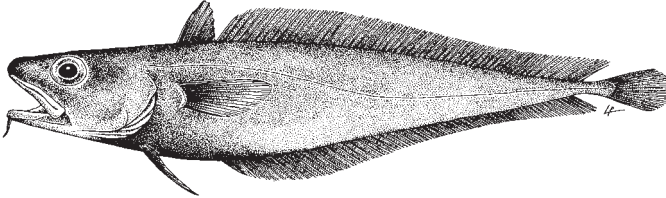
(after Maul, 1952)



***Physiculus dalwigki* Kaup, 1858**

En – Black codling; **Sp** – Abrótea de natura.

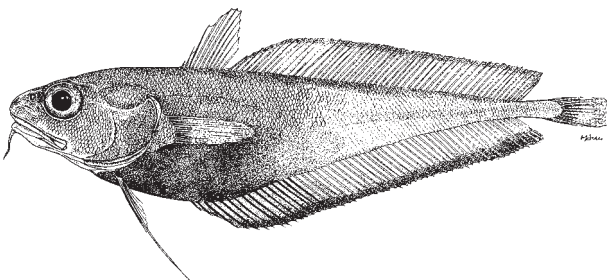
Maximum size about 25 cm total length. Benthopelagic over continental slope in about 100 to 300 m. Eggs and larvae pelagic; spawns in Mediterranean in spring. Distribution northwestern Africa, from Straits of Gibraltar to Mauritania, Madeira, Great Meteor Bank, and in western Mediterranean. Taken as bycatch by bottom trawls and longlines; marketed mostly fresh.



***Physiculus huloti* Poll, 1953**

En – Brown codling; **Sp** – Abrotea.

Maximum size about 20 cm total length. Benthopelagic over continental shelf and upper slope in about 90 to 260 m. Spawning occurs during the southern spring through autumn (September to April). Feeds on small fish and probably various invertebrates. Distribution in eastern Atlantic from Mauritania south to northern Angola (to 10°39'S). Uncommon.

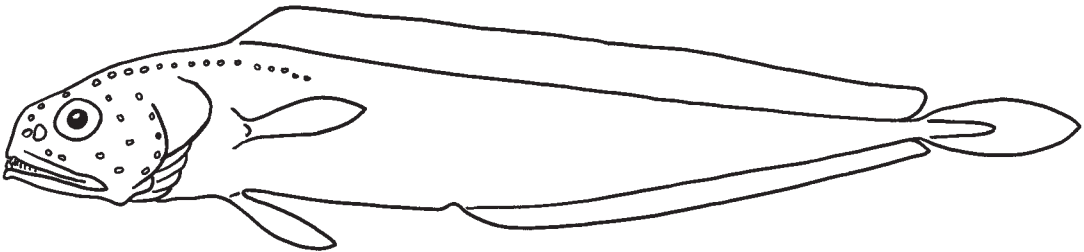


MELANONIDAE

Pelagic cods

by T. Iwamoto, California Academy of Sciences, San Francisco, CA and D.M. Cohen, Bodega Bay, CA, USA

Diagnostic characters: Small (to 28 cm, commonly 10 to 15 cm); body elongated, compressed behind head; caudal peduncle narrow. **Head covered with free neuromasts aligned longitudinally into short ridges; pores of sensory lateralis system on head large, prominent.** Mouth large, upper jaw extending to below posterior third of orbit. Barbel absent. Teeth in irregular row in lower jaw, in 2 or more rows in upper jaw; **prominent teeth on vomer and palatines. One long-based dorsal fin; 1 long-based anal fin with straight margin and rays shorter than dorsal rays;** pelvic fin with 7 or 8 rays, none prolonged, base of fin under pectoral-fin base; caudal fin small, somewhat rounded to pointed, not connected to dorsal and anal fins. **Colour:** usually black or brownish black overall.



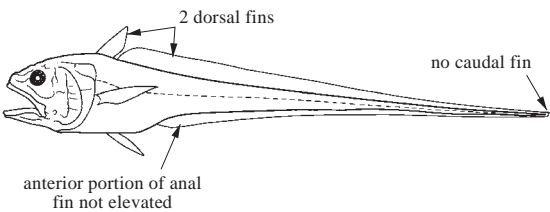
Habitat, biology, and fisheries: Oceanic, meso- to bathypelagic, widely distributed in subantarctic, temperate, and tropical waters. Uncommon and poorly known; of no importance to fisheries.

Remarks: Only 1 genus and 2 widespread species.

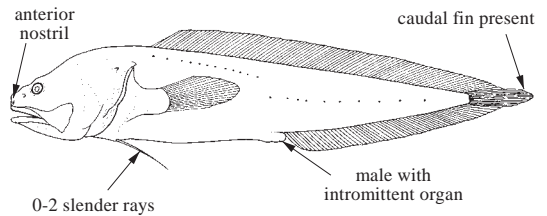
Similar families occurring in the area

Bathygadidae: 2 dorsal fins, first with a slightly to greatly elongated spinous ray; no caudal fin; chin barbel developed in some; jaw teeth in bands, all small; no teeth on palate.

Bythitidae: dorsal and anal fins often connected to caudal fin; 0 to 2 pelvic-fin rays; anterior nostril immediately above upper lip in most; viviparous, males with an external intromittent organ.



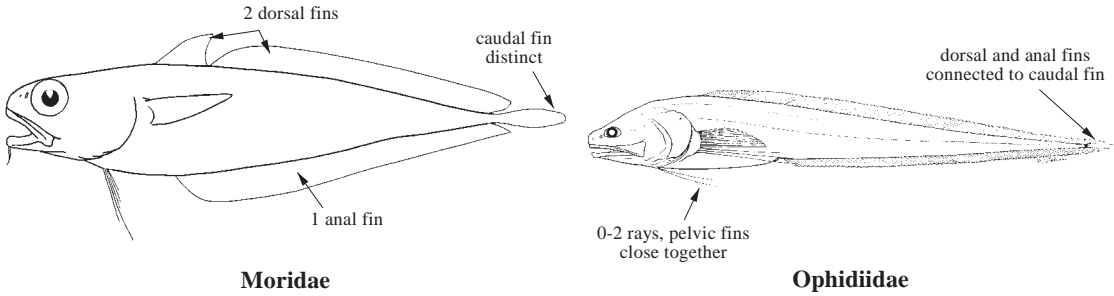
Bathygadidae



Bythitidae

Moridae: 2 dorsal fins; 1 anal fin; jaw teeth small, teeth few or lacking on vomer, none on palatines; swimbladder with anterior projections that connect to rear of skull.

Ophidiidae: dorsal and anal fins connected to caudal fin; bases of pelvic fins close together, without a broad scaly space between; 0 to 2 pelvic-fin rays.



Key to the species of Melanonidae occurring in the area

- 1a. Large, fang-like teeth in lower jaw; pectoral-fin rays 14 to 16 ***Melanonus zugmayeri***
- 1b. Teeth in lower jaw all small; pectoral-fin rays 11 to 13 ***Melanonus gracilis***

List of species occurring in the area

- Melanonus gracilis* Günther, 1878. To 15 cm. Southern Ocean, circumantarctic, rarely entering temperate waters; rare in ECA area.
- Melanonus zugmayeri* Norman, 1930. To 25 cm. Circumglobal in tropical and subtropical seas; widespread in eastern and western North Atlantic.

References

Cohen, D.M., Inada, T., Iwamoto, T. & Scialabba, N. 1990. FAO species catalogue. Vol. 10. Gadiform fishes of the world (Order Gadiformes). An annotated and illustrated catalogue of cods, hakes, grenadiers and other gadiform fishes known to date. *FAO Fisheries Synopsis*, (125)Vol.10: 442 p.

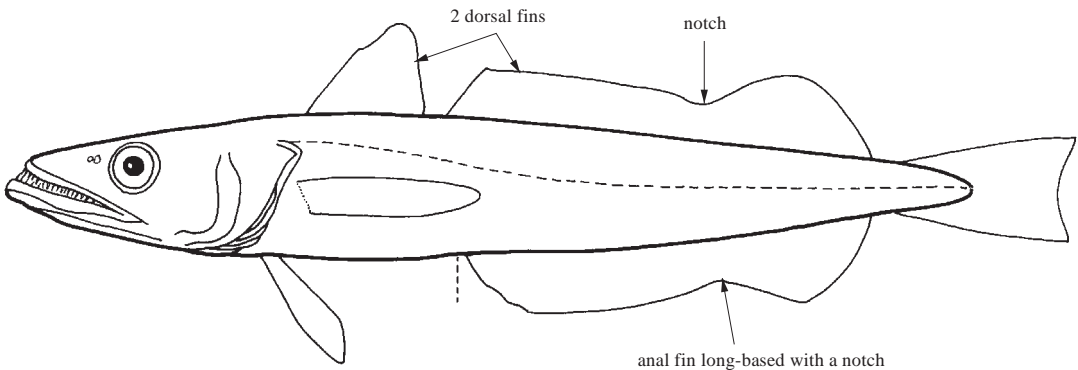
Howes, G.J. 1993. Anatomy of the Melanonidae (Teleostei: Gadiformes), with comments on its phylogenetic relationships. *Bulletin of the Natural History Museum (Zoology)*, 59(1): 11–31.

MERLUCCIIDAE

Merluccid hakes

by D. Lloris, Instituto de Ciencias del Mar de Barcelona, Spain; J. Matallanas, Universidad Autónoma de Barcelona, Spain and T. Iwamoto California Academy of Sciences, San Francisco, CA, USA

Diagnostic characters: Medium-sized to large species to greater than 100 cm, commonly 30 to 60 cm. Body long, slender, laterally compressed posteriorly, ending in a separate truncated caudal fin or tapering to a point. Head large, slightly depressed and cylindrical (*Merluccius*) or laterally compressed, with **low V-shaped ridge on upper side of head**. **Mouth large, terminal or lower jaw slightly protruding beyond upper jaw. Strong, pointed teeth in jaws; roof of mouth with vomerine teeth.** Chin barbel absent. Seven branchiostegal rays. Outer gill rakers on first arch long and slender (except short in adults of *Lyconus brachycolus*). Two dorsal fins; **first dorsal fin short-based and roughly triangular; second dorsal fin long-based, with a distinct notch, separated from truncated caudal fin (*Merluccius*) or confluent with pointed caudal (*Lyconus*, *Macruronus*).** Anal fin long-based, with a notch in subfamily Merlucciinae but not in Macruroninae; pelvic fins thoracic, below or anterior to pectoral fin. Scales cycloid, deciduous. **Colour:** variously metallic grey to silvery, especially below mid-line of body; belly white, light grey or blackish.

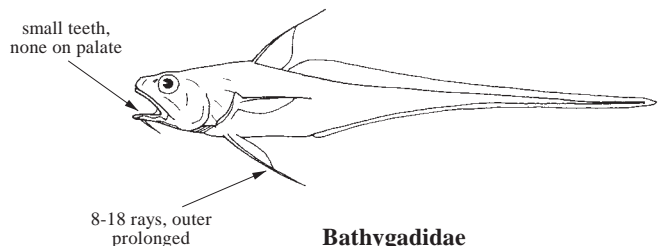


Habitat, biology, and fisheries: Demersal and benthopelagic, often hovering pelagically in large shoals over continental slopes at considerable depths. Feeds on wide variety of prey organisms including fish, crustaceans, and cephalopods.

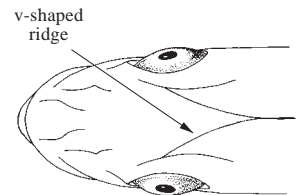
Remarks: Howes (1991) erected the family Macruronidae to include *Macruronus* and *Lyconodes*, leaving *Merluccius* as the only member of the Merlucciidae. A general lack of consensus on the extent of the family Merlucciidae forces us to take a conservative approach and continue recognition of 2 subfamilies, Merlucciinae (*Merluccius*), and Macruroninae (*Macruronus*, *Lyconodes*, and *Lyconus*). In the eastern central Atlantic, only *Merluccius* spp., *Lyconus brachycolus* Holt and Byrne, 1906, and *Macruronus maderensis* Maul, 1951 are known, but Howes (1991) considers *L. brachycolus* as a *Macruronus*, and *M. maderensis* as uncertain status, as it was described from 8 juveniles with no other specimens known.

Similar families occurring in the area

Bathygadidae: second dorsal fin better developed than anal fin; jaw teeth all small, in bands; no teeth on palate; barbel developed in some; outer pelvic ray usually prolonged.



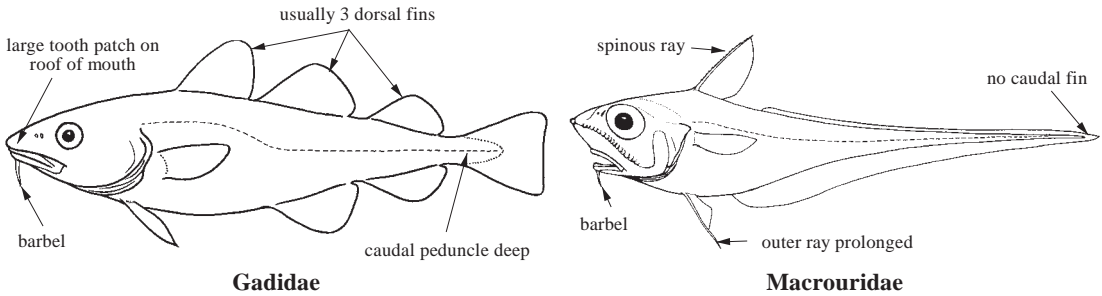
Bathygadidae



dorsal view of head

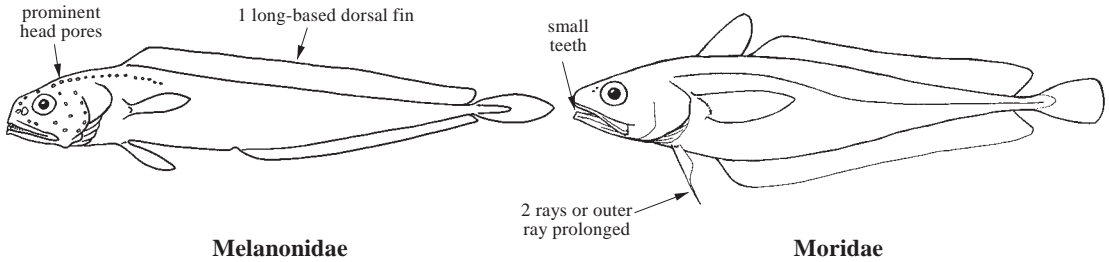
Gadidae: barbel present on chin; jaw teeth small; head of vomer with a large tooth patch in most species; 2 or 3 dorsal fins and 1 or 2 anal fins, without a distinct notch.

Macrouridae: 2 dorsal fins separated by a distinct gap; anal fin without notch or elevated lobe, its rays generally much longer than opposites of long-based second dorsal fin, the two fins confluent around tail tip; no caudal fin; no teeth on palate; outer gill rakers on first arch short, tubercular; first gill arch restricted dorsally and ventrally by opercular membrane; snout slightly to greatly protruding; scales in most species covered with spinules.



Melanonidae: dorsal and anal fins separated from caudal fin; head covered with short, low ridges of free neuromasts; head pores large, prominent.

Moridae: jaw teeth small; teeth few or lacking on head of vomer; second dorsal fin without a notch; chin barbel present in some species; pelvic fins with 2 rays or outer rays produced into filaments.



Key to the species of Merlucciidae occurring in the area

- 1a. Caudal fin tapering to a point and connected with second dorsal and anal fins (Fig. 1) ***Lyonus brachycolus***
- 1b. Caudal fin separate, not connected with second dorsal and anal fins (*Merluccius*) → 2

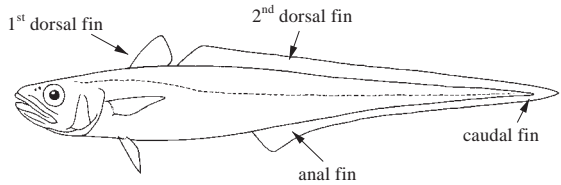


Fig. 1

- 2a. Dark patch, more or less widespread and obvious on submandibular fold; lower part of preopercle and interopercle scaly → 3
- 2b. No dark patch on submandibular fold; no scales on lower part of interopercle → 5

- 3a. No scales on lacrimal ***Merluccius senegalensis***
 3b. Scales on lacrimal (Fig. 2) → 4
- 4a. First gill arch with 8 to 12 rakers total (Fig. 3); mouth and tongue blackish; posterior edge of caudal fin with whitish stripe ***Merluccius polli***
 4b. First gill arch with 17 to 23 rakers total; mouth and tongue greyish; posterior edge of caudal fin of uniform colour, no whitish stripe ***Merluccius paradoxus***

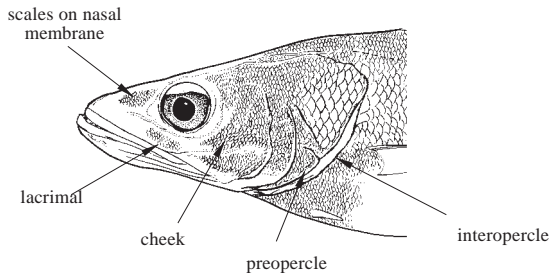


Fig. 2 *Merluccius merluccius*

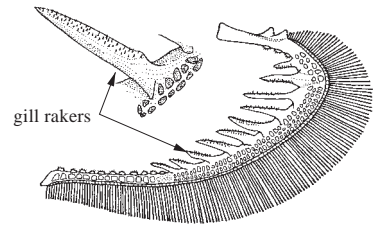



Fig. 3 *Merluccius polli*






- 5a. Lacrimal and lower part of preopercle scaly; first gill arch with 8 to 12 rakers ***Merluccius merluccius***
 5b. Lacrimal and lower part of preopercle naked; first gill arch with 15 to 20 rakers ***Merluccius capensis***

List of species occurring in the area

The symbol  is given when species accounts are included.

Lyconus brachycolus Holt and Bryne, 1906. North Atlantic (off Canada, Ireland, Madeira, Sahara) and southeastern Atlantic; rarely captured; juveniles pelagic over open ocean, adults over continental shelf and sea mounts. Synonymous with *Macruronus caninus* Maul, 1951.

Macruronus maderensis Maul, 1951. Known only from type specimens from Madeira.

-  *Merluccius capensis* Castelnau, 1861.
 *Merluccius merluccius* (Linnaeus, 1758).
 *Merluccius paradoxus* Franca, 1960.
 *Merluccius polli* Cadenat, 1950.
 *Merluccius senegalensis* Cadenat, 1950.

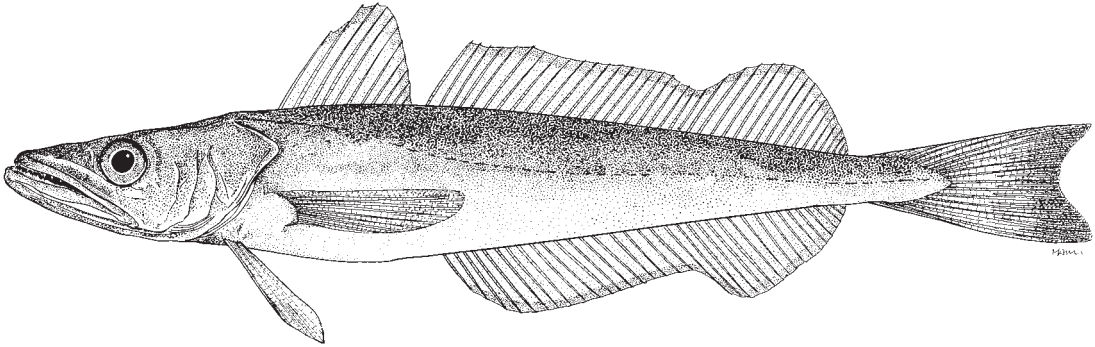
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- Howes, G. 1991. Anatomy, phylogeny and taxonomy of the gadoid fish genus *Macruronus* Günther, 1873, with a revised hypothesis of gadoid phylogeny. *Bulletin of the British Museum (Natural History), Zoology*, 57(1): 77–110.
- Lloris, D., Matallanas, J. & Oliver, P. 2004. Hakes of the world (Family Merlucciidae). An annotated and illustrated catalogue of the known hakes of the world. *FAO Species catalogue for fishery purposes*. No. 2. Rome, FAO, 57 p., 12 colour plates.

***Merluccius capensis* Castelnau, 1861**

Frequent synonyms / misidentifications: *Merluccius merluccius capensis* Castelnau, 1861 / *Gadus merluccius* (non Linnaeus, 1758); *Merluccius vulgaris* (non Fleming, 1828).

FAO names: En – Shallow-water Cape hake; Fr – Merlu côtier du Cap; Sp – Merluza del Cabo.



Diagnostic characters: Head 27 to 30% of standard length. Mouth large, upper jaw extending to below centre of eye; lower jaw prominent, projecting beyond upper. Teeth in jaws large and strong. **Total number of gill rakers on first arch 15 to 20.** Two separate dorsal fins, the first short-based, triangular, and higher than the long-based second dorsal fin, which has a distinct notch; anal fin similar to second dorsal fin; pectoral fins long and slender; pelvic fins below gill cover and well anterior to pectoral-fin base; caudal fin truncate or with margin slightly convex. **Scales on nasal membrane and lower part of cheek, none on lacrimal, lower part of preopercle, and interopercle;** lateral line with 120 to 153 scales. **Colour:** lead grey, darker dorsally than on sides, white on belly; fins greyish; no black submandibular mark.

Size: To 120 cm, commonly between 40 and 60 cm.

Habitat, biology, and fisheries: Demersal and benthopelagic in shelf and upper slope depths from 50 to 500 m, but usually between 50 and 400 m. Migrates seasonally and daily, demersal during the day and nektonic at night. Voracious predators, juveniles feed on pelagic crustaceans and myctophids; adults euryphagous, but prey mainly on myctophids, horse mackerels, sardines, macrourids, and other *Merluccius*. Males attain sexual maturity at between 28 and 67 cm. Spawning occurs year round but peaks in Cape Town region between August and September. A highly valued foodfish, marketed fresh, whole or filleted; caught primarily by trawls fishing on bottom during the day and in the water column at night. Catches usually mixed with *M. paradoxus*, and fishery statistics combined for the two species. *M. capensis* dominates catches off Namibia and most of South Africa. Combined fishery (mostly by foreign fleets) reached 100 000 tonnes in 1975, the main fishing countries are Namibia and South Africa.

Distribution: Southeastern Atlantic from southern Angola (Farta Bay, 12°30'S) to Cape of Good Hope, around Agulhas Bank into Indian Ocean to Natal (Cape St Lucia, 32°E).

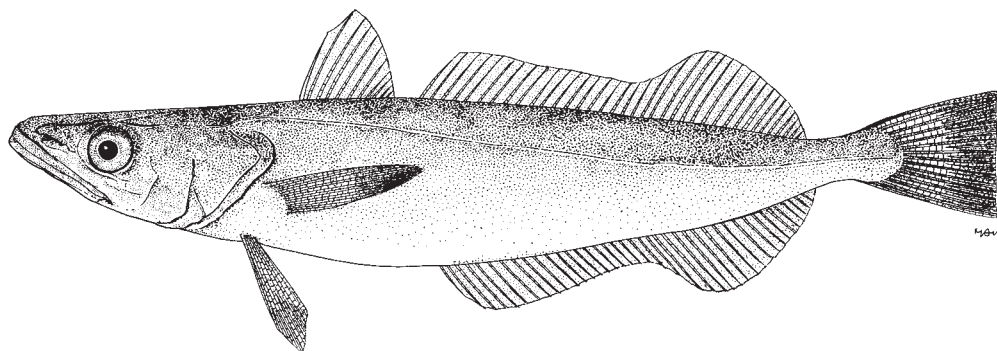
Remarks: Distribution overlaps in northern part of range with *M. polli* and in deep waters with *M. paradoxus*.



***Merluccius merluccius* (Linnaeus, 1758)**

Frequent synonyms / misidentifications: *Gadus ruber* Lacépède, 1803; *Merluccius smiridus* Rafinesque, 1812; *Onus riali* Rafinesque, 1810; *Merluccius esculentus* Risso, 1827; *Merluccius vulgaris* Fleming, 1828; *Hidronus marlucius* Minding, 1832; *Merlucius sinuatus* Swainson, 1838; *Merlucius ambiguus* Lowe, 1841; *Merlucius lanatus* Gronov, 1854; *Merluccius argentatus* Günther, 1862; *Merluccius linnei* Malm, 1877; *Trachinoides maroccanus* Borodin, 1934 / None.

FAO names: En – European hake; Fr – Merlu européen; Sp – Merluza europea.



Diagnostic characters: Head 25 to 30% of standard length. Mouth large, upper jaw extending to below centre of eye; lower jaw slightly projecting beyond upper. Teeth in jaws large and hinged. **Total number of gill rakers on first arch 8 to 12.** Two separate dorsal fins, the first short-based, triangular, and higher than the long-based second dorsal fin, which has a distinct notch; anal fin similar to second dorsal fin; pectoral fins long and slender; pelvic fins below gill cover and well anterior to pectoral-fin base; caudal fin smaller than head, becoming progressively forked with growth. **Scales on nasal membrane, lacrimal, lower part of cheek, and preopercle, none on lower part of interopercle;** lateral line more or less straight, with 127 to 156 scales. **Colour:** silvery grey dorsally, lighter on sides, white on belly; no submandibular mark.

Size: To 140 cm, commonly to about 60 cm.

Habitat, biology, and fisheries: Demersal and benthopelagic in shelf and upper slope depths from 50 to 370 m, but sometimes to greater than 1 000 m. Voracious predator of fish and crustaceans; diet changes from primarily euphausiids in young (to 15 cm) to mostly fish (especially *Micromesistius poutassou*) in adults. In Atlantic, females attain sexual maturity in 7 years and 57 cm, males in 5 years and 40 cm. A highly esteemed and valued foodfish, marketed fresh, whole or filleted; caught by trawls, seines, gillnets, and longlines by multinational fleets throughout its range. Moroccan fishing grounds one of most important for species and before EEZ declarations of 1970s, area heavily fished by foreign fleets. Catches of *M. merluccius* mixed with *M. senegalensis* off Morocco.

Distribution: Eastern Atlantic from Norway and Iceland to Mauritania (Cape Blanc, 21°N) and Mediterranean Sea.

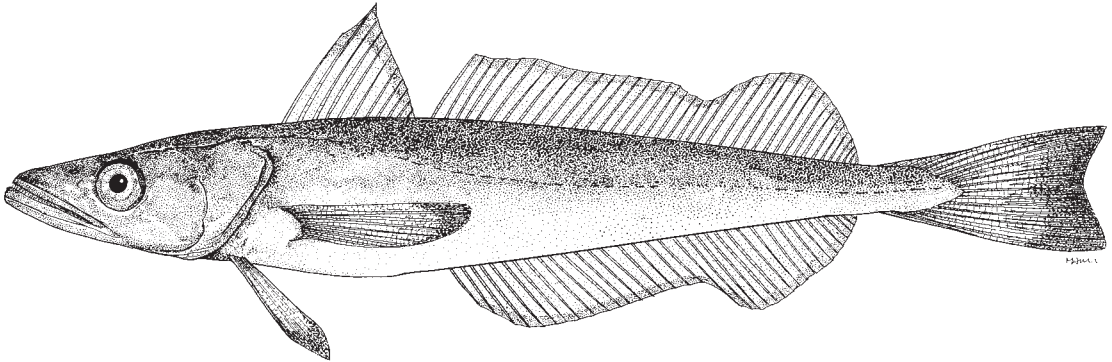
Remarks: Three subspecies recognized by Lloris *et al.* (2005): *Merluccius m. merluccius* (Linnaeus, 1758) (eastern Atlantic north of Morocco and southwestern Mediterranean), *M. m. smiridus* Rafinesque, 1810 (western and eastern Mediterranean), and *M. m. lessepsianus* Lloris, Matallanas, and Oliver, 2005 (Red Sea). After this last reference, 2 new records of the genus *Merluccius* sp. (MNHN-IC 1996-1401 and MNHN-IC 1996-1402) were collected in the Indian Ocean (northeastern of Madagascar) that suggest a relationship with the subspecies *M. m. lessepsianus*, cited in the Red Sea. If confirmed, its validity as a species from the Mediterranean should be reviewed.



Merluccius paradoxus Franca, 1960

Frequent synonyms / misidentifications: *Merluccius capensis paradoxus* Franca, 1960; *M. merluccius paradoxus* Franca, 1962 / None.

FAO names: En – Deep-water Cape hake; Fr – Merlu du large du Cap; Sp – Merluza de altura del Cabo.



Diagnostic characters: Head 26 to 29% of standard length; upper side flattened, with a low, V-shaped ridge. Mouth large, upper jaw extending to below posterior one-fourth of eye; lower jaw slightly or not projecting beyond upper. **Teeth in jaws relatively small. Total number of gill rakers on first arch 17 to 23.** Two separate dorsal fins, the first short-based, triangular, and higher than the long-based second dorsal fin, which has a distinct notch; anal fin similar to second dorsal fin; pectoral fins long and slender; pelvic fins anterior to pectoral-fin base; caudal fin with margin slightly convex. **Head completely scaly dorsally and laterally, including nasal membrane and all of lacrimal, cheek, preopercle, subopercle, and interopercle.** Lateral line with 121 to 143 scales. **Colour:** dark grey dorsally, lighter on sides, light grey on belly; mouth and tongue greyish; **black submandibular mark present.**

Size: To 82 cm (females) and 53 cm (males); commonly 40 to 60 cm.

Habitat, biology, and fisheries: Demersal over muddy bottoms on continental shelf and slope between 200 and 850 m, but most common around 400 m. Feeds mainly on fish, crustaceans (Mysidacea, Euphausiacea), and cephalopods (squid). Spawning probably between September and November. Fishery statistics mixed with *M. capensis*.

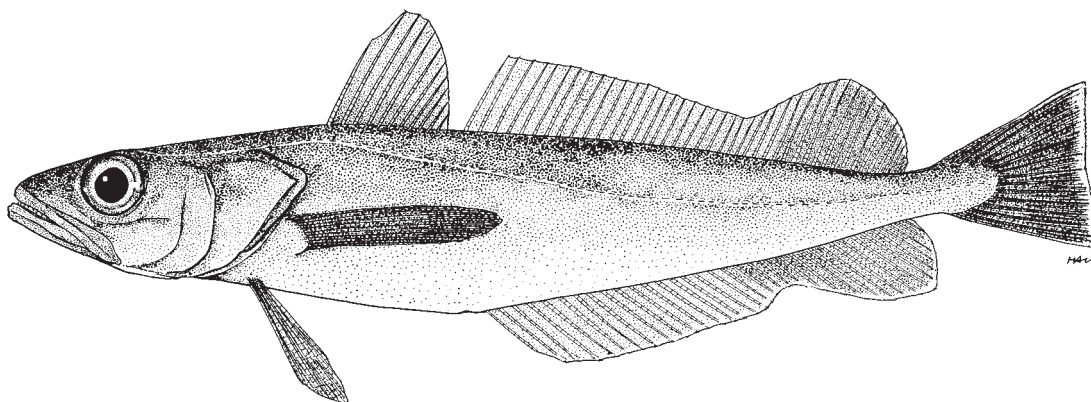
Distribution: Southeastern Atlantic from Cape Frio (18°S) to Agulhas Bank in Indian Ocean to east London; also south of Madagascar on Madagascar Ridge.



Merluccius polli Cadenat, 1950

Frequent synonyms / misidentifications: *Merluccius merluccius polli* Franca, 1962; *M. merluccius cadenati* Franca, 1962; *M. cadenati* Doutre, 1960 / None.

FAO names: En – Benguela hake; Fr – Merlu d’Afrique tropicale; Sp – Merluza de Benguela.



Diagnostic characters: Head 25 to 29% of total length. Mouth large, upper jaw extending to below posterior one-fourth of eye; lower jaw slightly or not projecting beyond upper. **Teeth in jaws relatively small. Total number of gill rakers on first arch 8 to 12.** Two separate dorsal fins, the first short-based, triangular, and higher than the long-based second dorsal fin, which has a distinct notch; anal fin similar to second dorsal fin; pectoral fins long and slender; pelvic fins anterior to pectoral-fin base; caudal fin usually with truncate margin, but margin sometimes concave. **Scales on nasal membrane, lacrimal, lower part of cheek, preopercle, and interopercle;** lateral line with 98 to 127 scales. **Colour:** blackish dorsally, steel-grey to blackish on belly; mouth and tongue blackish; **submandibular mark present;** caudal fin white-edged.

Size: To about 80 cm, commonly 16 to 42 cm.

Habitat, biology, and fisheries: Demersal on continental shelf and slope between 50 to 600 m. *M. polli cadenati* sometimes taken as deep as 1 000 m off Senegal and Gambia. Feeds mainly on small fish, some squid, and natant crustaceans. Exploited in Angola and northern Namibia, but of little commercial interest. Fishery statistics mixed with *M. senegalensis* in the north and with *M. capensis* in the south.

Distribution: Eastern Atlantic from Mauritania to Namibia.

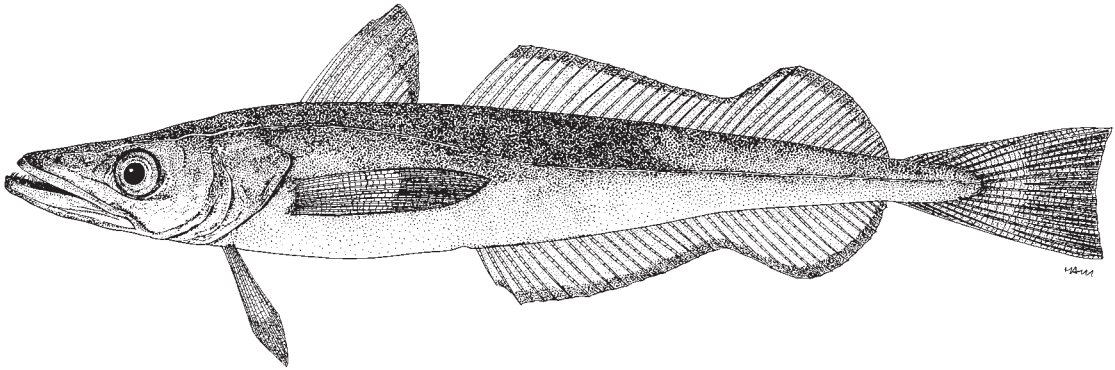
Remarks: Two subspecies recognized: *Merluccius polli cadenati* from Cape Barbas (about 22°30'N) to Liberia (05°07'N); and *M. p. polli* from Angola to northern Namibia (18°30'S). *M. polli* specimens have recently been collected by the R/V Dr Fridtjof Nansen off Ghana. It seems likely that the distribution of the species is continuous throughout the Gulf of Guinea.



***Merluccius senegalensis* Cadenat, 1950**

Frequent synonyms / misidentifications: *Merluccius merluccius senegalensis* Franca, 1962 / *Merluccius merluccius* (non Linnaeus, 1758).

FAO names: En – Senegalese hake; Fr – Merlu du Sénégal; Sp – Merluza del Senegal.



Diagnostic characters: Head 25 to 28% of total length, about as wide as deep. Mouth large, upper jaw extending to below centre of eye; lower jaw slightly projecting beyond upper. Teeth in jaws large and hinged. **Total number of gill rakers on first arch 12 to 21.** Two separate dorsal fins, the first short-based, triangular, and higher than the long-based second dorsal fin, which has a distinct notch; anal fin similar to second dorsal fin; pectoral fins long and slender; pelvic fins below gill cover and well anterior to pectoral-fin base; caudal fin usually truncate, more concave in larger (>40 cm) specimens. **Scales on nasal membrane and lower part of cheek, preopercle and interopercle, none on lacrimal;** lateral line more or less straight, with 124 to 155 scales. **Colour:** dark grey to blackish dorsally, silvery white on sides and belly; a black submandibular mark; mouth and tongue blackish.

Size: To 87 cm (females) and 78 cm (males); commonly to about 65 cm.

Habitat, biology, and fisheries: Demersal to bathypelagic in shelf and slope depths of 18 to 800 m, but most abundant at 100 to 600 m. Feeds on fish (*Synagrops microlepis*, *Chlorophthalmus agassizi*, *Trachurus trecae*, scombrids, macrourids, myctophids, and other merlucciids), crustaceans (*Munida iris*, *Parapenaeus longirostris*, *Plesionika edwardsii* and *P. heterocarpus*), and cephalopods. Males attain sexual maturity at about 22 to 28 cm; that for females unknown. Spawning period occurs from January to March in northern areas, and October to March in the south, coinciding with an annual southerly migration. About 78 600 eggs counted in a 58 cm (total length) female. Senegalese hake under 40 cm targeted by trawlers, smaller longliners, and gillnetters. Catches often mixed with those of *M. merluccius* in the northern part of its range (off Morocco), and with *M. polli* in the southern part. Annual catches in the area around 13 000 tonnes showing a marked decrease in recent years.

Distribution: Eastern Atlantic from Morocco (Cape Cantin, 21°N) to Senegal (Cape Roxo, 12°25'N).

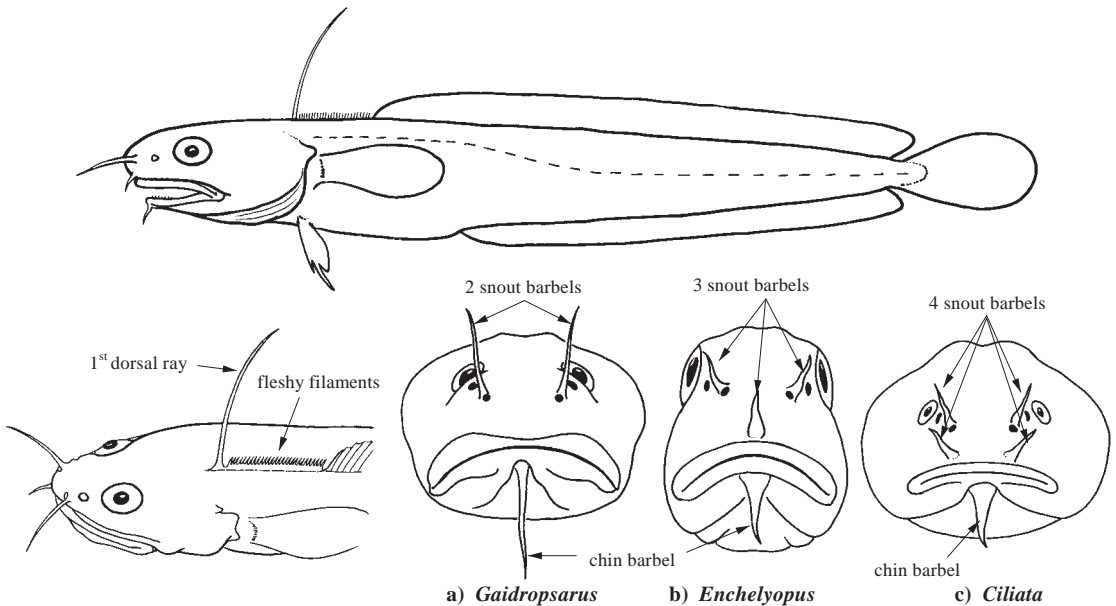


GAIDROPSARIDAE

Rocklings

by T. Iwamoto, California Academy of Sciences, San Francisco, CA and D.M. Cohen, Bodega Bay, CA, USA

Diagnostic characters: Small to medium (to about 60 cm, usually 20 to 40 cm), elongate, soft-bodied fish, somewhat cylindrical in front, laterally compressed behind vent; caudal peduncle relatively deep, about equal to or deeper than long in several species. Head somewhat depressed, wider than high in some; mouth large, lower jaw usually shorter than upper jaw; **1 barbel present on chin and 2, 3 or 4 on snout**. Jaw teeth in bands, outer series enlarged, sometimes with greatly enlarged canines at anterior end; teeth on palate (vomer). **Three dorsal fins, the first consisting of a single undivided, flexible ray, slightly to substantially longer than rays of the second dorsal, which are numerous, small, fleshy filaments situated in a deep longitudinal groove; third dorsal normal and long-based with 46 to 70 rays; anal fin long-based, base shorter than that of third dorsal**, with no indentation in margin, and 37 to 59 rays; pelvic fin with 6 to 8 rays, the second slightly prolonged, but generally not extending beyond middle of abdomen, fin base well forward of pectoral-fin base; caudal fin well developed, not connected to dorsal and anal fins, margin rounded. No light organ; swimbladder not connected to back of skull. **Colour:** dark brown to red or pinkish, usually paler ventrally, often variable depending on habitat, some with spots or other markings, median fins often with dark distal margins or stripes.



Habitat, biology, and fisheries: Demersal, on soft mud or sand bottoms or over rocks, from intertidal to the deep sea. Most species distributed around rim of North Atlantic, but some also found off South Africa, New Zealand, Japan, off oceanic islands and seamounts of South Atlantic, Indian Ocean, and southeastern Pacific. Larvae and juveniles pelagic. Of minor commercial importance, usually appearing as incidental bycatch in trawls, gillnets, and hook-and-line gear.

Remarks: The rockling genera are currently placed under a subfamily (Phycinae) of the family Lotinae by Eschmeyer's Catalog of Fishes. Three genera (*Ciliata*, *Enchelyopus*, *Gaidropsarus*) and 16 or more species, some of uncertain status; at least 6 species in area.

Similar families occurring in the area

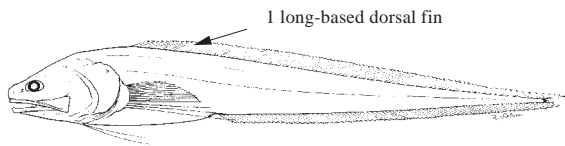
Lotidae: 2 dorsal fins with normal rays; no large barbels on snout (*Lota* with small barbel-like flap on nostril).



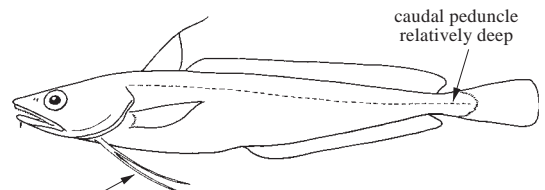
(*Molva*) Lotidae

Ophidiidae: 1 long-based dorsal fin; small caudal fin connected with dorsal and anal fins; bases of pelvic fins close together, without a broad-scaled space between.

Phycidae: 2 dorsal fins with normal rays; no barbels on snout; pelvic fin appearing as one long, branched, filamentous ray extending to anus or beyond.



Ophidiidae



Phycidae

caudal peduncle relatively deep
pelvic fin consists of 2 long, slender feeler-like rays

Key to the species of Gaidropsaridae occurring in the area

- 1a. Barbels on snout 3 (Figs 1a and 2) *Enchelyopus cimbricus*
- 1b. Barbels on snout 2 (Fig. 1b) (*Gaidropsarus*) → 2

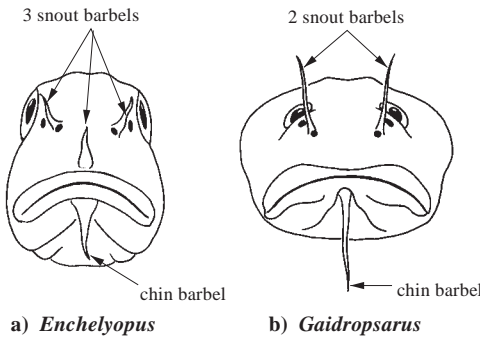


Fig. 1 front view

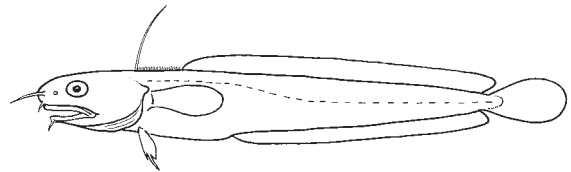


Fig. 2 *Enchelyopus*

- 2a. Gill rakers tubercular (Fig. 3); anterior canine teeth on upper jaw not enlarged (Fig. 4a); eyes small, 5 or more times in head length → 3
- 2b. Gill rakers long, laterally compressed; 2 or more anterior canine teeth on upper jaw greatly enlarged (Fig. 4b); eyes large, less than 5 times in head length → 6



Fig. 3

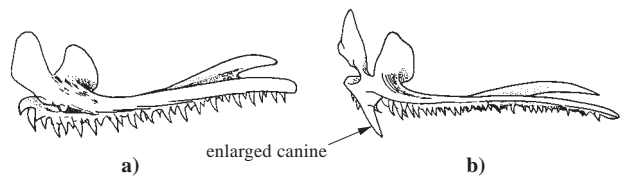


Fig. 4

- 3a. Prominent dark spots on dorsal parts of head and body, and on second dorsal and caudal fins (Fig. 5) ***Gaidropsarus vulgaris***
- 3b. No prominent dark spots as above → 4

- 4a. Second dorsal fin with 60 rays; pectoral fin with 21 rays; upper part of body dark with broad sinuous pale longitudinal stripe, narrower anteriorly; head with fine, irregular pale lines; second dorsal dark with pale stripe (Fig. 6) ***Gaidropsarus granti***
- 4b. Second dorsal fin with 53 to 58 rays; pectoral fin with 16 to 19 rays; no pale stripes or lines as above → 5

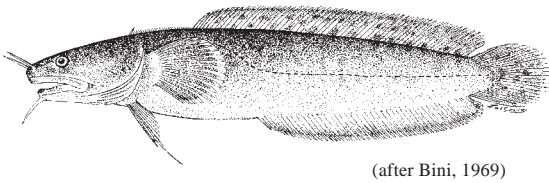


Fig. 5 *Gaidropsarus vulgaris*

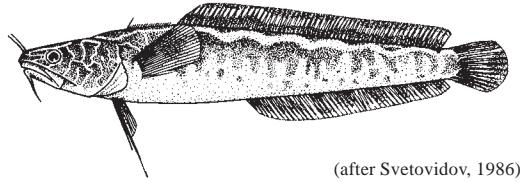


Fig. 6 *Gaidropsarus granti*

- 5a. Head, body, and second dorsal fin plain or with irregular vertical bands, cheek and lower part of head with diffuse light blotches; lateral line marked with small pale spots or dashes; anal-fin rays 44 to 49 (Fig. 7) ***Gaidropsarus mediterraneus***
- 5b. Head, body, and second dorsal fin with irregular pattern of pale spots; anal-fin rays 48 to 50 (Fig. 8) ***Gaidropsarus guttatus***

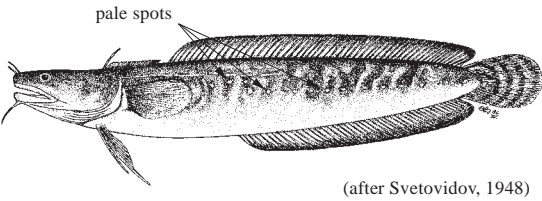


Fig. 7 *Gaidropsarus mediterraneus*

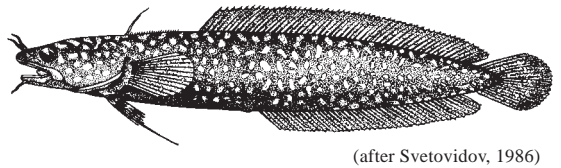


Fig. 8 *Gaidropsarus guttatus*

- 6a. Second dorsal fin with 53 to 58 rays; anal fin with 45 to 49 rays (Fig. 9) ***Gaidropsarus macrophthalmus***
- 6b. Second dorsal fin with 48 to 52 rays; anal fin with 40 to 45 rays (Fig. 10) ***Gaidropsarus biscayensis***

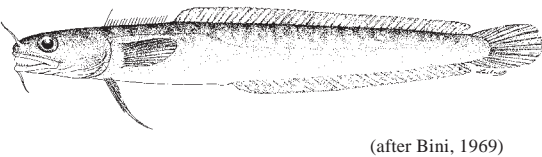


Fig. 9 *Gaidropsarus macrophthalmus*

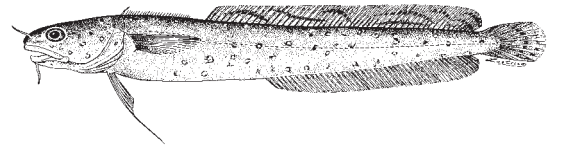










Fig. 10 *Gaidropsarus biscayensis*

List of species occurring in the area

The symbol  is given when species accounts are included.

-  *Enchelyopus cimbrius* (Linnaeus, 1766).
-  *Gaidropsarus biscayensis* (Collett, 1890).
-  *Gaidropsarus granti* (Regan, 1903).
-  *Gaidropsarus guttatus* (Collett, 1890).
-  *Gaidropsarus macrophthalmus* (Günther, 1867).
-  *Gaidropsarus mediterraneus* (Linnaeus, 1758).
-  *Gaidropsarus vulgaris* (Cloquet, 1824).

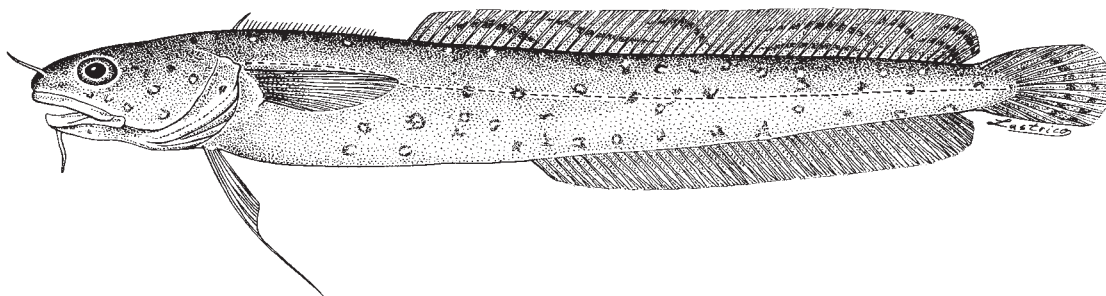
References

- Cohen, D.M., Inada, T., Iwamoto, T. & Scialabba, N.** 1990. FAO species catalogue. Vol. 10. Gadiform fishes of the world (Order Gadiformes). An annotated and illustrated catalogue of cods, hakes, grenadiers and other gadiform fishes known to date. *FAO Fisheries Synopsis*, (125)Vol.10: 442 p.
- Cohen, D.M. & Russo, J.L.** 1979. Variation in the fourbeard rockling, *Enchelyopus cimbrius*, a North Atlantic gadid fish, with comments on the genera of rocklings. *U.S. Fishery Bulletin*, 77(1): 91–104.
- Svetovidov, A.N.** 1986. Review of the three-bearded rocklings of the genus *Gaidropsarus* Rafinesque, 1810 (Gadidae) with description of a new species. *Journal of Ichthyology*, 62(1): 115–135.

***Gaidropsarus biscayensis* (Collett, 1890)**

Frequent synonyms / misidentifications: *Motella megalokynodon* Kolombatovic, 1894; *Gaidropsarus barbatus* de Buen, 1934 / None.

FAO names: En – Mediterranean bigeye rockling; Fr – Mostelle; Sp – Barbada.



Diagnostic characters: Body elongated, cylindrical anteriorly, becoming laterally compressed on tail; caudal peduncle length less than its depth. Eyes large, 20 to 24% of head length. **Two or more greatly enlarged fang-like anterior teeth in upper jaw. Two barbels on snout, 1 on chin.** Second dorsal fin with 48 to 52 rays, anal fin with 40 to 45 rays; caudal fin with rounded posterior margin; pelvic fins with 6 or 7 rays. **Colour:** brownish with dark brown spots; sides reddish, belly pink, second dorsal and caudal fins with narrow, wavy stripes or bands.

Size: To about 15 cm total length; records of specimens 30 to 40 cm are probably referable to *Gaidropsarus vulgaris*.

Habitat, biology, and fisheries: A demersal and bathypelagic species in offshore waters over mud, shell, and coral bottoms at depths of 80 to 600 m. Spawns in February. Feeds mainly on crustaceans. Taken as bycatch in bottom trawls and with line gear. Of little commercial importance because of its small size, but occasionally found in Mediterranean markets.

Distribution: From Iberian Peninsula south to Morocco (24°N) and Madeira; also western Mediterranean, Adriatic and Aegean seas.

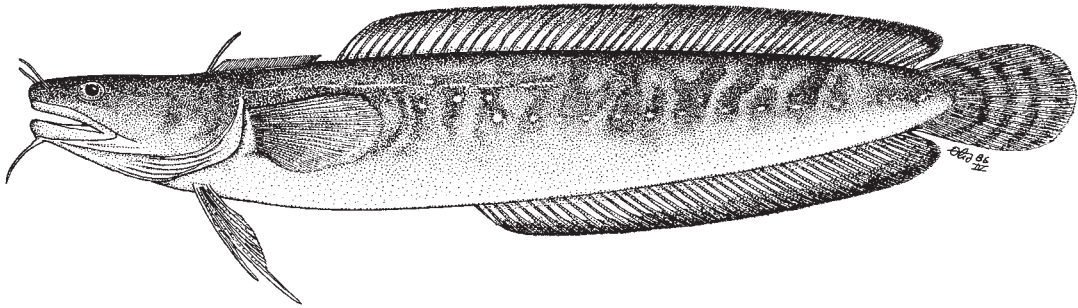
Remarks: *Gaidropsarus biscayensis* has been placed in the genera *Onus*, *Motella* and *Antonogadus*, all of which are considered synonyms of *Gaidropsarus*. The species is closely similar to *G. macrophthalmus*, with which it shares the character of greatly enlarged anterior canines.



***Gaidropsarus mediterraneus* (Linnaeus, 1758)**

Frequent synonyms / misidentifications: *Gadus tricirratus* Brunnich, 1768; *Gaidropsarus mustellaris* Rafinesque, 1810; *Gadus fuscus* Risso, 1810; *G. jubatus* Pallas, 1814; *G. argenteolus* Montagu, 1818; *Merlangus communis* Costa, 1844; *Onos sellai* Cipria, 1938 / None.

FAO names: En – Shore rockling; Fr – Mostelle de Méditerranée; Sp – Bertorella.



Diagnostic characters: Body elongated, cylindrical anteriorly, becoming laterally compressed on tail; caudal peduncle length less than its depth. Eyes small, 9 to 13% of head length. **No greatly enlarged fang-like anterior teeth in upper jaw. Two barbels on snout, 1 on chin.** Second dorsal fin with 54 to 58 rays, anal fin with 44 to 49 rays; caudal fin with rounded posterior margin; pelvic fins with 6 (rarely 5) rays. **Colour:** variable with habitat, usually dark brownish dorsally, paler ventrally, with row of whitish dots along lateral line.

Size: To about 50 cm total length, commonly 15 to 20 cm; records of specimens >50 cm are probably referable to *Gaidropsarus vulgaris*.

Habitat, biology, and fisheries: Generally near shore on rocky bottoms at depths to about 60 m, but deeper in northern Africa, from 200 to 450 m. Spawns from September to March in the Mediterranean and Black Sea and from April to September in the northeastern Atlantic. Eggs and larvae pelagic. Feeds on fish, crustaceans, worms, and algae. Taken as bycatch in small-scale and artisanal fisheries using trawls, gillnets, longlines, traps, and handlines. Marketed fresh or as fishmeal.

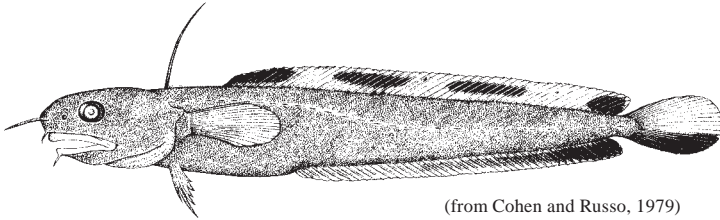
Distribution: From Atlantic coast of British Isles to northernmost Morocco; also western Mediterranean, Adriatic, Aegean, and Black seas. Records of species from Scandinavian Peninsula probably of *G. vulgaris*.



***Enchelyopus cimbrius* (Linnaeus, 1776)**

En – Fourbeard rockling; **Fr** – Motelle à quatre barbillons.

Maximum size about 41 cm, commonly from 15 to 20 cm. Benthic on muddy sand in 20 to 650 m (usually 20 to 50 m). Migrates inshore in autumn and winter and offshore during spring and summer. Spawning prolonged, occurring from January to August or even later; larvae silvery and pelagic. Feeds on small fish and crustaceans (including amphipods, copepods, decapods, isopods, and mysids). Distribution in eastern Atlantic from Norway and Iceland south to British Isles and northern Bay of Biscay, one record from Cape Blanc, Mauritania; widespread in western Atlantic from Greenland to northern Gulf of Mexico. Of minor fishery importance; used smoked.

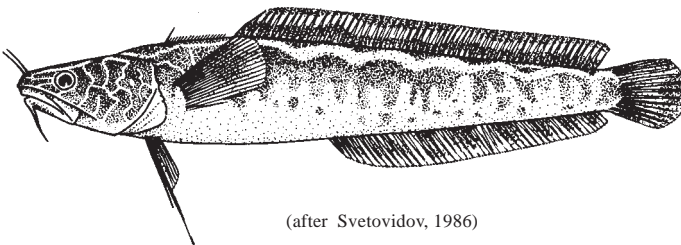


(from Cohen and Russo, 1979)

***Gaidropsarus granti* (Regan, 1903)**

En – Grant's rockling.

Maximum size about 36 cm. Ground colour white with prominent red-brown blotches dorsally over one-third of head and body. Blotches on body forming disrupted lateral stripe. Head dorsally more completely reddish, but with thin white lines forming irregular patterns. Benthic over rough bottom in 20 to 50 m. Distribution known only from Azores and Canaries. Too rare to be of fishery importance.

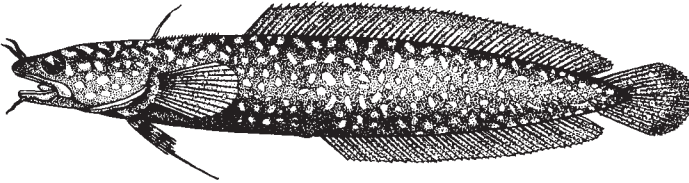


(after Svetovidov, 1986)

***Gaidropsarus guttatus* (Collett, 1890)**

En – Tidepool rockling; **Sp** – Brota de tierra.

Maximum size about 26 cm. Colour overall brown with white spots covering entire body and fins. Benthic intertidal to sublittoral in 5 to 10 m. Spawns in July and August. Feeds on decapod crustaceans and algae. Distribution in Madeira, Azores, and Canaries.



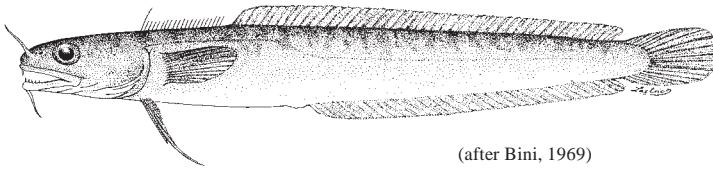
(from Svetovidov, 1986)



***Gaidropsarus macrophthalmus* (Günther, 1867)**

En – Bigeye rockling.

Maximum size about 25 cm total length. Benthic in 150 to 530 m. Distribution from Faeroe Islands south along west coast of British Isles to Bay of Biscay; also taken south of Azores. Very minor fishery importance, occasionally taken as bycatch in bottom trawls.



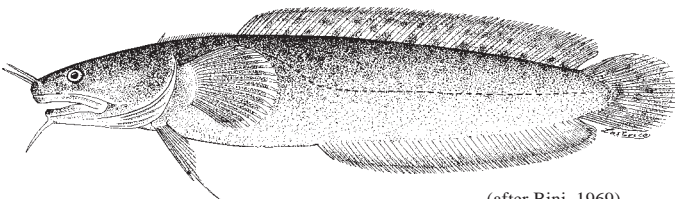
(after Bini, 1969)



***Gaidropsarus vulgaris* (Cloquet, 1824)**

En – Three-bearded rockling; **Fr** – Motelle commune; **Sp** – Mollareta.

Maximum size about 60 cm. Benthic in 10 to 120 m on hard rocky bottoms, but also on sand and gravel. Spawns in spring and summer in Mediterranean, later in the north. Eggs and larvae pelagic. Feeds on shrimps, crabs, isopods, small fish, molluscs and polychaetes. Distribution from Strait of Gibraltar to Norway and Barents Sea; also western Mediterranean and Adriatic. Common; often taken in trawls, with longlines, and handlines. Of minor fishery importance; marketed fresh.



(after Bini, 1969)

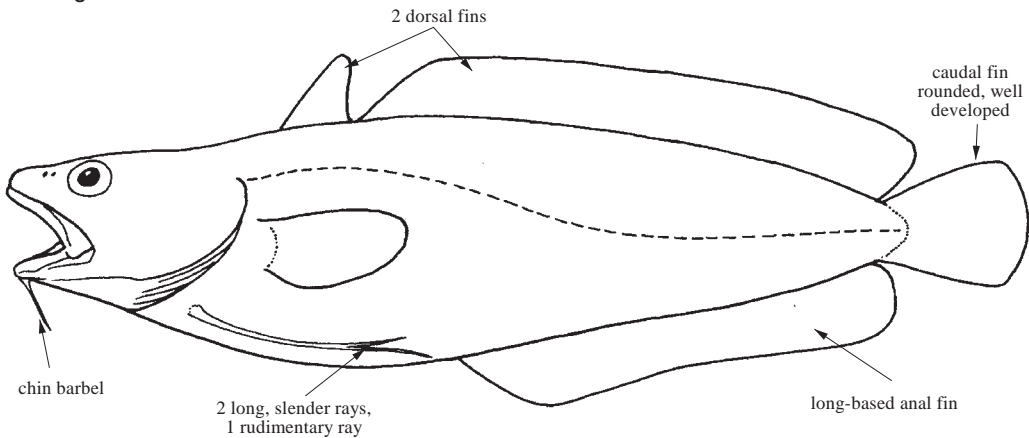


PHYCIDAE

Phycid hakes

by T. Iwamoto, California Academy of Sciences, San Francisco, CA and D.M. Cohen, Bodega Bay, CA, USA

Diagnostic characters: Small to large (to about 10 cm, usually 20 to 40 cm); body moderately soft, elongated, generally rounded in front of vent, more laterally flattened behind vent; caudal peduncle narrow to moderately deep. Top of head lacking V-shaped ridge. Mouth large, lower jaw usually shorter than upper jaw. **Chin barbel usually present**, occasionally absent. Well-developed tooth patch on roof of mouth (vomer). **Two dorsal fins, the first short-based and long-rayed, with 8 to 13 rays, the second long-based with straight distal margin;** anal fin long-based without indentation in margin; **pelvic fin with 3 rays (2 long rays may appear as 1, and 1 rudimentary ray) extending to or beyond anal-fin origin**, fin base usually well forward of pectoral-fin base; **caudal fin well developed, not connected to dorsal and anal fins, margin rounded.** No light organ; swimbladder not connected to back of skull. **Colour:** olive, brown, or reddish, often becoming paler ventrally to silvery white on belly, median fins often with dark distal margins.

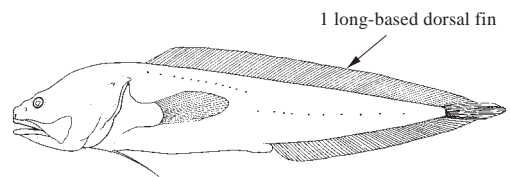


Habitat, biology, and fisheries: Demersal, on soft mud or sand bottoms or over rocks, from shallow coastal waters to offshore waters at upper continental slope depths. Young of most species found close inshore, often in estuaries in low salinity waters, migrating offshore as adults; adults of most species migrate inshore in summer and autumn for spawning, then offshore to deeper waters. Feeds primarily on small fish and crustaceans (especially shrimp and amphipods), but also on polychaetes and molluscs (especially squid). Of limited commercial importance in the area, although some incidentally trawled in substantial quantities and may be a potential resource. Taken primarily by bottom trawls, but also captured in gillnets and with longlines. Marketed fresh, dried, frozen, smoked, as fish cakes, or used as animal feed; livers of some species yield oils, swimbladders used in gelatins. Unspecified catches of this group amounts to 600 tonnes.

Remarks: Phycid hakes often treated in past as a subfamily of Gadidae and members of subfamily Lotinae, but currently considered a valid family by Eschmeyer's Catalog of Fishes. Two genera and many species, some of uncertain status; at least 2 species in area.

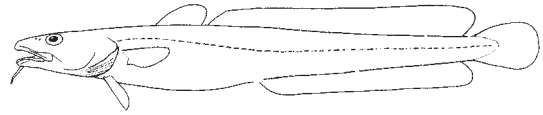
Similar families occurring in the area

Bythitidae: 1 long-based dorsal fin; anterior nostril immediately above upper lip in most; viviparous, males with an external intromittent organ.



Bythitidae

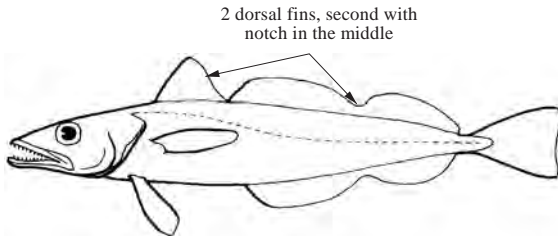
Lotidae: 2 dorsal fins, 1 anal fin; pelvic fins short, not reaching tip of pectoral fins.



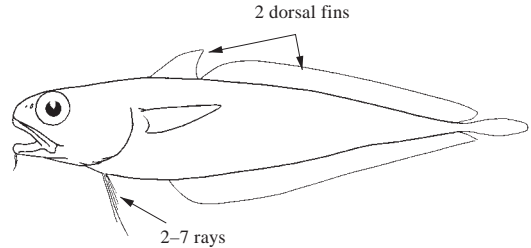
Lotidae

Merlucciidae: 2 dorsal fins, 1 anal fin, the second dorsal and anal fins similar in size and shape, with notch in middle; V-shaped crest on top of head; no chin barbel.

Moridae: 2 dorsal fins; 1 anal fin; pelvic fin with 2 to 7 rays; teeth few or lacking on vomer; swimbladder with anterior projections that connect to rear of skull.



Merlucciidae



Moridae

Key to the species of Phycidae occurring in the area

- 1a. Elongate rays of pelvic fin reaching beyond origin of anal fin; first dorsal fin with a slightly prolonged ray; scale rows between first dorsal fin and lateral line 5 to 7
 ***Phycis blennoides***
- 1b. Elongate rays of pelvic fin not reaching beyond origin of anal fin; no prolonged ray in first dorsal fin; scale rows between first dorsal fin and lateral line 11 or 12 ***Phycis phycis***

List of species occurring in the area

The symbol is given when species accounts are included.

Phycis blennoides (Brünnich, 1768).

Phycis phycis (Linnaeus, 1766).

References

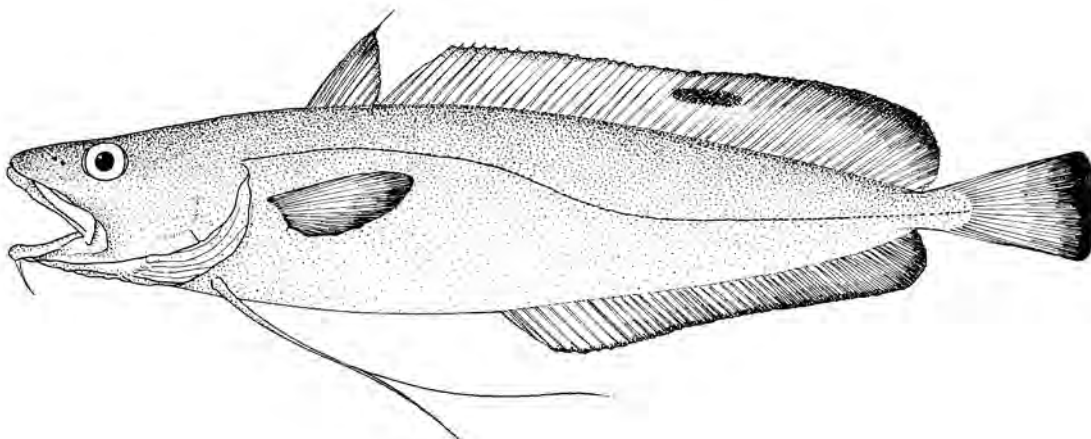
Cohen, D.M. 1990. Gadidae. In J.-C. Quéro, J.-C. Hureau, C. Karrer, A. Post & L. Saldanha, eds. *Check-list of the fishes of the eastern tropical Atlantic*. Vol. 1. Paris, UNESCO. pp. 526–531.

Cohen, D. M., Inada, T., Iwamoto, T. & Scialabba, N. 1990. FAO species catalogue. Vol. 10. Gadiform fishes of the world (Order Gadiformes). An annotated and illustrated catalogue of cods, hakes, grenadiers and other gadiform fishes known to date. *FAO Fisheries Synopsis*, (125)Vol.10: 442 p.

Phycis blenoides (Brünnich, 1768)

Frequent synonyms / misidentifications: *Gadus albidus* Gmelin, 1789; *G. bifurcus* Walbaum, 1792, *Blennius gadoides* Lacépède, 1800; *Phycis tinca* Bloch and Schneider, 1801; *Batrachoides gmelini* Risso, 1810; *Phycis furcatus* Fleming, 1828 / None.

FAO names: **En** – Greater forkbeard; **Fr** – Phycis de fond; **Sp** – Brótola de fango.



Diagnostic characters: Body fusiform, tapering to moderately narrow caudal peduncle, greatest depth about 4.7 to 4.8 times in length; head 3.8 to 4.5 times in standard length. Eye about 3.5 to 4.5 times in head length. **Jaw teeth small, in bands; small teeth on vomer. Chin barbel small.** Two dorsal fins close together, the first with a slightly prolonged ray, short-based, with 8 or 9 rays; second dorsal fin long-based, with 60 to 64 rays; anal fin shorter than second dorsal, with 50 to 55 rays; caudal fin small, hind margin rounded; **pelvic fin extending past anal-fin origin.** Scale rows between first dorsal and lateral line 5 to 7. **Colour:** brown to red-grey dorsally, pale ventrally; vertical fins with dark margins, often an elongate dark blotch at midlength of second dorsal fin.

Size: To about 110 cm total length, commonly less than 45 cm.

Habitat, biology, and fisheries: Benthopelagic over sand and mud bottoms at depths from 10 to 800 m, but mostly at 100 to 450 m. Young live in coastal and continental shelf waters, adults frequent slope depths. Spawns in spring to early summer in northeastern Atlantic, earlier (January to May) in Mediterranean; males reach sexual maturity at about 18 cm, females at 33 cm. Adults feed mainly on fish and crustaceans. Taken in bottom trawls and longlines, also with gillnets and handlines. Marketed fresh and as fillets, also used as fishmeal; of minor importance to fisheries.

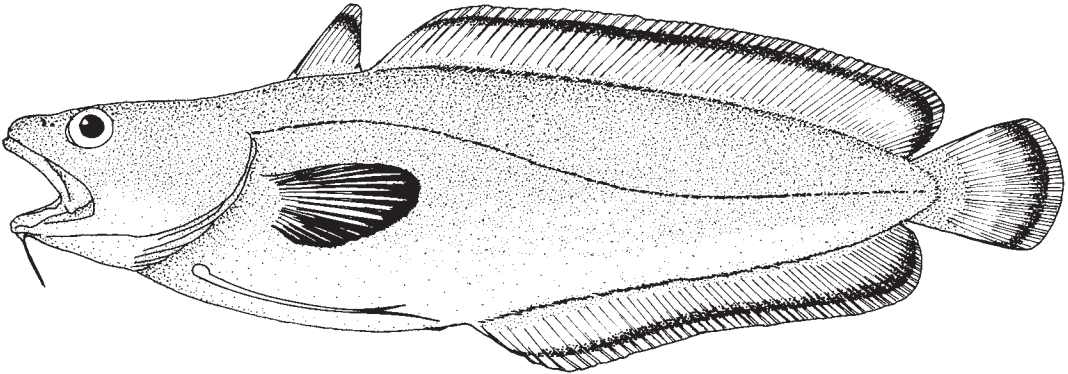
Distribution: Northeastern Atlantic from Iceland and Norway, south to Morocco and questionably in Angola; Azores and Madeira; also western Mediterranean and Adriatic.



***Phycis phycis* (Linnaeus, 1766)**

FAO names: En – Forkbeard; Fr – Phycis de roche; Sp – Brótola de roca.

Frequent synonyms / misidentifications: *Tinca marina* Walbaum, 1792; *Phycis mediterraneus* Delaroche, 1809; *P. furcatus* Bowdich, 1825; *P. limbatus* Valenciennes, 1838 / None.



Diagnostic characters: Body fusiform, tapering to a short and moderately deep caudal peduncle, greatest depth about 4.7 to 4.8 times in length; head 3.8 to 4.5 times in standard length. Eye about 4.5 to 5.5 times in head length. **Jaw teeth small, in bands; small teeth on vomer. Chin barbel moderately long.** Two dorsal fins close together, the first with no prolonged ray, short-based, with 10 or 11 rays; second dorsal fin long-based, with 60 to 63 rays; anal fin usually slightly shorter than second dorsal, with 58 to 64 rays; caudal fin of moderate size, hind margin rounded; **pelvic fin not extending past anal-fin origin.** Scale rows between first dorsal and lateral line 11 or 12. **Colour:** brownish red dorsally, paler ventrally; vertical fins darker distally, with narrow white margins.

Size: Maximum size about 60 cm, commonly 15 to 25 cm.

Habitat, biology, and fisheries: Benthic in 100 to 650 m; nocturnal, hiding among rocks during the day; feeds on small fishes and invertebrates. Spawns from January to May. Taken incidentally in trawls, gillnets, longlines, traps, and handlines. Marketed fresh in Morocco, Spain, Italy, and the former Yugoslavia, but of little commercial importance.

Distribution: From Bay of Biscay to Morocco, Azores, Madeira, and Cape Verde Islands; also in Mediterranean.



LOTIDAE

Lings

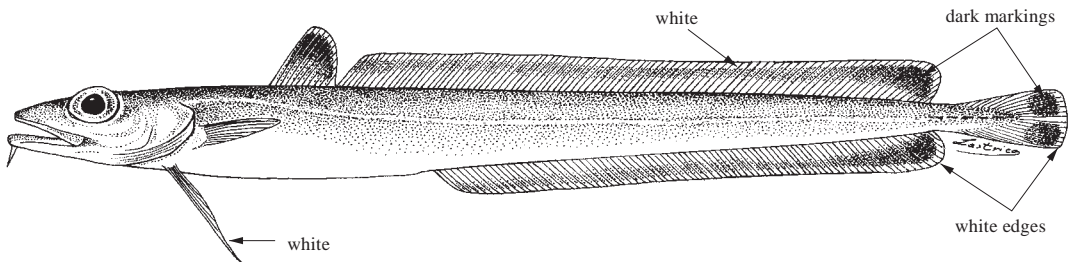
by T. Iwamoto, California Academy of Sciences, San Francisco, CA and D.M. Cohen, Bodega Bay, CA, USA

A single species occurring in the area.

Molva dipterygia (Pennant, 1784)

Frequent synonyms / misidentifications: *Molva byrkelange* (Walbaum, 1792) / None.

FAO names: En – Blue ling; Fr – Lingue bleue; Sp – Maruca azul.

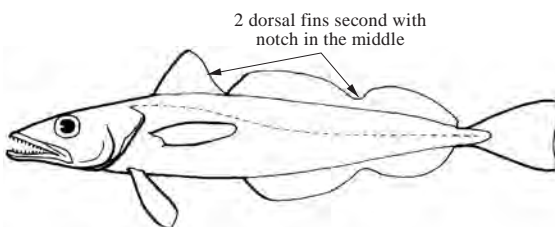


Diagnostic characters: Large (to about 155 cm); body elongate, generally rounded in cross-section in front of vent, more oval to laterally flattened behind vent; caudal peduncle moderately deep. Mouth large, but upper jaw extending to below anterior half of orbit; lower jaw longer than upper. One barbel on chin. Large tusk-like teeth on lower jaw and roof of mouth, small teeth in broad band in upper jaw. **Two dorsal fins, the first short-based, with 10 to 12 rays, none prolonged; second dorsal fin long-based with straight distal margin and 74 to 83 rays; anal fin long-based, with straight margin and 72 to 78 rays;** pelvic fin with 6 or 7 rays, outer rays somewhat prolonged, base of fin well forward of pectoral-fin base; caudal fin well developed, not connected to dorsal and anal fins, distal margin rounded. **Lateral-line canal continuous to caudal fin.** **Colour:** dorsally dark, greyish brown overall, sometimes with black dots, belly silvery white, distal parts of vertical fins black with narrow white edge, tip of pelvic fin white.

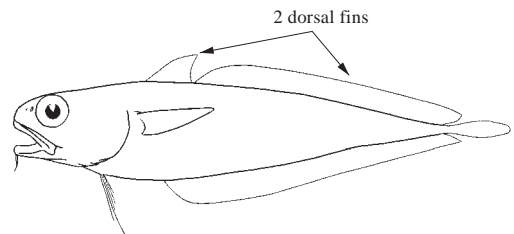
Similar families occurring in the area

Merlucciidae: 2 dorsal fins, 1 anal fin, the second dorsal and anal fins similar in size and shape, with notch in middle; V-shaped crest on top of head; no chin barbel.

Moridae: 2 dorsal fins; 1 anal fin; jaw teeth small, teeth few or lacking on vomer; swimbladder with anterior projections that connect to rear of skull.



Merlucciidae



Moridae

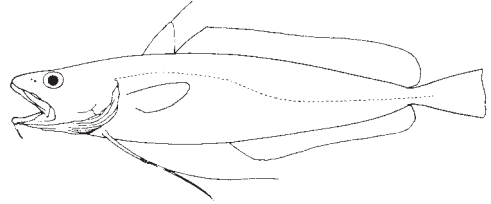
Phycidae: pelvic fin with 2 rays developed into long, slender feelers that extend to or beyond vent.

Size: To about 155 cm, usually less than 100 cm.

Habitat, biology, and fisheries: Deep water at edge of shelf to continental slope depths of 60 to 1 000 m, usually around 200 to 600 m. Females sexually mature at around 88 cm, males at 75 cm; spawns from April to May at 500 to 1 000 m depths in northeast Atlantic, from winter to early spring at 500 to 600 m in Mediterranean. Feeds primarily on fish, but also crustaceans. Of little commercial importance in the area. Taken by bottom trawls and longlines, especially in northeast Atlantic. Marketed fresh and frozen, but also reduced to fishmeal.

Distribution: North Atlantic from Iceland, Spitsbergen, and the Barents Sea south to Morocco and Azores; also in western Mediterranean, Adriatic, and Aegean seas; possibly in Black Sea. In western Atlantic known from southern Greenland and a few captures off Newfoundland.

Remarks: Two or more subspecies sometimes recognized, *Molva dipterygia dipterygia* in the north from Iceland to the British Isles grading into southern populations known variously as *M. dipterygia elongata* or *M. dipterygia macrophthalma*, but these latter 2 species now recognized as species *M. macrophthalma* (Rafinesque, 1810). *Molva molva*, a northern species, occurs south to Straits of Gibraltar. Lings most often treated in the past as subfamily Lotinae of family Gadidae. Two genera and 3 species, only 1 in the area.



Phycidae



References

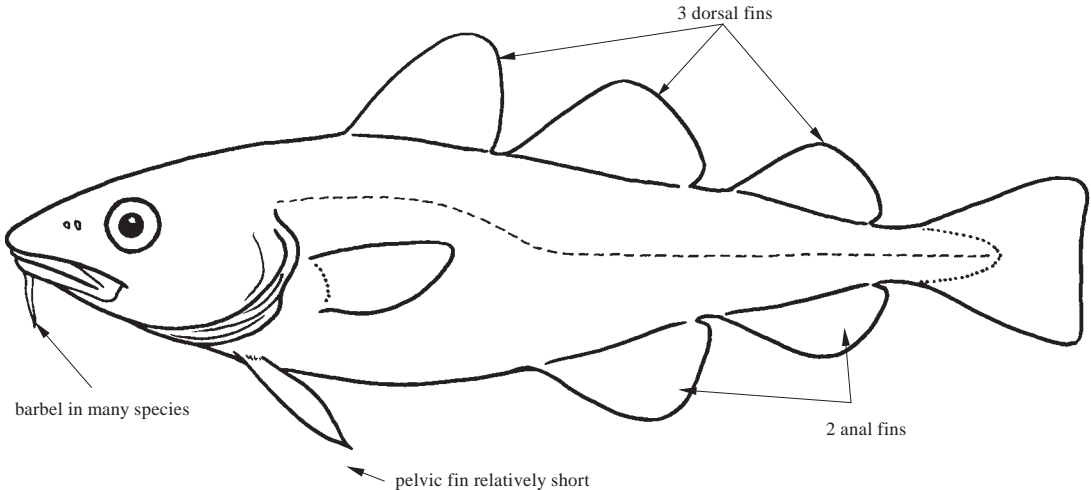
- Cohen, D.M., Inada, T., Iwamoto, T. & Scialabba, N. 1990. FAO species catalogue. Vol. 10. Gadiform fishes of the world (Order Gadiformes). An annotated and illustrated catalogue of cods, hakes, grenadiers and other gadiform fishes known to date. *FAO Fisheries Synopsis*, (125)Vol.10: 442 p.
- Svetovidov, A.N. 1948. Treskoobraznye [Gadiformes]. *Fauna SSSR, Zoologicheskogo Instituta Akademii Nauk. SSSR* (n.s.) 34, Ryby [Fishes] 9(4): 1–222, [plates] 1–72. [In Russian; English translation, 1962, Jerusalem: Israel Program for Scientific Translations, 304 p.]
- Svetovidov, A.N. 1986. Gadidae. In P.J.P. Whitehead, M.-L. Bauchot, J.-C. Hureau, J. Nielsen, and E. Tortonese, eds. *Fishes of the northeastern Atlantic and the Mediterranean, volume II*. Paris, UNESCO, pp. 680–710.

GADIDAE

True cods

by T. Iwamoto, California Academy of Sciences, San Francisco, CA and D.M. Cohen, Bodega Bay, CA, USA

Diagnostic characters: To 2 m, 50 cm in the area, with elongate body and moderately deep caudal peduncle. Top of head lacking V-shaped ridge. Mouth large with either upper jaw or lower jaw slightly protruding in many species; teeth on vomer; small **chin barbel present** in most species. **Long dorsal fin divided into 3 parts**; **anal fin in 2 parts**; caudal fin well developed, truncate to forked; pectoral fins well developed, pointed; **pelvic fins short, thoracic**. **Colour:** variable, usually brownish to olive, or greyish to bluish dorsally, somewhat paler ventrally, belly often white, grey, or yellowish.

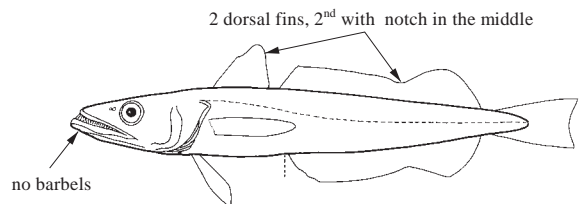


Habitat, biology and fisheries: Most species confined to cold temperate to Arctic waters of North Atlantic and North Pacific, with few species in Southern Hemisphere. Most live on or near bottom (a few species pelagic) over continental shelf from near shore to far offshore, but some occur at depths of 600 m or more; early-life stages pelagic, juveniles of some species found in estuaries and shallow coastal waters. Seasonal inshore-offshore migrations common, some undergo extensive north-south migrations. Fecundity in most species high, depending on size of individual; spawning occurs in colder months, usually from late autumn to spring, depending on locality and water temperature. Most species voracious and omnivorous predators; food preferences include, but not limited to, fish, shrimp, crabs, squid, and various bottom invertebrates. Many species highly valuable in cold temperate waters of the Pacific and Atlantic, but of little significance to fisheries in eastern central Atlantic area.

Remarks: Gadidae often treated as including several other groups, notably rocklings, lings, phycid hakes, and merlucciid hakes, all of which are here treated as of family rank. Gadidae include about 25 species in 12 genera, but only 4 species found in the area, and these only marginally at the northernmost border.

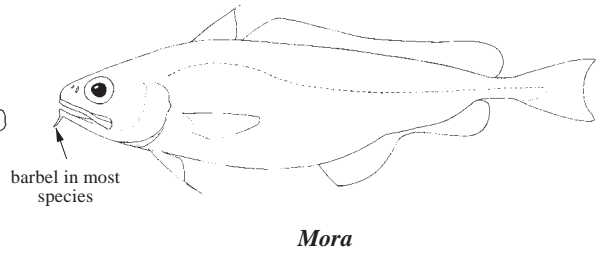
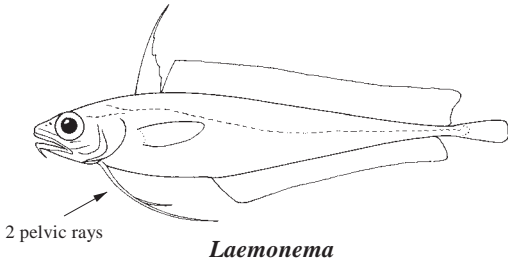
Similar families occurring in the area

Merlucciidae: 2 dorsal fins, 1 anal fin, the second dorsal and anal fins similar in size and shape, with notch in middle; V-shaped crest on top of head; no chin barbel.



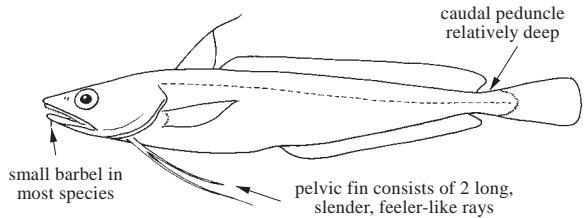
Merlucciidae

Moridae: 2 dorsal fins, 1 anal fin, pelvic fins narrow with filamentous tips in some species, more normal in shape in other species; teeth few or lacking on vomer; swimbladder with 2 anterior projections that connect to rear of skull, ventral light organ in some genera.



Moridae

Phycidae: 2 dorsal fins, 1 anal fin; teeth on vomer well developed; no connection of swimbladder to back of skull; caudal peduncle relatively deep; pelvic fin consists of 2 long, slender, feeler-like rays, the longest extending close to or beyond vent; no light organ.



Phycidae

Key to the species of Gadidae occurring in the area

- 1a. Chin barbel absent → 2
- 1b. Chin barbel well developed ***Trisopterus* → 3**

- 2a. Eye very large, diameter much greater than snout length or postorbital length of head; first anal-fin base less than half preanal distance (Fig. 1) ***Gadiculus argenteus***
- 2b. Eye diameter equal to or less than snout length, much shorter than postorbital length of head; first anal-fin base long, half or more of preanal distance (Fig. 2) ***Micromesistius poutassou***

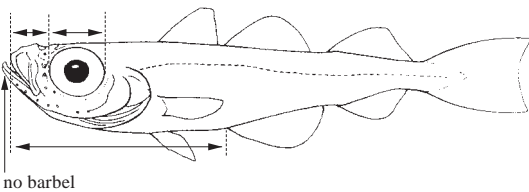


Fig. 1 *Gadiculus argenteus*

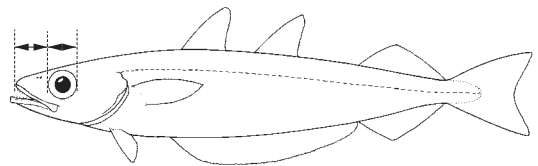


Fig. 2 *Micromesistius poutassou*

- 3a. Greatest body depth greater than head length (Fig. 3); dark vertical bars in fresh specimens ***Trisopterus luscus***
- 3b. Greatest body depth equal to or less than head length (Fig. 4); no dark bars . . . ***Trisopterus minutus***

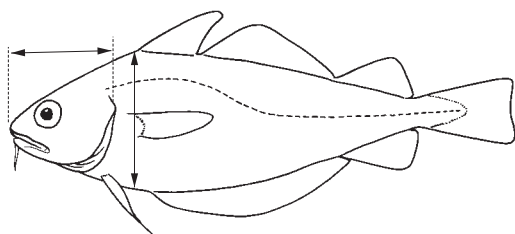


Fig. 3 *Trisopterus luscus*

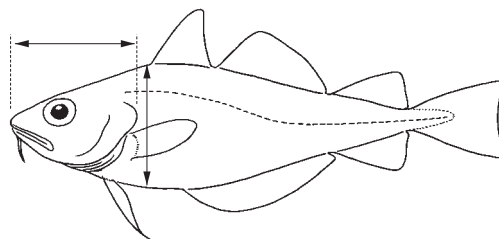






Fig. 4 *Trisopterus minutus*

List of species occurring in the area

The symbol  is given when species accounts are included.

-  *Gadiculus argenteus* Guichenot, 1850.
-  *Micromesistius poutassou* (Risso, 1827).
-  *Trisopterus luscus* (Linnaeus, 1758).
-  *Trisopterus minutus* (Linnaeus, 1758).

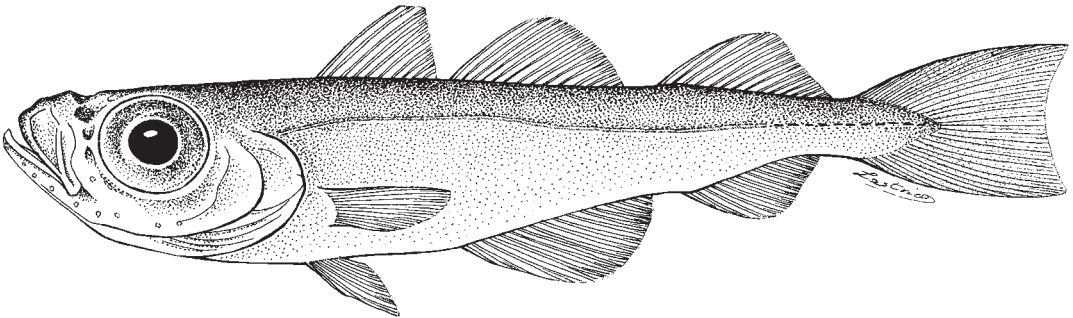
References

- Cohen, D.M. 1990. Gadidae. In J.-C. Quéro, J.-C. Hureau, C. Karrer, A. Post & L. Saldanha, eds. *Check-list of the fishes of the eastern tropical Atlantic*, Vol. II. JNICT, Portugal, pp. 526–531.
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- Svetovidov, A.N. 1986. Gadidae. In P.J.P. Whitehead, M.-L. Bauchot, J.-C. Hureau, J. Nielsen & E. Tortonese, eds. *Fishes of the northeastern Atlantic and the Mediterranean*, Vol. II. Paris, UNESCO, pp. 680–710.

***Gadiculus argenteus* Guichenot, 1850**

Frequent synonyms / misidentifications: *Merlangus argenteus* Vaillant, 1888 / None.

FAO names: En – Silvery pout; Fr – Merlan argenté; Sp – Faneca plateada.



Diagnostic characters: Body laterally compressed, deepest immediately behind head, tapering to moderately deep caudal peduncle (4.8% of standard length). Head large, 3.3 to 3.8 times in standard length, its length much greater than body depth. **Large pores on head. Eye large**, diameter greater than snout length. **Mouth oblique, jaws do not extend behind anterior margin of eye. No chin barbel.** Teeth very small on jaws and on vomer. **Three separate dorsal fins**, the first with 10 to 12 rays, second with 14 or 15 rays, third with 15 to 18 rays. **Two anal fins**, the first with 15 to 19 rays, the second with 16 to 19 rays. Posterior margin of caudal fin slightly concave. Pectoral fins small, positioned below mid-lateral line. Pelvic fins short, not extending to vent. Scales large, deciduous, about 60 in lateral line, which is continuous to below middle of third dorsal fin and interrupted beyond. **Colour:** light brown to pink dorsally, silvery on sides and belly.

Size: To about 15 cm, commonly around 7 to 10 cm.

Habitat, biology, and fisheries: A deep-water fish of the open sea, occurring in large schools at the edge of the continental shelf in 110 to 1 000 m, but mostly between 200 and 600 m. Spawning occurs in deep water from December to January in the Mediterranean, from mid-winter to spring in northern Europe. Short lived, rarely to 3 years and 15 cm maximum length. Feeds on small crustaceans and possibly worms. Of little importance to fisheries, caught as bycatch in small-scale and artisanal bottom trawls; sold fresh in Morocco; also used for fishmeal or bait.

Distribution: From Norway south to northern Morocco; also in western Mediterranean and Adriatic Sea.

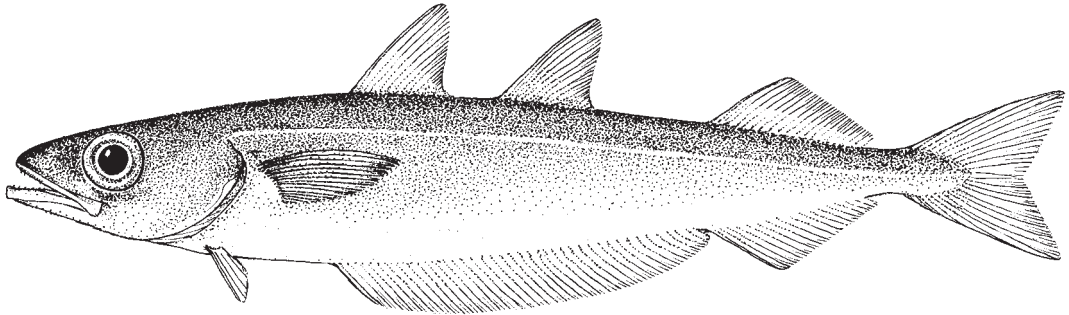
Remarks: Two subspecies recognized, *Gadiculus argenteus argenteus* from the western Mediterranean and Atlantic from Bay of Biscay south along Moroccan coast, and *G. argenteus thori* from Bay of Biscay north to British Isles and Scandinavian coast to North Cape, Norway.



***Micromesistius poutassou* (Risso, 1827)**

Frequent synonyms / misidentifications: *Merlangus vernalis* Risso, 1827; *M. pertusis* Cocco, 1829; *M. albus* Yarrell, 1841; *M. communis* Costa, 1844; *Gadus potassoa* Duben and Koren, 1846; *G. melanostomus* Nilsson, 1855 / None.

FAO names: **En** – Blue whiting; **Fr** – Merlan bleu; **Sp** – Bacaladilla.



Diagnostic characters: **Body slender, fusiform**, tapering to moderately deep caudal peduncle. Head about 4 or less times in standard length, its length much greater than body depth. Eye large, diameter slightly less than snout length. Mouth large, lower jaw projecting beyond upper; maxilla extends to below anterior half of eye. No chin barbel. Teeth on jaws; 1 or 2 hook-like teeth on either side of vomer. Gill rakers on first arch 26 to 34. **Three separate dorsal fins**, the first 2 relatively high and triangular, **the third dorsal fin with base longer than fin height and separated from second dorsal fin by a large gap**. **Two anal fins, the first long-based, the base longer than preanal distance**, its origin at or anterior to vertical through origin of first dorsal fin. Caudal fin forked. Pectoral fin extends well beyond origins of anal and first dorsal fins. Pelvic fins short, not extending to vent. Lateral line continuous to caudal fin. **Colour:** blue-grey on back, paler on sides, white on belly; sometimes a small dark blotch at base of pectoral fin.

Size: To about 50 cm, commonly around 15 to 30 cm.

Habitat, biology, and fisheries: An oceanic and benthopelagic fish over continental shelf and slope in 150 to more than 1 000 m, more commonly at 300 to 400 m. Migrates in summer to the north and back to spawning areas in the south in January and February; spawning takes place from February to June; also makes daily vertical migrations. Feeds on small fishes, crustaceans, and cephalopods. Growth is fast, 16 cm the first year, 27 to 29 cm by fifth year, and 29 to 34 cm by tenth year. Females usually larger than males. An important commercial fish in the northeastern Atlantic, but of minor value in areas 34 and 37. Caught mainly with trawls, but also with longlines, trammel nets, gillnets, seines, lampara nets, and handlines; marketed fresh and frozen, and also processed into oil and fishmeal.

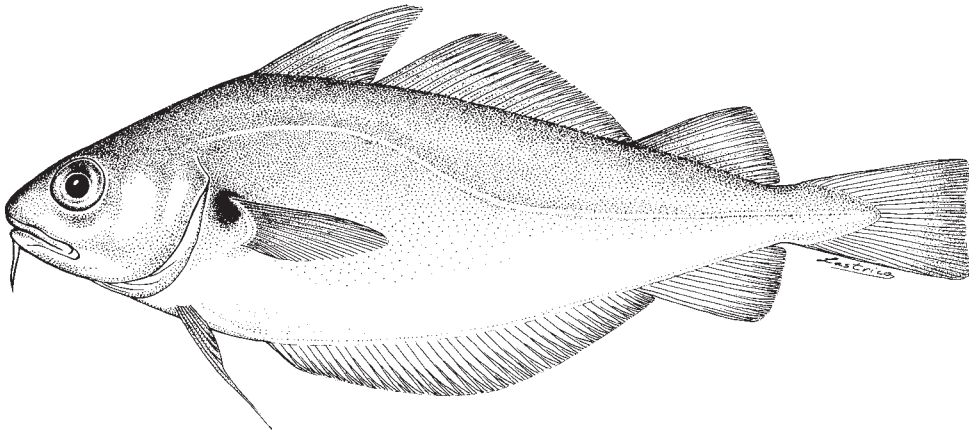
Distribution: Southwestern Barents Sea, eastern Norwegian Sea from Spitzbergen south and east to southern Iceland, and European coast to Morocco (Cape Bojador); also western Mediterranean to Adriatic Sea and east to Crete. Also found in western Atlantic off southern Greenland and from Nova Scotia south to Cape Hatteras.



***Trisopterus luscus* (Linnaeus, 1758)**

Frequent synonyms / misidentifications: *Gadus barbatus* Linnaeus, 1758; *G. bibus* Lacépède, 1800; *G. colias* Gronow, 1854 / None.

FAO names: En – Pouting; Fr – Tracaud commun; Sp – Faneca.



Diagnostic characters: **Body deep and compressed**, greatest depth more than head length; caudal peduncle longer than deep. **Anus below anterior part of first dorsal fin.** Head about 4 times in standard length. Eye 3.2 to 3.6 times in head. Upper jaw extending to below middle of eye; lower jaw shorter than upper. A chin barbel present. Teeth small on jaws and on vomer. **Three dorsal fins**, their bases in contact or with only a small interspace. **Two anal fins**, their bases in contact or with small interspace; **the first anal fin with long base 2 times or more of first dorsal-fin base**, second anal similar in size to third dorsal fin. Posterior margin of caudal fin truncate. Pelvic fin with slightly elongated ray. Lateral line continuous to end of caudal peduncle. **Colour:** reddish brown dorsally, silvery on sides with bluish grey tint, belly white, lateral line golden; **4 or 5 broad indistinct transverse dark bars on side**; a dark blotch at base of pectoral fin.

Size: To about 45 cm, commonly around 15 to 20 cm.

Habitat, biology, and fisheries: Benthopelagic, schooling, adults on outer continental shelf in 250 to 300 m, young closer to shore. Adults move inshore to spawn in relatively shallow waters of 50 to 100 m; spawning occurs from January through August, but peaks in spring (April and May). Growth rapid, sexually mature in one year at 21 to 25 cm, attains 30 to 31 cm by fourth year. Feeds on benthic crustaceans, small fish, molluscs, and polychaete worms. Commercially of some importance in northeastern Atlantic south to Morocco and in western Mediterranean.

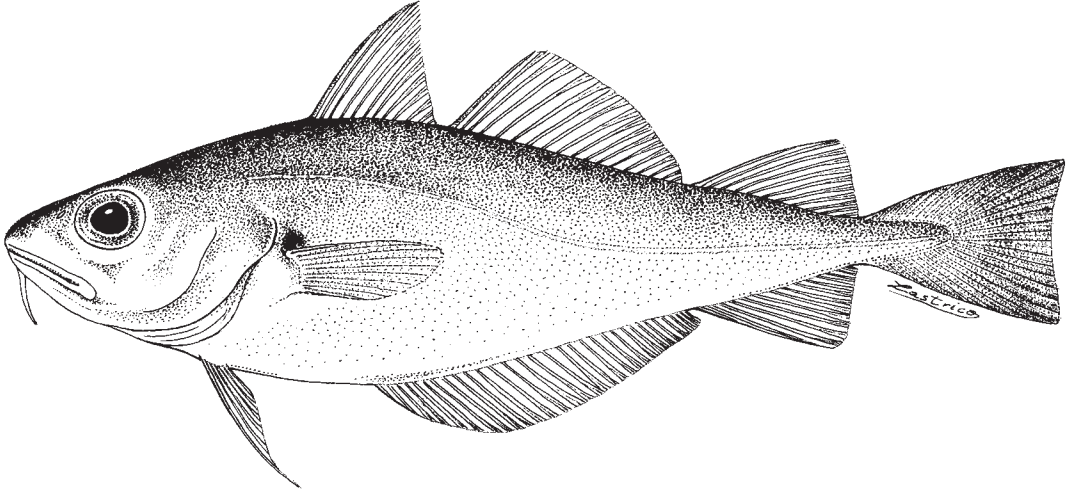
Distribution: From North Sea, around the British Isles and European coast south to Morocco; also in western Mediterranean.



Trisopterus minutus (Linnaeus, 1758)

Frequent synonyms / misidentifications: None / None.

FAO names: En – Poor cod; Fr – Capelan de Méditerranée; Sp – Capellán.



Diagnostic characters: Body relatively deep, greatest depth about equal to or less than head length; caudal peduncle much longer than deep. **Anus below posterior part of first dorsal fin.** Head about 4.3 to 4.5 times in standard length. Eye 3.0 to 3.3 times in head. Upper jaw short of, or extending to, below middle of eye; lower jaw shorter than upper. Chin barbel present. Teeth small on jaws and on vomer. **Three dorsal and 2 anal fins, their bases in contact or with only a small interspace. First anal fin with long base 2 times or more of first dorsal-fin base,** second anal fin similar in size and shape to third dorsal fin. Posterior margin of caudal fin slightly concave. Pelvic fin with slightly elongated ray. Lateral line continuous to end of caudal peduncle. **Colour:** yellowish brown dorsally, sides lighter, belly silvery grey; a black spot at base of pectoral fin.

Size: To about 40 cm, usually around 15 to 20 cm.

Habitat, biology, and fisheries: Benthopelagic, schooling fish, on continental shelf over mud or sand bottoms to depths of 400 m, mostly from 15 to 200 m in Atlantic and to 120 m in Mediterranean. Spawning occurs from December to March in the south, February to March in the north. Growth rapid, attains 12 to 14 cm and sexual maturity in first year, reaches maximum of about 40 cm by fourth year in females, sixth year in males. Feeds on crustaceans, small fish, and polychaetes. Locally abundant and a prized foodfish; captured in trawls, gillnets, longlines, and handlines; marketed fresh and also used for fishmeal.

Distribution: From Norway into the North Sea, around the British Isles and European coast south to Morocco; also in most parts of Mediterranean.

Remarks: Two subspecies sometimes recognized: *Trisopterus minutus minutus* (southern Norway, North and Baltic seas, British Isles south to southern tip of Iberian Peninsula) and *T. minutus capelanus* (western Mediterranean, Adriatic, and the Atlantic around the Straits of Gibraltar to off Morocco).



New Index

- A**
- Abrotea 2004
 Abrótea de natura 2004
 Abámbolo 1986
 Abámbolo de bajura 1985
 Antimora bleu 2003
Antimora rostrata 2003
Antonogadus 2019
APHYONIDAE 1964
- B**
- BATHYGADIDAE** 1959
BREGMACEROTIDAE 1957
 Bacaladilla 2033
 Bacaladilla imberbe 2003
 Barbada 2019
BATHYGADIDAE 1965,1969,2005,2007
 Bathygadids 1959
 BATHYGADINAE 1959,1968
Bathygadus macrops 1962
Bathygadus melanobranchus 1962
Batrachoides gmelini 2025
 Beardless codling 2003
 Benguela hake 2013
 Bertorella 2020
 Bigeye rockling 2022
 Black codling 2004
Blennius gadoides 2025
 Blue antimora 2003
 Blue ling 2027
 Blue whiting 2033
Bregmaceros maclellandi 1957
Brosmiculus imberbis 1998
 Brota de tierra 2022
 Brown codling 2004
 Brótola de fango 2025
 Brótola de roca 2026
 Bullseye grenadier 1962
BYTHITIDAE 1959,1965,1992,2005,2023
- C**
- Caelorinchus caelorhincus* 1983
 Capelan de Méditerranée 2035
 Capellán 2035
Chalinura occidentalis 1986
- Ciliata* 2015
 Codlets 1957
 Codling 2001
Coelorhynchus atlanticus 1982
Coelorhynchus coelorhynchus 1983
Coelorhynchus laville 1982
Coelorinchus caelorhincus 1982
Coelorinchus geronimo 1983,1989
Coelorinchus labiatus 1984
Coelorinchus mediterraneus 1984
Coelorinchus occa 1984
 Common Atlantic grenadier 1987
 Common mora 2002
Coryphaenoides sublaevis 1986
Coryphaenoides talismani 1984
- D**
- Deep-water Cape hake 2012
 Doublethread grenadier 1963
- E**
- Enchelyopus* 2015
Enchelyopus cimbricus 2021
 European hake 2011
- F**
- Faneca 2034
 Faneca plateada 2032
 Forkbeard 2026
 Fourbeard rockling 2021
- G**
- GADIDAE** 2029
 GADIFORMES 1957
GADROPSARIDAE 2015
 Gadella 1998
Gadella imberbis 1998,2003
Gadella maraldi 1998
Gadiculus argenteus 2032
Gadiculus argenteus argenteus 2032
Gadiculus argenteus thori 2032
GADIDAE 1992,2008,2023
Gadomus arcuatus 1963
Gadus albidus 2025
Gadus argenteolus 2020
Gadus barbatus 2034
Gadus bibus 2034

<i>Gadus bifurcus</i>	2025
<i>Gadus colias</i>	2034
<i>Gadus fuscus</i>	2020
<i>Gadus jubatus</i>	2020
<i>Gadus melanostomus</i>	2033
<i>Gadus merluccius</i>	2010
<i>Gadus potassoa</i>	2033
<i>Gadus ruber</i>	2011
<i>Gadus tricirratus</i>	2020
Gaidropsarus	2015,2019
<i>Gaidropsarus barbatus</i>	2019
<i>Gaidropsarus biscayensis</i>	2019
<i>Gaidropsarus granti</i>	2021
<i>Gaidropsarus guttatus</i>	2022
<i>Gaidropsarus macrophthalmus</i>	2019,2022
<i>Gaidropsarus mediterraneus</i>	2020
<i>Gaidropsarus mustellaris</i>	2020
<i>Gaidropsarus vulgaris</i>	2019-2020,2022
Granadero liso	1987
Granadero tristón	1982
Grant's rockling	2021
Greater forkbeard	2025
Grenadier barbu	1985
Grenadier lisse	1987
Grenadier raton	1982
Grenadier scie	1986
Grenadiers	1968
Guinean codling	1999

H

<i>Halargyreus johnsonii</i>	2003
<i>Haloporphyreus modestum</i>	2000
<i>Hidronus marluccius</i>	2011
Hollowsnout grenadier	1982

L

LOTIDAE	2027
LOTINAE	2015,2023
<i>Laemonema curtipes</i>	2001
<i>Laemonema laureysi</i>	1999
<i>Laemonema robustum</i>	2000
<i>Laemonema yarrellii</i>	2001
<i>Lepidion guentheri</i>	2004
<i>Lepidoleprus trachyrincus</i>	1966
Lings	2027
Lingue bleue	2027
<i>Lionurus (Nezumia) occidentalis</i>	1986
Lota	2016
LOTIDAE	2016,2024
<i>Lyconodes</i>	2007

<i>Lyconus</i>	2007
<i>Lyconus brachycolus</i>	2007

M

MACROURIDAE	1968
MACROUROIDIDAE	1964
MELANONIDAE	2005
MERLUCCIIDAE	2007
MORIDAE	1991
MACROURIDAE	1959,1964-1965,1967,2008
MACROURINAE	1968
<i>Macrouroides</i>	1964
MACROUROIDIDAE	1969
MACROUROIDINAE	1964,1968
Macrouroids	1964
MACROURONINAE	2007
<i>Macrourus rupestris</i>	1982
Macruronus	2007
<i>Macruronus maderensis</i>	2007
<i>Macruroplus violaceus</i>	1986
<i>Macrurus (Coelorhynchus) coelorhynchus</i>	1982
<i>Macrurus atlanticus</i>	1982
<i>Macrurus japonicus</i>	1984
<i>Macrurus serratus</i>	1987
<i>Macrurus smiliophorus</i>	1987
<i>Malacocephalus hawaiiensis</i>	1985
Malacocephalus laevis	1985
<i>Malacocephalus luzonensis</i>	1985
<i>Malacocephalus nipponensis</i>	1985
Malacocephalus occidentalis	1986
Maruca azul	2027
Mediterranean bigeye rockling	2019
MELANONIDAE	1960,1969,1992,2008
Merlan argenté	2032
Merlan bleu	2033
<i>Merlangus albus</i>	2033
<i>Merlangus argenteus</i>	2032
<i>Merlangus communis</i>	2020,2033
<i>Merlangus pertusis</i>	2033
<i>Merlangus vernalis</i>	2033
Merlu côtier du Cap	2010
Merlu du Sénégal	2014
Merlu du large du Cap	2012
Merlu d'Afrique tropicale	2013
Merlu européen	2011
Merluccid hakes	2007
MERLUCCIIDAE	1992,2024,2027,2029
MERLUCCIINAE	2007
<i>Merluccius</i>	2007

<i>Merluccius ambiguous</i>	1998	MORIDAE	1967,2006,2008,2024,2027,2030
<i>Merluccius argentatus</i>	2011	Moro imberbe	2003
<i>Merluccius attenuatus</i>	1998	Mostelle	2019
<i>Merluccius cadenati</i>	2013	Mostelle de Méditerranée	2020
<i>Merluccius capensis</i>	2010,2012-2013	<i>Motella</i>	2019
<i>Merluccius capensis paradoxus</i>	2012	<i>Motella megalokynodon</i>	2019
<i>Merluccius esculentus</i>	2011	Motelle commune	2022
<i>Merluccius linnei</i>	2011	Motelle à quatre barbillons	2021
<i>Merluccius merluccius</i>	2011,2014	N	
<i>Merluccius merluccius cadenati</i>	2013	<i>Nezumia aequalis</i>	1987,1989
<i>Merluccius merluccius capensis</i>	2010	<i>Nezumia africana</i>	1989
<i>Merluccius merluccius lessepsianus</i>	2011	<i>Nezumia duodecim</i>	1989
<i>Merluccius merluccius merluccius</i>	2011	<i>Nezumia hildebrandi</i>	1987-1988
<i>Merluccius merluccius paradoxus</i>	2012	<i>Nezumia micronychodon</i>	1989-1990
<i>Merluccius merluccius polli</i>	2013	O	
<i>Merluccius merluccius senegalensis</i>	2014	<i>Onos sellai</i>	2020
<i>Merluccius merluccius smiridus</i>	2011	<i>Onus</i>	2019
<i>Merluccius paradoxus</i>	2010,2012	<i>Onus riali</i>	2011
<i>Merluccius polli</i>	2010,2013-2014	OPHIDIIDAE	1960,1965,1969,1992,2006,2016
<i>Merluccius polli cadenati</i>	2013	P	
<i>Merluccius polli polli</i>	2013	PHYCIDAE	2023
<i>Merluccius senegalensis</i>	2011,2013-2014	Pelagic cods	2005
<i>Merluccius smiridus</i>	2011	Phycid hakes	2023
<i>Merluccius uraleptus</i>	1998	PHYCIDAE	1992,2016,2028,2030
<i>Merluccius vulgaris</i>	2010-2011	PHYCINAE	2015
<i>Merlucius ambiguous</i>	2011	<i>Phycis blennoides</i>	2025
<i>Merlucius lanatus</i>	2011	Phycis de fond	2025
<i>Merlucius sinuatus</i>	2011	Phycis de roche	2026
Merluza de Benguela	2013	<i>Phycis furcatus</i>	2025-2026
Merluza de altura del Cabo	2012	<i>Phycis limbatus</i>	2026
Merluza del Cabo	2010	<i>Phycis mediterraneus</i>	2026
Merluza del Senegal	2014	<i>Phycis phycis</i>	2026
Merluza europea	2011	<i>Phycis tinca</i>	2025
<i>Micromesistius poutassou</i>	2011,2033	<i>Physiculus dalwigki</i>	2004
Mollareta	2022	<i>Physiculus huloti</i>	2004
Mollera azul	2003	Poor cod	2035
Mollera moranella	2002	Puting	2034
<i>Molva byrkelange</i>	2027	R	
<i>Molva dipterygia</i>	2027	Rattails	1968
<i>Molva dipterygia dipterygia</i>	2028	Robust codling	2000
<i>Molva dipterygia elongata</i>	2028	Rocklings	2015
<i>Molva dipterygia macrophthalma</i>	2028	Roughsnout grenadier	1966
<i>Molva molva</i>	2028	S	
Mora commun	2002	Saddled grenadier	1982
<i>Mora dannevigii</i>	2002	Senegalese hake	2014
<i>Mora mediterranea</i>	2002		
<i>Mora moro</i>	2002		
<i>Mora pacifica</i>	2002		
Moras	1991		

Shallow-water Cape hake	2010
Shore rockling	2020
Silvery pout	2032
Slender codling	2003
Smalltooth grenadier	1990
Softhead grenadier	1985
Spearsnouted grenadier	1984
<i>Squalogadus</i>	1964
<i>Strinsia tinca</i>	1998

T

TRACHYRINCIDAE	1966
Three-bearded rockling	2022
Threeprong grenadier	1989
Tidepool rockling	2022
<i>Tinca marina</i>	2026
Tracaud commun	2034
<i>Trachinoides maroccanus</i>	2011
TRACHYRINCIDAE	1969
Trachyrincids	1966-1967
TRACHYRINCINAE	1967-1968
<i>Trachyrincus</i>	1967
<i>Trachyrincus anonyma</i>	1966
<i>Trachyrincus longirostris</i>	1966-1967
<i>Trachyrincus scabrissimus</i>	1966
<i>Trisopterus luscus</i>	2034
<i>Trisopterus minutus</i>	2035
<i>Trisopterus minutus capelanus</i>	2035
<i>Trisopterus minutus minutus</i>	2035
True cods	2029
Twelve-rayed grenadier	1989

V

Vaillant's grenadier	1962
<i>Ventrifossa</i>	1986
<i>Ventrifossa occidentalis</i>	1986

W

Western softhead grenadier	1986
--------------------------------------	------

A

<i>aequalis, Nezumia</i>	1987,1989
<i>africana, Nezumia</i>	1989
<i>albidus, Gadus</i>	2025
<i>albus, Merlangus</i>	2033
<i>ambiguous, Merluccius</i>	1998
ambiguous, Merluccius	2011
<i>anonyma, Trachyrincus</i>	1966
<i>arcuatus, Gadomus</i>	1963
<i>argentatus, Merluccius</i>	2011

<i>argenteolus, Gadus</i>	2020
<i>argenteus argenteus, Gadidulus</i>	2032
<i>argenteus thori, Gadidulus</i>	2032
argenteus, Gadidulus	2032
<i>argenteus, Gadidulus argenteus</i>	2032
<i>argenteus, Merlangus</i>	2032
<i>atlanticus, Coelorhynchus</i>	1982
<i>atlanticus, Macrurus</i>	1982
<i>attenuatus, Merluccius</i>	1998

B

<i>barbatus, Gadus</i>	2034
<i>barbatus, Gaidropsarus</i>	2019
<i>bibus, Gadus</i>	2034
<i>bifurcus, Gadus</i>	2025
biscayensis, Gaidropsarus	2019
blennoides, Phycis	2025
brachycolus, Lyconus	2007
<i>byrkelange, Molva</i>	2027

C

<i>cadenati, Merluccius</i>	2013
<i>cadenati, Merluccius polli</i>	2013
cadenatim Merluccius merluccius	2013
<i>caelorhincus, Caelorinchus</i>	1983
caelorhincus, Coelorinchus	1982
<i>capensis paradoxus, Merluccius</i>	2012
capensis, Merluccius	2010,2012-2013
<i>capensis, Merluccius merluccius</i>	2010
cimbrius, Enchelyopus	2021
<i>coelorhynchus, Coelorhynchus</i>	1983
<i>coelorhynchus, Macrurus (Coelorhynchus)</i>	1982
<i>colias, Gadus</i>	2034
<i>communis, Merlangus</i>	2020,2033
<i>curtipes, Laemonema</i>	2001

D

dalwigki, Physiculus	2004
<i>dannevigi, Mora</i>	2002
<i>dipterygia dipterygia, Molva</i>	2028
<i>dipterygia macrophthalma, Molva</i>	2028
dipterygia, Molva	2027
<i>dipterygia, Molva dipterygia</i>	2028
duodecim, Nezumia	1989

E

<i>elongata, Molva dipterygia</i>	2028
<i>esculentus, Merluccius</i>	2011

F

- furcatus*, *Phycis* 2025-2026
fuscus, *Gadus* 2020
- G**
- gadoides*, *Blennius* 2025
geronimo, *Coelorinchus* 1983,1989
gmelini, *Batrachoides* 2025
granti, *Gaidropsarus* 2021
guentheri, *Lepidion* 2004
guttatus, *Gaidropsarus* 2022
- H**
- hawaiiensis*, *Malacocephalus* 1985
hildebrandi, *Nezumia* 1987-1988
huloti, *Physiculus* 2004
- I**
- imberbis*, *Brosmiculus* 1998
imberbis, *Gadella* 1998,2003
- J**
- japonicus*, *Macrurus* 1984
johnsonii, *Halargyreus* 2003
jubatus, *Gadus* 2020
- L**
- labiatus**, *Coelorinchus* 1984
laevis, *Malacocephalus* 1985
lanatus, *Merluccius* 2011
laureysi, *Laemonema* 1999
laville, *Coelorhynchus* 1982
lessepsianus, *Merluccius merluccius* 2011
limbatus, *Phycis* 2026
linnei, *Merluccius* 2011
longirostris, *Trachyrincus* 1966-1967
luscus, *Trisopterus* 2034
luzonensis, *Malacocephalus* 1985
- M**
- macrophthalmia*, *Molva dipterygia* 2028
macrophthalmus, *Gaidropsarus* 2019,2022
macrops, *Bathygadus* 1962
maderensis, *Macruronus* 2007
maraldi, *Gadella* 1998
marina, *Tinca* 2026
marluccius, *Hidronus* 2011
maroccanus, *Trachinoides* 2011
mccllellandi, *Bregmaceros* 1957
mediterranea, *Mora* 2002
mediterraneus, *Coelorinchus* 1984
mediterraneus, *Gaidropsarus* 2020
- mediterraneus*, *Phycis* 2026
megalokynodon, *Motella* 2019
melanobranchus, *Bathygadus* 1962
melanostomus, *Gadus* 2033
merluccius cadenati, *Merluccius* 2013
merluccius capensis, *Merluccius* 2010
merluccius lessepsianus, *Merluccius* 2011
merluccius merluccius, *Merluccius* 2011
merluccius paradoxus, *Merluccius* 2012
merluccius polli, *Merluccius* 2013
merluccius senegalensis, *Merluccius* 2014
merluccius smiridus, *Merluccius* 2011
merluccius, *Gadus* 2010
merluccius, *Merluccius* 2011,2014
merluccius, *Merluccius merluccius* 2011
micronychodon, *Nezumia* 1989-1990
minutus capelanus, *Trisopterus* 2035
minutus minutus, *Trisopterus* 2035
minutus, *Trisopterus* 2035
minutus, *Trisopterus minutus* 2035
modestum, *Haloporphyreus* 2000
molva, *Molva* 2028
moro, *Moro* 2002
mustellaris, *Gaidropsarus* 2020
- N**
- nipponensis*, *Malacocephalus* 1985
- O**
- occa*, *Coelorinchus* 1984
occidentalis, *Chalinura* 1986
occidentalis, *Lionurus (Nezumia)* 1986
occidentalis, *Malacocephalus* 1986
occidentalis, *Ventrifossa* 1986
- P**
- pacifica*, *Mora* 2002
paradoxus, *Merluccius* 2010,2012
paradoxus, *Merluccius capensis* 2012
paradoxus, *Merluccius merluccius* 2012
pertusis, *Merlangus* 2033
phycis, *Phycis* 2026
polli cadenati, *Merluccius* 2013
polli polli, *Merluccius* 2013
polli, *Merluccius* 2010,2013-2014
polli, *Merluccius merluccius* 2013
polli, *Merluccius polli* 2013
potassoa, *Gadus* 2033
poutassou, *Micromesistius* 2011,2033

R

<i>riaii, Onos</i>	2011
robustum, Laemonema	2000
rostrata, Antimora	2003
<i>ruber, Gaber</i>	2011
<i>rupestris, Macrourus</i>	1982

S

scabrus, Trachyrincus	1966
<i>sellai, Onos</i>	2020
senegalensis, Merluccius	2011,2013-2014
<i>senegalensis, Merluccius merluccius</i>	2014
<i>serratus, Macrurus</i>	1987
<i>sinuatus, Merlucius</i>	2011
<i>smiliophorus, Macrurus</i>	1987
<i>smiridus, Merluccius</i>	2011
<i>smiridus, Merluccius merluccius</i>	2011
<i>sublaevis, Coryphaenoides</i>	1986

T

<i>talismani, Coryphaenoides</i>	1984
<i>thori, Gadidulus argenteus</i>	2032
<i>tinca, Phycis</i>	2025
<i>tinca, Strinsia</i>	1998
<i>trachyrincus, Lepidoleprus</i>	1966
<i>tricirratu, Gadus</i>	2020

U

<i>uraleptus, Merluccius</i>	1998
--	------

V

<i>vernalis, Merlangus</i>	2033
<i>violaceus, Macruroplus</i>	1986
vulgaris, Gaidropsarus	2019-2020,2022
<i>vulgaris, Merluccius</i>	2010-2011

Y

yarrellii, Laemonema	2001
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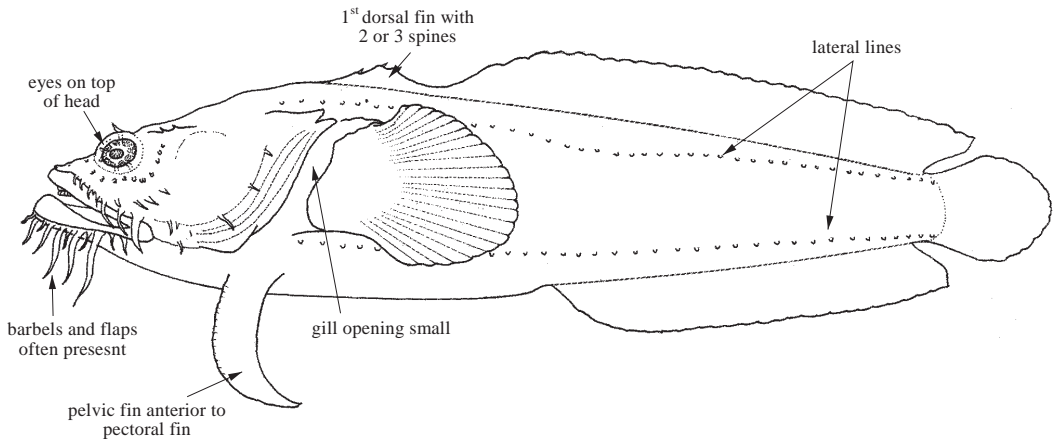
Order BATRACHOIDIFORMES

BATRACHOIDIDAE

Toadfishes

by B.B. Collette, National Marine Fisheries Service Systematics Laboratory, National Museum of Natural History, Washington, DC, USA and D.W. Greenfield, California Academy of Sciences, San Francisco, CA, USA

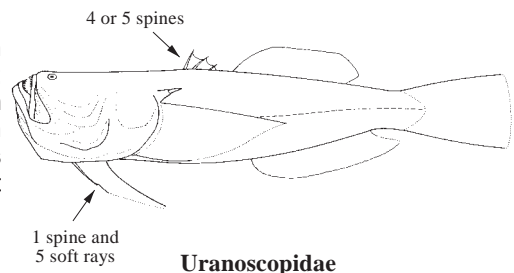
Diagnostic characters: Small to medium-sized fishes (to about 30 cm in the area) easily recognized by their characteristic shape. **Head broad and flattened, often with barbels and/or fleshy flaps around jaws;** mouth large, terminal and slightly protrusible; rather strong and pointed teeth present in jaws as well as on roof of mouth; **gill openings small, restricted to sides of body;** opercle and subopercle with spines. Glandular tissue may be present in the opercular region and in the pectoral-fin axil. Two separate dorsal fins, **the first with 2 or 3 spines (3 in all eastern Atlantic species),** the second long, with 16 to 25 soft rays; **anal fin somewhat shorter than second dorsal,** with 13 to 23 soft rays; pectoral fins large and broad-based; **pelvic fins jugular in position and composed of 1 spine and 2 soft rays.** Skin scaly or naked. Lateral-line system very well developed, lateral line either single or multiple. Swimbladder closed and capable of producing loud sounds. Number of vertebrae ranging from 27 to 45. **Colour:** rather variable; back and sides usually brownish, often with spots, saddles, bars or other markings.



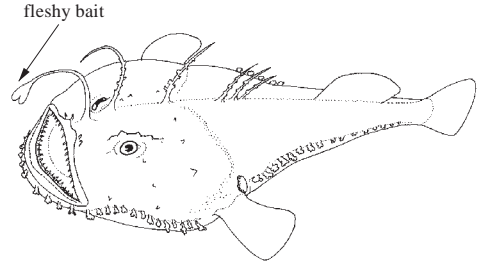
Habitat, biology, and fisheries: Toadfishes are bottom-dwellers ranging from littoral areas to rather deep waters. Several species enter rivers, and some migrate regularly between shallow and deep waters. Eastern Atlantic toadfishes are sluggish ambush predators, feeding mainly on molluscs, sea urchins, and crustaceans. They often hide in the sediment or in rock crevices. Although none of the species occurring in Fishing Area 34 are presently of commercial importance, they are taken in local artisanal or trawl fisheries and are used as food or in the production of fishmeal and oil. The spines may inflict wounds to people handling these fishes.

Similar families occurring in the area

Uranoscopidae (stargazers): head rounded rather than depressed, the mouth strongly oblique, opening dorsally; gill openings wide, not restricted to sides; first dorsal fin with 4 or 5 spines (3 in eastern Atlantic Batrachoididae); anal-fin base equal to or longer than second dorsal-fin base (always shorter in Batrachoididae); pelvic fins with 1 spine and 5 soft rays (1 spine and 2 soft rays in Batrachoididae).



Lophiidae: body and head more strongly depressed; first dorsal-fin spine modified into a long fishing rod with a fleshy bait.



Lophiidae

Key to the species of Batrachoididae occurring in the area

- 1a. Eyes small, contained 8 to 12 times in head length; anal-fin rays 21 to 23; dorsal-fin rays 24 to 26; anterior nostril tubular, without tentacles (Fig. 1a); vertebrae 33 to 35 ***Batrachoides liberiensis***
- 1b. Eyes larger, contained 4 to 8 times in head length; anal-fin rays 13 to 17; dorsal-fin rays 16 to 21; anterior nostril with tentacles (Fig. 1b); vertebrae 27 to 30 → 2

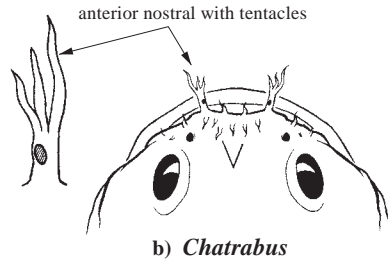
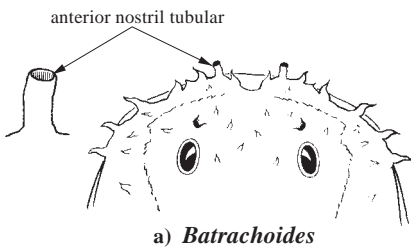


Fig. 1 anterior nostril

- 2a. Head rounded and narrow, head depth in width 1.3 times or less; a more or less funnel-shaped pocket (axillary pocket) present on upper part of pectoral axilla (Fig. 2a) ***Perulibatrachus* → 3**
- 2b. Head flattened and wide, head depth in width 1.6 times or greater; pectoral axilla without a pocket; a small foramen (axillary pore) present or absent, if present, it is a small hole high up in the pectoral axilla just below edge of opercular membrane (Fig. 2b) → 4
- 3a. Body colour a network of irregular dark lines on head and sides; 26 pectoral-fin rays; more than 60 pores in the dorsal lateral line; axillary pocket deep ***Perulibatrachus elminensis***
- 3b. Dark spots on body and pectoral fins; 23 pectoral-fin rays; about 35 pores in the dorsal lateral line; axillary pocket shallow ***Perulibatrachus rossignoli***
- 4a. No foramen on upper part of pectoral axilla; body without reticulate pattern, dark with traces of dorsal bars . . ***Chatrabus damaranus***
- 4b. A small foramen (axillary pore) high up in pectoral axilla just below edge of opercular membrane (Fig. 2b); body with reticulate pattern, dark spots on pectoral and caudal fins ***Halobatrachus didactylus* → 5**

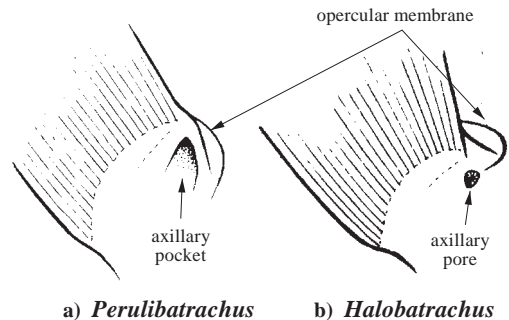








Fig. 2 pectoral fin (folded forward)

- 5a. Eye small, 5.1 to 8.0 times in head length, 5.3 to 7.9% standard length; interorbital space wide, 12.2 to 16.1% standard length **small-eyed form (northern area)**
- 5b. Eye large, 3.6 to 5.1 times in head length, 7.8 to 11.19% standard length; interorbital space narrow, 8.8 to 12.1% standard length **large-eyed form (southern area)**

List of species occurring in the area

The symbol  is given when species accounts are included.

-  *Batrachoides liberiensis* (Steindachner, 1867).
-  *Chatrabus damaranus* (Barnard, 1927).
-  *Halobatrachus didactylus* (Bloch and Schneider, 1801).
-  *Perulibatrachus elminensis* (Bleeker, 1863).
-  *Perulibatrachus rossignoli* (Roux, 1957).

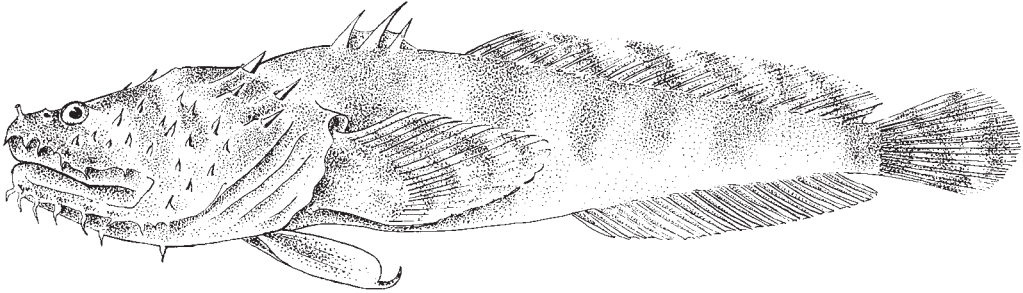
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Batrachoides liberiensis (Steindachner, 1867)

Frequent synonyms / misidentifications: *Batrachus liberiensis* Steindachner, 1867; *Batrachoides beninensis* Regan, 1915 / None.

FAO names: En – Hairy toadfish; Fr – Crapaud poilu; Sp – Sapo peludo.



Diagnostic characters: Body covered with small, embedded, cycloid scales except the head anterior to first dorsal fin and chest anterior to pelvic-fin origin are naked. Head broad, strongly depressed and regularly rounded anteriorly (but more oval in young), **most of its surface covered with numerous short, simple filaments giving it a "hairy" appearance**; underside of lower jaw on each side with a double row of 4 multibranching mental barbels bordering a groove pierced by 4 pores; each one of these lateral grooves followed posteriorly by a crest bearing tentacles; branched tentacles also present above upper jaw; **eyes small, contained 8 to 12 times in head length**; sides of head crossed by a longitudinal groove extending from anterior profile to opercular spines; **anterior, as well as posterior nostrils tubular, without ornamentation**, the former opening on a fleshy frontal lobe above upper lip; **2 spines on both opercle and subopercle**; teeth in upper jaw in 3 or 4 rows anteriorly and 2 or 3 rows laterally; those in lower jaw in 4 or 5 rows anteriorly and a single row laterally; teeth on vomer and palatines (roof of mouth) strong and conical. First dorsal fin with 3 spines, **second dorsal with 24 to 26 soft rays**; **anal fin with 21 to 23 soft rays**; **pectoral fins with 19 to 22 rays**; glands present between 13 and 15 pectoral-fin rays. Body mostly covered with small, embedded, cycloid scales except the head anterior to supratemporal canal and chest anterior to pelvic-fin origin are naked. Two lateral lines, the upper bending upward at level of tenth dorsal-fin ray, the lower bending downward at level of seventh anal-fin ray, both lines thereafter running along fin bases to caudal fin; **upper lateral line with 30 to 41**, the lower with 34 to 42 pores, each pore flanked by a pair of branched tentacles. **Number of vertebrae: 33 to 35.** **Colour:** rather variable, in preserved specimens ranging from dark to light brown, with usually 4 irregular brown cross-bars on body; a brown spot between eyes, and sometimes other spots behind eyes.

Size: Maximum to 245 mm total length, 205 mm standard length.

Habitat, biology, and fisheries: A bottom-living species occurring mainly in littoral areas and shallow coastal waters less than 30 m deep, but occasionally reported from deeper waters (to about 100 m). Also found in brackish environments. Feeds chiefly on crabs. Minimum size at first maturity 170 mm standard length for males, 122 mm standard length for females. Taken throughout its range, mainly in artisanal fisheries, apparently rather abundant. Separate statistics are not reported for this species. Caught mainly with artisanal fishing gear. Probably marketed mostly fresh.

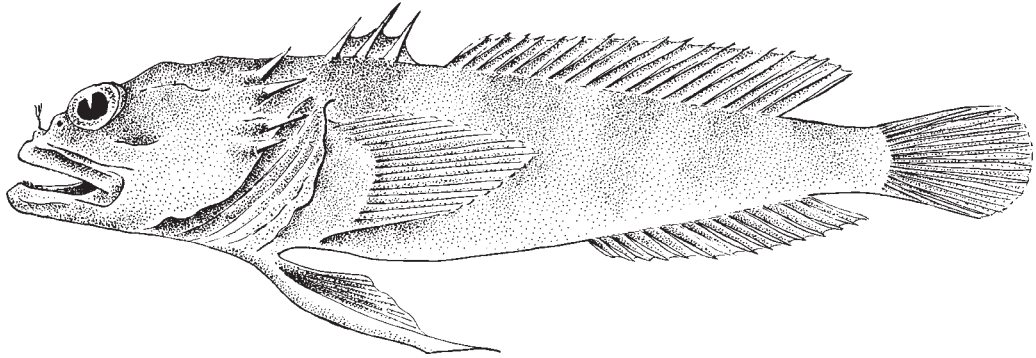
Distribution: West African coast from Senegal to Mangué Grande, northern Angola.



Chatrabus damaranus (Barnard, 1927)

Frequent synonyms / misidentifications: *Batrachoides damaranus* Barnard, 1927 / *Chatrabus melanurus* (Barnard, 1927).

FAO names: En – Pony toadfish; Fr – Crapaud angolais; Sp – Sapo chasquilla.



Diagnostic characters: Body covered with small, embedded, cycloid scales except the head anterior to first dorsal fin and chest anterior to pelvic-fin origin are naked. Body robust. Head massive; underside of lower jaw on each side with a double row of simple and rather flat mental barbels (8 or 9 pairs), each pair bordering a pore; farther posterior, a single row of 2 to 4 isolated, simple barbels on each side; **eyes large, contained 6 to 8 times in head length**; **anterior nostrils tubular** and located on edge of a frontal lobe **bearing 3 or 4 flattened tentacles**; posterior nostrils circular with a slightly prominent margin; **a few small filaments present between anterior nostrils**; 2 spines on both opercle and subopercle. First dorsal fin with 3 spines, second dorsal with 18 or 19 soft rays; **anal fin with 14 or 15 soft rays**; pectoral fins with 24 rays, **their inner surfaces with diffuse glandular tissue (not concentrated in inter-radial pockets)**. **No pore or pocket in pectoral axillary fold**. Body mostly covered with small, embedded, cycloid scales except the head anterior to first dorsal fin and chest anterior to pelvic-fin origin are naked. Two lateral lines, **upper with 29 to 37 pores**, lower scarcely visible, the pores each flanked by a pair of small vertical skin flaps; a third longitudinal row of pores, each flanked by a pair of horizontal flaps, present on midline of body. Number of vertebrae 28 to 30. **Colour:** in preserved specimens, back brownish, belly light brown; brown dots spread over entire body (including belly), sometimes arranged to form eye-like spots (ocelli) on head; 2 brown cross-bars on head and 4 on body.

Size: Maximum to 293 mm total length, 237 mm standard length.

Habitat, biology, and fisheries: A bottom-living species occurring on the continental shelf to about 200 m depth. Occasionally taken in artisanal and trawl fisheries throughout its range. Separate statistics are not reported for this species. Caught mainly with bottom trawls.

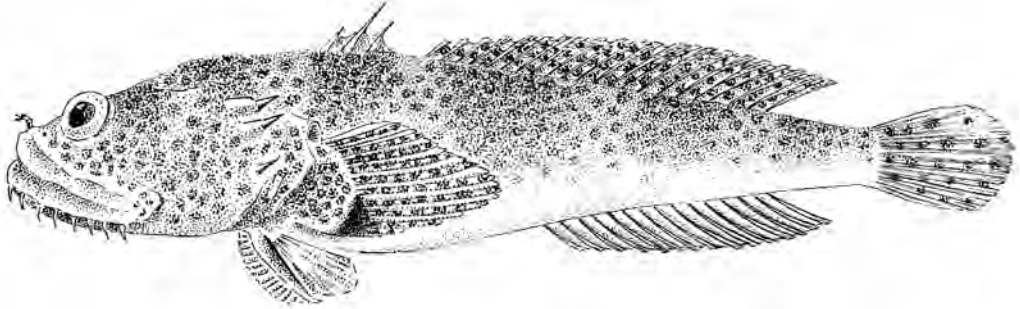
Distribution: West African coast from Baía dos Tigres, southern Angola to Walvis Bay, Namibia.



Halobatrachus didactylus (Bloch and Schneider, 1801)

Frequent synonyms / misidentifications: *Batrachus didactylus* Bloch and Schneider, 1801; *Halobatrachus conspicillum* (Cuvier, 1829) / None.

FAO names: **En** – Lusitanian toadfish; **Fr** – Crapaud-lusitanien; **Sp** – Sapo lusitánico.



Diagnostic characters: Body covered with small, embedded, cycloid scales except the head anterior to first dorsal fin and chest anterior to pelvic-fin origin are naked. Head large and massive; a double row of simple mental barbels on each side of lower jaw bordering a groove pierced by about 15 pores, followed laterally by a single row of rather long, simple barbels. **Two forms which may represent separate species, the small-eyed *H. didactylus*, eyes 5.1 to 8.0 times in head length, 5.3 to 7.9% standard length; interorbital space wide, 12.2 to 16.1% standard length; and the large-eyed *H. conspicillum*, eyes 3.6 to 5.1 times in head length, 7.8 to 11.1% standard length, interorbital space narrow, 8.8 to 12.1% standard length.** Anterior tube-like nostrils located on anterior profile of head and bearing a tuft of finger-like tentacles; posterior nostrils simple rounded openings just in front of eyes; 2 spines on opercle and 1 on subopercle; anterior teeth of both jaws in 3 rows, upper lateral teeth in 2 rows, lower laterals in a single row; 2 or 3 rows of teeth on vomer and palatines (roof of mouth). First dorsal fin with 3 spines, second dorsal with 19 to 21 soft rays; anal fin with 16 or 17 soft rays; pectoral fins with 24 or 25 rays, their inner surfaces bearing inter-radial pockets of glandular tissue; a small axillary pore on upper part of pectoral axilla beneath upper edge of opercular membrane. Two lateral lines, the upper comprising 48 pores, each surrounded by minute skin flaps. Number of vertebrae 11 precaudal plus 19 or 20 caudal, total 30 or 31. **Colour:** rather variable; in preserved specimens, darker on back and upper sides, lighter on belly; often 4 dark cross-bars on body and 3 on head (1 between eyes, the other 2 posterior to eyes); head and body covered with small dark spots superimposed on a lighter network; second dorsal fin with brown oblique lines; opercular and dorsal fin spines often surrounded by light areas at bases.

Size: Maximum to 277 mm total length, 235 mm standard length. The IGFA all-tackle angling record is 2.50 kg for a fish taken in Dahkla, Western Sahara in 2003.

Habitat, biology, and fisheries: A bottom-dwelling species inhabiting mainly shallow coastal waters to about 60 m depth, although some countries fishing in the area have reported it from deeper waters (to about 250 m). Feeds chiefly on molluscs and crustaceans. In the northern part of the range, spawning extends from March to April. Minimum size at maturity 191 mm total length for females, 160 mm for males. Fecundity ranges from 227 to 1 233 eggs/female. Taken in artisanal fisheries and as bycatch in trawl fisheries throughout its range. Separate statistics are not reported for this species. Caught with bottom trawls and artisanal fishing gear. Marketed mostly fresh; also used for fishmeal and oil. Has received special attention in recent years because of its use as an experimental species in toxicology and cardiology experiments.

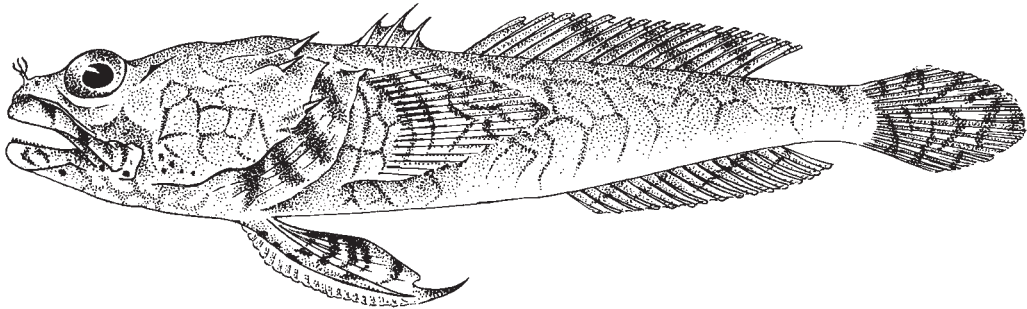
Distribution: The small-eyed *H. didactylus* form is known from an old northern record from the Kattegat in Norway south along the coast of the Iberian Peninsula into the Mediterranean and along the coast of northern West Africa. The large-eyed *H. conspicillum* form is found on the West African coast from the Straits of Gibraltar south to at least Ghana and perhaps as far as Nigeria, with some old literature records from the Canary Islands.



***Perulibatrachus elminensis* (Bleeker, 1863)**

Frequent synonyms / misidentifications: *Batrachus elminensis* Bleeker, 1863; *Parabatrachus elminensis* (Bleeker, 1863); *Batrachus budkeri* Roux, 1957 / None.

FAO names: En – Guinean toadfish; Fr – Crapaud guinéen; Sp – Sapo guineano.



Diagnostic characters: Body covered with small, embedded, cycloid scales except the head anterior to first dorsal fin and chest anterior to pelvic-fin origin are naked. Head large and depressed; mouth terminal; underside of lower jaw on each side with a double row of simple or bifid filamentous mental barbels bordering a groove pierced by about 14 pores (each surrounded by a pair of short tentacles) and ending in a rather large orifice on either end; farther back on underside of lower jaw, at level of mouth cleft, another 2 pores surrounded by fringed barbels; **anterior nostrils** located on anterior profile of head and **bearing a tuft of tentacles**; posterior nostrils simple round orifices surrounded by a low wall and located just in front of eyes; 2 spines on opercle and **a single bifid spine on subopercle**; teeth in upper jaw in 3 rows anteriorly and a single row laterally; those in lower jaw in 3 or 4 rows anteriorly followed laterally first by 2 rows and then ending in a single row; 3 or 4 rows of teeth on vomer and 1 or 2 rows on palatines (roof of mouth). First dorsal fin with 3 spines; second dorsal with 16 to 21 soft rays (usually 16 or 17); anal fin with 14 to 17 soft rays; pectoral fins with 26 rays, **their inner sides bearing a variable number of inter-radial globules of glandular tissue; a deep axillary pocket (distinct funnel-like depression) occupying the entire upper part of the pectoral axillary fold**. Two lateral lines, **the upper comprising about 60 pores**, each surrounded by 2 short skin flaps. Number of vertebrae: 27. **Colour:** in preserved specimens, back more or less dark brown, sides and belly light brown; **a network of irregular brown lines covering the entire body except belly**; soft dorsal and anal fins with oblique brown stripes; a dark spot on body beneath pectoral fins close to the axillary pocket.

Size: Maximum to 343 mm total length, 285 mm standard length; common to 200 mm total length.

Habitat, biology, and fisheries: A bottom-living species inhabiting coastal waters on the continental shelf. Feeds on crustaceans and molluscs. Occasionally taken in artisanal and trawl fisheries, but apparently nowhere abundant. Separate statistics are not reported for this species. Caught with bottom trawls and artisanal fishing gear. Probably utilized fresh.

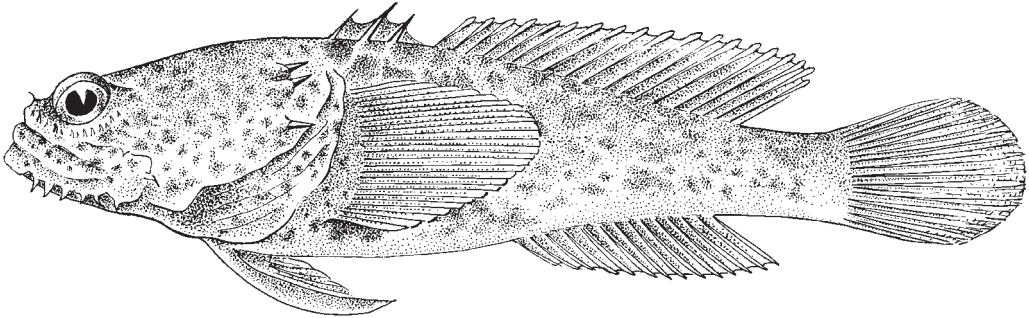
Distribution: West African coast from Ghana to Walvis Bay, Namibia.



***Perulibatrachus rossignoli* (Roux, 1957)**

Frequent synonyms / misidentifications: *Batrachus rossignoli* Roux, 1957 / None.

FAO names: **En** – Rossignol's toadfish; **Fr** – Crapaud de Rossignol; **Sp** – Sapo do Rossignol.



Diagnostic characters: Body covered with small, embedded, cycloid scales except the head anterior to first dorsal fin and chest anterior to pelvic-fin origin are naked. Head large and massive; underside of lower jaw on each side with a double row of flat, broad-based mental barbels bordering a groove pierced by about 12 pores (each surrounded by a pair of short tentacles); **eyes large, contained 4 to 5 times in head length**; **anterior nostrils tubular** and located on the edge of a fleshy frontal lobe, **bearing a simple tentacle**; posterior nostrils simple round openings; 2 spines on opercle and **1 on subopercle**; teeth in both jaws small and conical, in 3 rows anteriorly, and successively reduced to 2 and 1 row laterally; a single row of teeth on vomer and palatines (roof of mouth). First dorsal fin with 3 spines, second dorsal with 19 soft rays; anal fin with 13 to 15 soft rays; **pectoral fins with 23 rays, their inner surfaces with diffuse glandular tissue (not concentrated in inter-radial pockets)**. **A shallow funnel-shaped pocket present on upper part of pectoral axillary fold**. Body mostly covered with small, embedded, cycloid scales except the head anterior to first dorsal fin and chest anterior to pelvic-fin origin are naked. **Two lateral lines, the upper comprising about 35 pores**, each surrounded by 2 skin flaps, the lower with about 30 pores. Number of vertebrae 29 or 30. **Colour:** in preserved specimens, back brownish, belly beige; 3 or 4 brown cross-bars on body and 2 on head. Fresh specimens sometimes with brown spots spread over entire body (including belly) arranged to form constellations or eye-like spots (ocelli).

Size: Maximum to at least 270 mm total length, 215 mm standard length.

Habitat, biology, and fisheries: A bottom-living species occurring on the continental shelf to about 100 m. Feeds chiefly on crustaceans. Separate statistics are not reported for this species. Occasionally taken in artisanal and trawl fisheries throughout its range, but apparently nowhere abundant. Caught with bottom trawls and several types of artisanal gear. Utilized mainly fresh.

Distribution: West African coast from Gabon to Walvis Bay, Namibia.



New Index

B	
BATRACHOIDIDAE	2036
BATRACHOIDIFORMES	2036
<i>Batrachoides beninensis</i>	2039
<i>Batrachoides damaranus</i>	2040
<i>Batrachoides liberiensis</i>	2039
<i>Batrachus budkeri</i>	2042
<i>Batrachus didactylus</i>	2041
<i>Batrachus elminensis</i>	2042
<i>Batrachus liberiensis</i>	2039
<i>Batrachus rossignoli</i>	2043
C	
<i>Chatrabus damaranus</i>	2040
<i>Chatrabus melanurus</i>	2040
Crapaud angolais	2040
Crapaud de Rossignol	2043
Crapaud guinéen	2042
Crapaud poilu	2039
Crapaud-lusitanien	2041
G	
Guinean toadfish	2042
H	
Hairy toadfish	2039
<i>Halobatrachus conspicillum</i>	2041
<i>Halobatrachus didactylus</i>	2041
L	
LOPHIIDAE	2037
Lusitanian toadfish	2041
P	
<i>Parabatrachus elminensis</i>	2042
<i>Perulibatrachus elminensis</i>	2042
<i>Perulibatrachus rossignoli</i>	2043
Pony toadfish	2040
R	
Rossignol's toadfish	2043
S	
Sapo chasquilla	2040
Sapo do Rossignol	2043
Sapo guineano	2042
Sapo lusitánico	2041
Sapo peludo	2039
Stargazers	2036
T	
Toadfishes	2036
U	
URANOSCOPIDAE	2036
B	
<i>beninensis, Batrachoides</i>	2039
<i>budkeri, Batrachus</i>	2042
C	
<i>conspicillum, Halobatrachus</i>	2041
D	
<i>damaranus, Batrachoides</i>	2040
<i>damaranus, Chatrabus</i>	2040
<i>didactylus, Batrachus</i>	2041
<i>didactylus, Halobatrachus</i>	2041
E	
<i>elminensis, Batrachus</i>	2042
<i>elminensis, Parabatrachus</i>	2042
<i>elminensis, Perulibatrachus</i>	2042
L	
<i>liberiensis, Batrachoides</i>	2039
<i>liberiensis, Batrachus</i>	2039
M	
<i>melanurus, Chatrabus</i>	2040
R	
<i>rossignoli, Batrachus</i>	2043
<i>rossignoli, Perulibatrachus</i>	2043

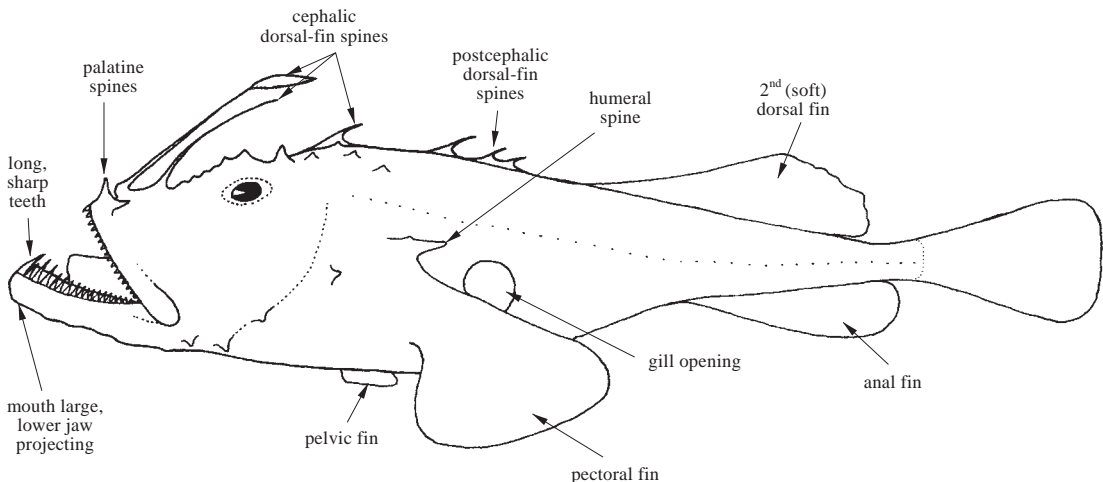
Order LOPHIIFORMES

LOPHIIDAE

Goosefishes

by J.H. Caruso, Tulane University, New Orleans, LA, USA

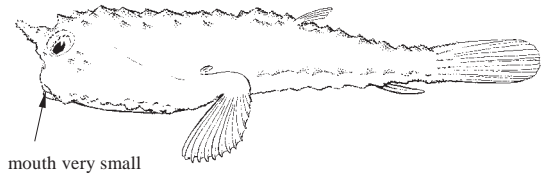
Diagnostic characters: Head and anterior part of body much depressed and very broad, posterior portion of body tapering; maximum size to about 200 cm, about 120 cm in the area, commonly 25 to 45 cm. Head rounded, bearing numerous sharp spines and ridges on dorsal and lateral surfaces, the most conspicuous of which are the following: 1 very large prominent spine or group of spines immediately anterior to each pectoral-fin base (humeral spines); 1 pair of sharp prominent spines on either side of snout, immediately behind mouth (palatine spines); a bony ridge above eyes with 2 or 3 short spines (frontal spines); and 2 bony ridges on snout running forward from eyes (frontal ridges); interorbital space slightly concave. Mouth very large and wide, upper jaw protractile and the lower projecting, both bearing numerous long, sharp, depressible teeth; gill openings fairly large, low in pectoral-fin axil, sometimes extending forward in front of pectoral-fin base. **Two separate dorsal fins, the first composed of 2 or 3 isolated slender spines on head (cephalic spines) and of 1 to 3 spines (often connected by a membrane, at least in juveniles), at the level of pectoral fins (post-cephalic spines); first 2 cephalic spines located at anterior end of snout, the foremost modified into an angling apparatus, usually bearing a fleshy appendage (esca) at tip;** the third cephalic spine, when present, is located at level of humeral spines; anal fin with 6 to 11 soft rays, below second dorsal fin; caudal fin with 8 rays, the 2 outer rays unbranched; pectoral-fin rays unbranched, terminating in small fleshy filaments; pelvic fins on ventral surface of head, anterior to pectoral fins. Lateral line present, but usually indistinct. **Skin smooth, naked, often with fleshy flaps on head and/or body** (well visible only when fish is immersed in liquid). **Colour:** dorsal surface usually uniform light to dark brown or grey (changing with substrate), lighter on ventral surface; distinctive markings present in some species.



Habitat, biology, and fisheries: Most monkfishes inhabit the waters of the continental slope, usually at depths beyond 200 m, with some species inhabiting depths in excess of 1 000 m. North of Area 34, *Lophius piscatorius* may inhabit very shallow depths. Two species, *Lophius budegassa* and *L. piscatorius*, are at present exploited in Area 34. They are highly esteemed as foodfishes.

Similar families occurring in the area

Ogcocephalidae: fishing lure small, placed in a depression between snout tip and mouth; head broader and more strongly depressed, devoid of long, slender dorsal-fin spines; mouth very small, without long sharp teeth.



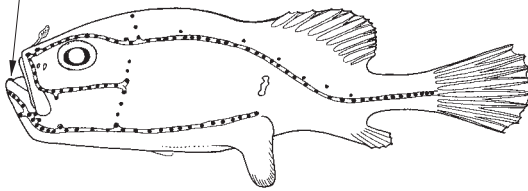
Ogcocephalidae

Chaunacidae: body rounded, not flattened; head cuboid, devoid of long, slender dorsal-fin spines; mouth large, but without long, sharp teeth; skin very loose and flaccid, bearing small spiny scales; lateral-line canals conspicuous, especially on head; colour deep pink or reddish.

Antennariidae: body short, globose, slightly compressed; teeth small, villiform.

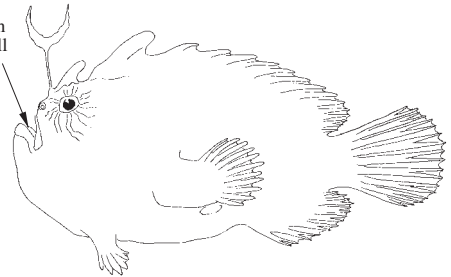
Bathypelagic anglerfish families: no pelvic fins; second and third dorsal-fin spines greatly reduced or absent; also, body shape different.

mouth without long, sharp teeth



Chaunacidae

teeth small



Antennariidae

Key to the species of Lophiidae occurring in the area

- 1a. Gill opening not extending in front of pectoral fin; bony ridge on snout rugose; soft dorsal-fin rays 9 to 12; anal-fin rays 8 to 11; pectoral-fin rays 19 to 28; vertebrae 27 (Fig. 1) **(Lophius) → 2**
- 1b. Gill opening extending in front of pectoral fin; bony ridge on snout smooth; soft dorsal-fin rays 8; anal-fin rays 6; pectoral-fin rays 14 to 21; vertebrae 19 (Fig. 2) **Lophiodes kempii**

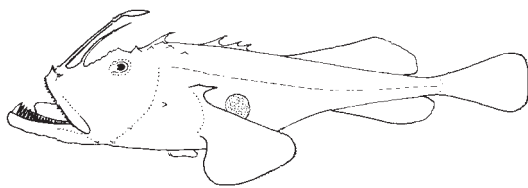


Fig. 1 Lophius

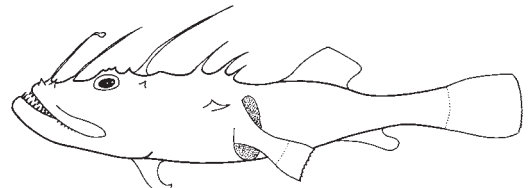







Fig. 2 Lophiodes

- 2a. Parietal peritoneum (tissue layer lining body cavity) pale, not black → **3**
- 2b. Parietal peritoneum (tissue layer lining body cavity) very dark or black → **4**
- 3a. Esca bifid, with 2 distinct, flattened, roughly circular lobes; third dorsal-fin spine long, length greater than distance between posterior frontal spines; fourth dorsal fin spine length greater than snout width **Lophius piscatorius**
- 3b. Esca not bifid; third dorsal-fin spine short, length less than distance between posterior frontal spines; fourth dorsal fin spine less than snout width **Lophius upsicephalus**

- 4a. Pectoral-fin rays 19 to 24, usually less than 23; esca usually a simple bulb, not bifid or pennant-like; snout short ***Lophius vaillanti***
- 4b. Pectoral-fin rays 22 to 28, usually greater than 22; esca usually a simple pennant-like flap; snout short → 5
- 5a. Third dorsal-fin spine short (7.8 to 12.4% of SL); Eastern North Atlantic . . . ***Lophius budegassa***
- 5b. Third dorsal-fin spine long (10.9 to 18.2% of SL); Eastern South Atlantic . . . ***Lophius vomerinus***

List of species occurring in the area

The symbol  is given when species accounts are included.

-  *Lophiodes kempfi* (Norman, 1935).
-  *Lophius budegassa* Spinola, 1807.
-  *Lophius piscatorius* Linnaeus, 1758.
Lophius upsicephalus Smith, 1841. Considered by some authors a synonym of *L. vomerinus*. May occur in southern part of area 47 south of Cape Fria.
-  *Lophius vaillanti* Regan, 1903.
Lophius vomerinus Valenciennes, 1837. May occur in southern part of area 47 south of Cape Fria.

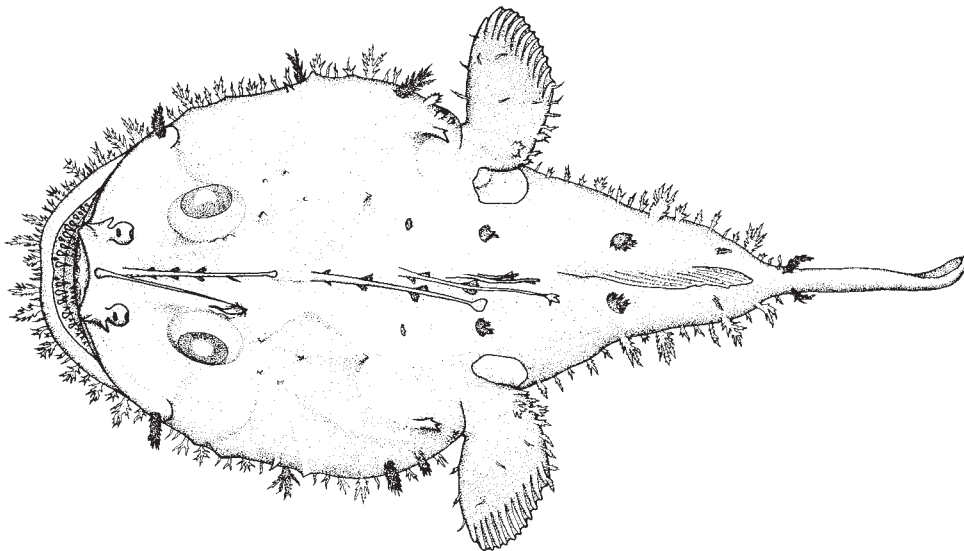
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- Caruso, J.H.** 1983. The systematics and distribution of the lophiid anglerfishes. II: Revisions of the genera *Lophiomus* and *Lophius*. *Copeia*, 1983(1): 11–30.
- Caruso, J.H.** 1985. The systematics and distribution of the lophiid anglerfishes. III: Intergeneric relationships. *Copeia*, 1985(4) :870–875.
- Vakily, J.M., Camara, S.B., Mendy, A.N., Marques, V., Samb, B., Dos Santos, A.J., Sheriff, M.F., Sidi, M.O.T. & Pauly, D.** 2002. *Poissons Marins de la Sout-Région Nord-Ouest Africaine*. Commission Européenne, Centre Commun de Recherche, Institut de l'Environnement Durable, I-21020 Ispra (VA) Italie, 2002 EUR 20379 FR.

Lophiodes kemp (Norman, 1935)

Frequent synonym / misidentifications: *Chirolophius kemp* Norman, 1935 / None.

FAO names: En – Longspine African angler; Fr – Baudroie épineuse.



Distinctive characters: Head and anterior part of body moderately depressed, posterior portion of body tapering; head and body bearing numerous flattened, fleshy tendrils. Head bearing numerous sharp spines on dorsal and lateral surfaces; humeral spines (in front of pectoral-fin bases) long and well developed, frequently branched and antler-like; inner sphenotic spines (just behind eyes) well developed, outer sphenotic spines reduced to low, rounded knobs; **frontal ridges (running forward from eyes) smooth, without knobs or ridges; gill openings extending below, behind, and in front of pectoral-fin bases.** First (spinous) dorsal fin consisting of 3 isolated spines on head (cephalic spines), and a group of 3 short slender spines behind head (post-cephalic spines) connected by a low membrane and bearing scattered fleshy tendrils; **the first dorsal-fin spine modified into an angling apparatus (illicium) bearing a fleshy lure (esca), third and fourth dorsal-fin spines long, length of third much greater than least distance between sphenotic spines. Second (soft) dorsal fin with 8 rays; anal fin with 6 rays; pectoral fins with 13 to 16 rays.** **Colour:** dorsal surface uniform dark brown, fleshy tendrils darker brown or black; ventral surface slightly lighter; ventral surface of pectoral fins darker distally, but tips of rays pale; **peritoneum pale.**

Size: Maximum: 30 cm; common to 20 cm.

Habitat, biology, and fisheries: Larvae are pelagic; young and adults are exclusively benthic on the outer continental shelf and upper slope at depths ranging from 50 to at least 400 m. Caught with bottom trawls, but separate statistics are not reported for this species from Areas 34 and 47.

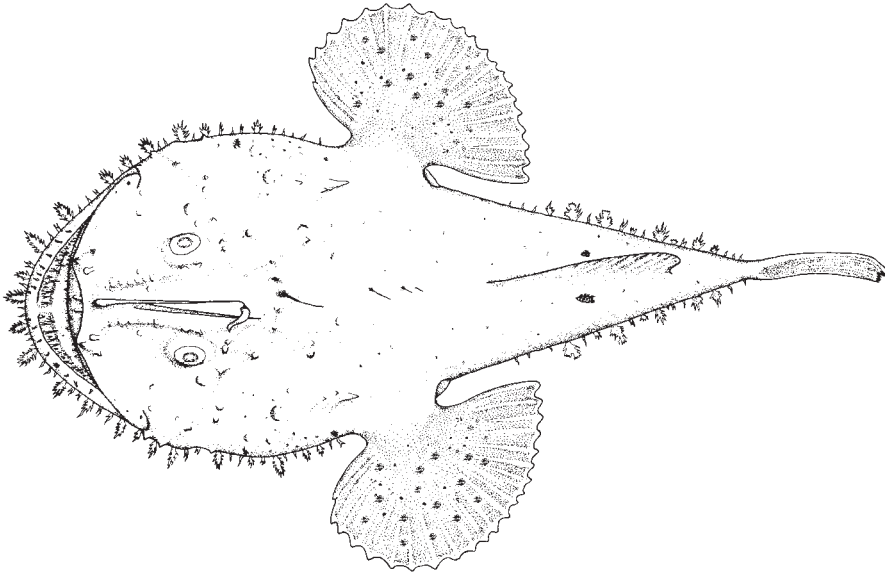
Distribution: Known from coast of western Africa between Mauritania (about 20°N) and Angola (about 12°S).



***Lophius budegassa* (Spinola, 1807)**

Frequent synonym / misidentifications: None / *Lophius piscatorius*.

FAO names: En – Blackbellied angler; Fr – Baudroie rousse; Sp – Rape negro.



Diagnostic characters: Head and anterior part of body very broad and strongly depressed, posterior portion of body tapering; head and body bearing numerous flattened, fleshy tendrils. Head bearing numerous sharp spines on dorsal and lateral surfaces; humeral spines (in front of pectoral-fin bases) long, straight, and well developed, occasionally with 2 smaller spines arising from sides; inner and outer sphenotic spines (just behind eyes) well developed; **frontal ridges (running forward from eyes) rugose; gill openings below and behind pectoral-fin bases.** First (spinous) dorsal fin consisting of 3 isolated spines on head (cephalic spines), and a group of 3 short slender spines behind head (post-cephalic spines) connected by a low membrane and bearing scattered fleshy tendrils; first dorsal-fin spine modified into an angling apparatus (Illicium) bearing a long **fleshy, pennant-like lure (esca); second dorsal-fin spine darkly pigmented, bearing small tendrils; third dorsal-fin spine long, length less than distance between sphenotic spines; post-cephalic dorsal spines with dark pigment at bases. Second (soft) dorsal fin with 9 or 10 rays; anal fin with 8 or 9 rays; pectoral fins with 22 to 26 rays.**

Colour: dorsal surface uniform grey or dark brown, frequently with scattered small, dark rings; ventral surface light tan; distal third of ventral surface of pectoral fins becoming abruptly darker, forming a broad, dark band; **peritoneum pale.**

Size: Maximum: 100 cm; common to 50 cm.

Habitat, biology, and fisheries: Larvae are pelagic; young and adults are exclusively benthic and occur from the shoreline to the continental slope at depths ranging to at least 1 000 m. Caught with bottom trawls, but separate statistics are not reported for this species from Areas 34 and 47.

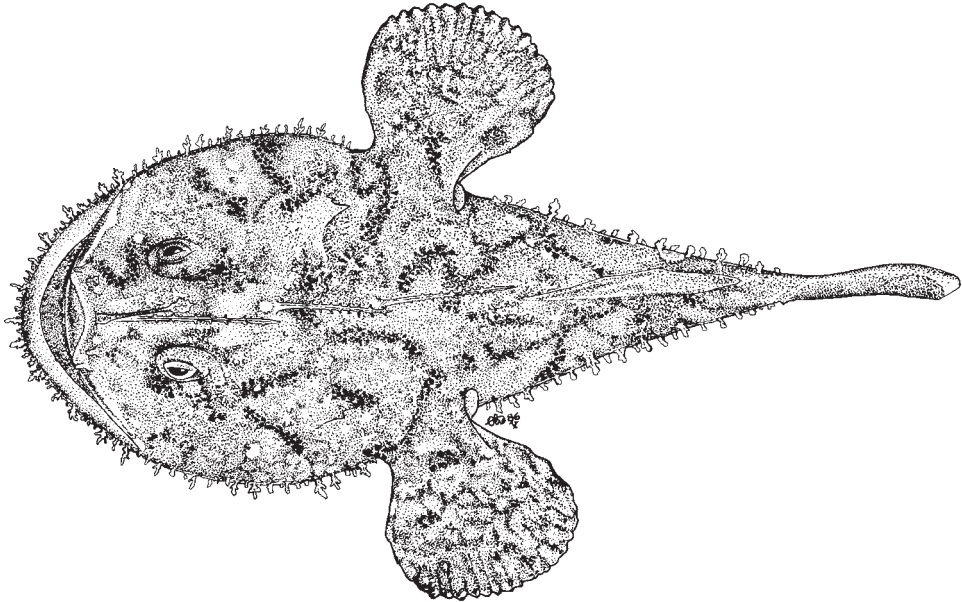
Distribution: Off continental coasts throughout the area (including the Mediterranean Sea) south at least to Senegal.



***Lophius piscatorius* Linnaeus, 1758**

Frequent synonym / misidentifications: None / *Lophius budegassa*.

FAO names: En – Angler; Fr – Baudroie commune; Sp – Rape.



Diagnostic characters: Head and anterior part of body very broad and strongly depressed, posterior portion of body tapering; head and body bearing numerous flattened, fleshy tendrils. Head bearing numerous sharp spines on dorsal and lateral surfaces; humeral spines (in front of pectoral-fin bases) long, straight and well developed, occasionally with 2 smaller spines arising from sides; inner and outer sphenotic spines (just behind eyes) well developed; **frontal ridges (running forward from eyes) rugose; gill openings below and behind pectoral-fin bases.** First (spinous) dorsal fin consisting of 3 isolated spines on head (cephalic spines), and a group of 3 short slender spines behind head (post-cephalic spines) connected by a low membrane and bearing scattered fleshy tendrils; **first dorsal-fin spine modified into an angling apparatus (illicium) bearing a short, bifid lure (esca) consisting of 2 flattened, rounded blades; second dorsal-fin spine darkly pigmented, bearing small tendrils; third dorsal-fin spine very long, length greater than distance between posterior frontal spines and usually greater than distance between sphenotic spines, when retracted reaches level of fifth or sixth post-cephalic spines; post-cephalic spines also long, length of fourth greater than snout width and frequently greater than distance between posterior frontal spines. Second (soft) dorsal fin with 11 or 12 rays; anal fin with 9 or 10 rays; pectoral fins with 23 to 27 rays. Colour:** dorsal surface mottled grey or dark brown; ventral surface light tan; distal third of ventral surface of pectoral fins becoming abruptly darker, forming a broad, dark band; **peritoneum pale.**

Size: Maximum: 200 cm; common from 40 to 60 cm.

Habitat, biology, and fisheries: Larvae are pelagic; young and adults are exclusively benthic and occur from the shoreline to the continental slope at depths ranging to at least 600 m. Caught with bottom trawls. Statistics for this species include *Lophius budegassa*.

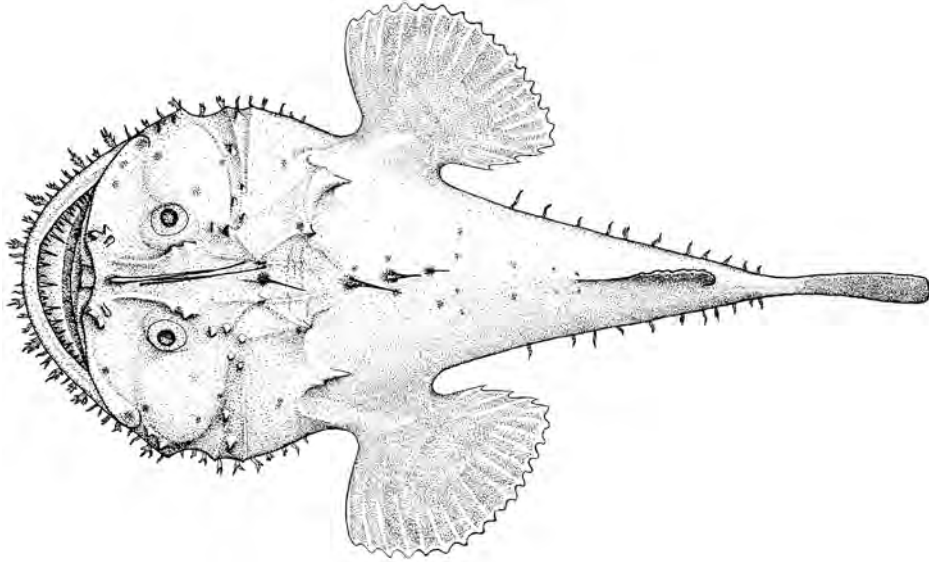
Distribution: Off continental coasts throughout the area (including the Mediterranean Sea) south at least to Mauritania.



Lophius vaillanti Regan, 1903

Frequent synonym / misidentifications: None / None.

FAO names: En – Shortspine African angler; Fr – Baudroie africaine; Sp – Rape africano.



Diagnostic characters: Head and anterior part of body very broad and strongly depressed, posterior portion of body tapering; head and body bearing numerous thin, fleshy tendrils. Head with numerous sharp spines on dorsal and lateral surfaces; humeral spines (in front of pectoral-fin bases) long, straight and well developed, occasionally with 2 smaller spines arising from sides; inner and outer sphenotic spines (just behind eyes) well developed; **frontal ridges (running forward from eyes) nearly smooth; gill openings below and behind pectoral-fin bases. Head and snout very short.** First (spinous) dorsal fin consisting of 3 isolated spines on head (cephalic spines), and a group of 3 short slender spines behind head (post-cephalic spines) connected by a low membrane; all dorsal-fin spines lacking large, fleshy tendrils; first dorsal-fin spine modified into an angling apparatus (illicium) bearing a **simple, rounded, fleshy bulb (esca); second dorsal-fin spine darkly pigmented, bearing small tendrils; third dorsal-fin spine long, length of exposed portion less than distance between sphenotic spines; post-cephalic spines with dark pigment at bases. Second (soft) dorsal fin with 10 or 11 rays; anal fin with 8 to 10 rays; pectoral fins with 19 to 24 rays.** **Colour:** uniform dark brown above and below, dorsal surface occasionally with scattered, diffuse, dark spots, lateral-line pores surrounded by lightly pigmented area; distal half of ventral surface of pectoral fins becoming gradually darker, all fin rays with pale tips; **peritoneum dark.**

Size: Maximum: 50 cm; common to 25 cm.

Habitat, biology, and fisheries: Larvae are pelagic; young and adults are exclusively benthic and occur on the continental slope at depths ranging from 200 to nearly 800 m. Caught with bottom trawls, but separate statistics are not reported for this species.

Distribution: Known from coast of western Africa between Mauritania (ca. 20°N) and Angola (ca. 17°S).

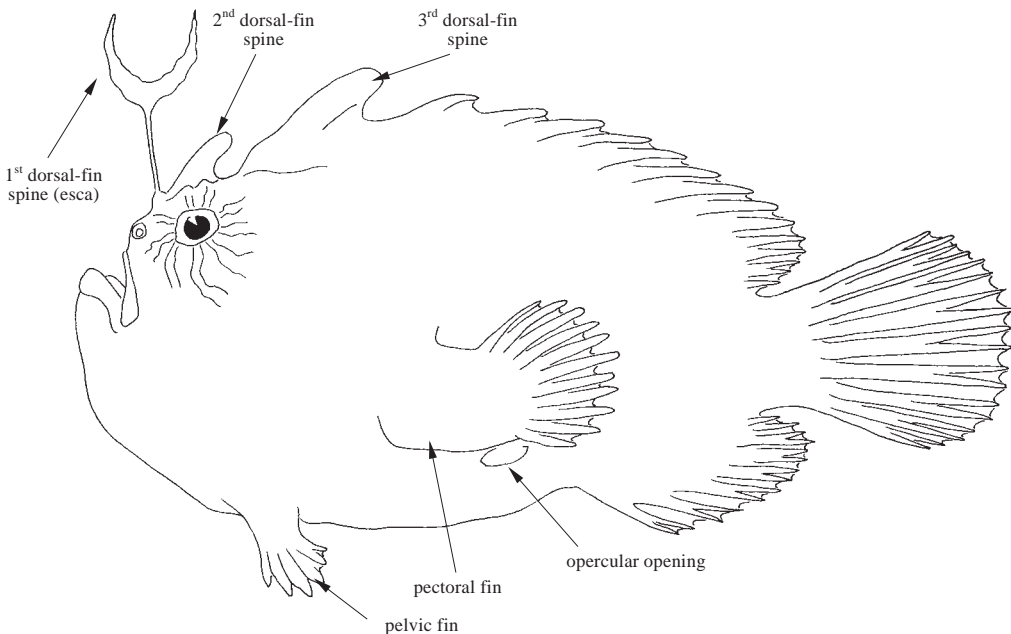


ANTENNARIIDAE

Frogfishes

by T.W. Pietsch, University of Washington, Seattle, WA, USA

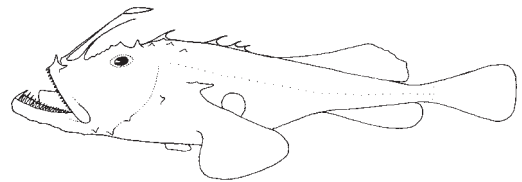
Diagnostic characters: **Body short, deep, globose, slightly compressed.** Mouth large, oblique to vertical, with numerous, small, villiform teeth. Eyes small, lateral. **Opercular (gill) opening restricted to a small pore** located behind and below pectoral-fin base. Spinous dorsal fin of 3 spines, widely separated from soft part of fin. **First dorsal-fin spine (illicium) free from rest of fin, nearly always bearing a well-developed terminal bait (esca);** second and third dorsal-fin spines also free from rest of fin, well developed, and covered by thick skin. **Pectoral-fin lobe elongate, leg-like;** fin single, not divided into upper and lower portions. Skin spinulose or naked, often with membranous filaments or flaps. **Colour:** usually in 2 phases: a more common light phase with light tan to yellow, brown or rust background usually overlaid with black, brown, pink, or bright yellow streaks, bars, and/or spots on head, body, and fins; a dark phase with dark brown to black background with streaks, bars, or spots showing through as deeper black, tips of rays of paired fins often white.



Habitat, biology, and fisheries: Frogfishes spend the greater part of their lives squatting on the bottom in shallow water or, as in the case of *Histrio*, clinging to floating *Sargassum* weed. Despite their sedentary nature, nearly all are voracious carnivores that sit quietly waiting for smaller fishes to pass by, at which time they enticingly wriggle their bait to attract the potential prey to their cavernous mouths. Their ovaries are tightly rolled like a double scroll, and eggs are released embedded in a single, large, buoyant gelatinous mass. Some frogfishes reach a total length of over 50 cm, but most species do not exceed 20 cm. Besides their limited value in the aquarium trade, they are of no significant economic interest.

Similar families occurring in the area

Lophiidae: body strongly depressed (flattened); mouth enormous, nearly horizontal; teeth extremely large; skin smooth, tubercles or scales entirely absent; first dorsal fin of 6 spines, first spine long and slender, bearing a terminal bait, inserted on upper surface of snout, never nested within a cavity over the mouth.

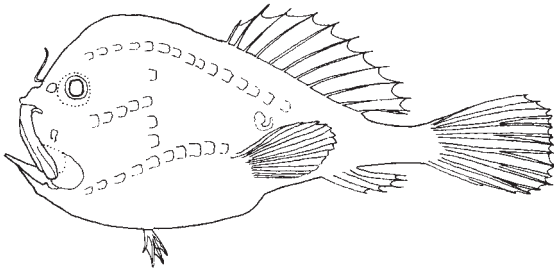


Lophiidae

Chaunacidae: body rounded or cuboid; mouth large, oblique to nearly vertical; skin rough, spinulose; bait visible on snout, nested within a shallow cavity above the mouth, but cavity never extending forward to form a rostrum; second and third dorsal-fin spines reduced and embedded beneath skin.

Ogcocephalidae: body strongly depressed (flattened); mouth small, horizontal to slightly oblique; skin rough, everywhere covered by a thick armour of consolidated scales; bait visible on snout, nested within a shallow cavity above the mouth; remnant of second dorsal-fin spine embedded beneath skin, third dorsal-fin spine absent.

Meso- and bathypelagic anglerfish families: pelvic fins absent; second dorsal-fin spine greatly reduced, nearly always embedded beneath skin; third dorsal-fin spine absent.



Chaunacidae



Ogcocephalidae

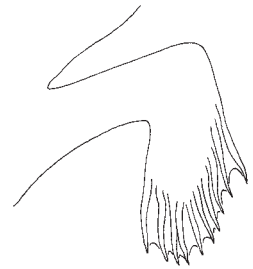
Key to species occurring in the area

- 1a. Skin of body rough, everywhere covered with extremely close-set spinules; pectoral-fin lobe broadly connected to body; pelvic fins short, considerably less than 25% standard length (Fig. 1); benthic in coral or rocky reefs, or on muddy or sandy bottoms (*Antennarius*) → 2
- 1b. Skin of body smooth, appearing naked (dermal spinules, if present, difficult to detect without microscopic aid); pectoral-fin lobe free from body; pelvic fins long, greater than 25% standard length (Fig. 2); pelagic in floating *Sargassum* weed. *Histrio histrio*



pectoral fin

Fig. 1 *Antennarius*



pectoral fin

Fig. 2 *Histrio*

- 2a. Pelvic fin with all rays bifurcate; membrane behind second dorsal-fin spine divided into naked dorsal and ventral portions by a dense cluster of dermal spinules; only distal 20 to 25% of maxilla naked and tucked beneath folds of skin, the remaining proximal portion covered directly with spinulose skin; dorsal fin with at least 7 to 13 posteriormost rays bifurcate; dorsal rays 13 (rarely 12), anal rays 8 (rarely 7), pectoral rays 13 (rarely 11 or 12) → 3
- 2b. Pelvic fin with rays simple or only posteriormost ray bifurcate; membrane behind second dorsal-fin spine not divided into naked dorsal and ventral portions by a dense cluster of dermal spinules; distal 2/3 of maxilla naked and tucked beneath folds of skin, only the extreme proximal end directly covered with spinulose skin; dorsal fin with only 2 or 3 posteriormost rays bifurcate; dorsal rays 11 or 12 (rarely 13), anal rays 6 or 7 (rarely 8), pectoral rays 9 to 11 (rarely 12) → 4

- 3a. Pectoral-fin rays simple; dorsal fin with all rays bifurcate; esca a simple, oval-shaped appendage, with numerous, more or less parallel, vertically aligned folds; illicium length 14.6 to 19.4% of standard length; eye diameter 7.4 to 11.4% of standard length ***Fowlerichthys radiosus***
- 3b. Pectoral-fin rays bifurcate; dorsal fin with only 7 to 13 posteriormost rays bifurcate; esca a tuft of elongate slender filaments; illicium length 9.0 to 13.6% of standard length; eye diameter 3.9 to 6.3% of standard length ***Fowlerichthys senegalensis***
- 4a. Anterior end of pterygiophore of illicium nearly always extending anteriorly beyond symphysis of upper jaw, slightly overhanging the mouth; esca with 2 to 7 elongate, worm-like appendages; head, body, and fins usually completely covered with roughly parallel, darkly pigmented streaks ***Antennarius striatus***
- 4b. Anterior end of pterygiophore of illicium terminating well posterior to symphysis of upper jaw, not overhanging the mouth; esca without worm-like appendages; head, body, and fins never covered with roughly parallel, darkly pigmented streaks → 5
- 5a. Illicium long (18.9 to 29.6 % of standard length), approximately twice length of second dorsal-fin spine, the latter attached to head by membranous skin; head, body, and fins usually with dark, circular spots of pigments (caudal fin often with a triangle of 3 large spots) ***Antennarius pardalis***
- 5b. Illicium short (8.8 to 14.7% of standard length), approximately equal to length of second dorsal-fin spine, the latter free, not connected to head by membrane; a darkly pigmented basidorsal spot nearly always present, but otherwise head, body, and fins without large dark circular spots; unpaired fins usually peppered with numerous, small, dark spots ***Antennatus nummifer***

List of species occurring in the area

Antennarius pardalis (Valenciennes, 1837). To 9.7 cm SL. Tropical E Atlantic.

Antennarius striatus (Shaw in Shaw and Nodder, 1794). To 15.5 cm SL. Atlantic, Indian, and W Pacific.

Antennatus nummifer (Cuvier, 1817). To 9.0 cm SL. Tropical E Atlantic and Indo-Pacific.

Fowlerichthys radiosus (Garman, 1896). To 18.0 cm SL. N Atlantic.

Fowlerichthys senegalensis (Cadenat, 1959). To 28.5 cm SL. Tropical E Atlantic.

Histrio histrio (Linnaeus, 1758). To 14.1 cm SL. Atlantic, Indian, and W Pacific.

References

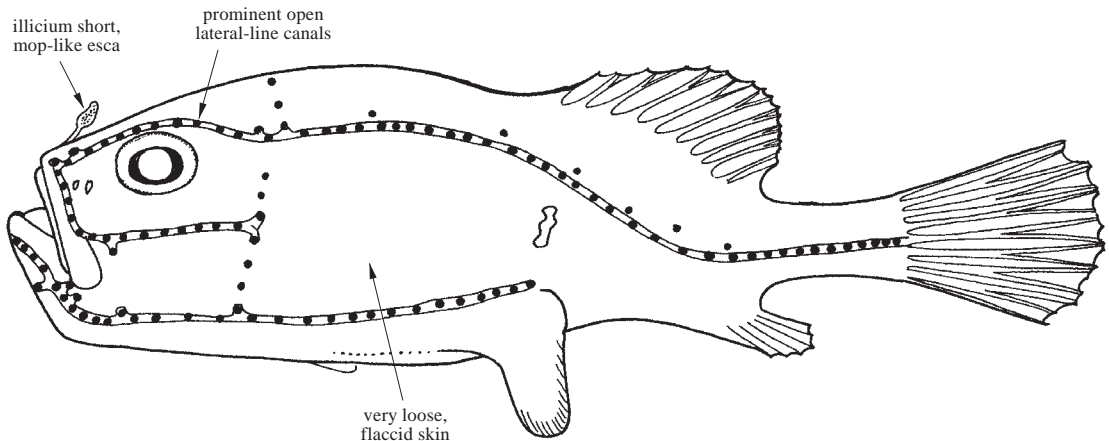
- Arnold, R.J. & Pietsch, T.W. 2011. Evolutionary history of frogfishes (Teleostei: Lophiiformes: Antennariidae): A molecular approach. *Molecular Phylogenetics and Evolution*, 62(2012):117–129.
- Pietsch, T.W. 1984. The genera of frogfishes (family Antennariidae). *Copeia*, 1984(1): 27–44.
- Pietsch, T.W. & Grobecker, D.B. 1987. *Frogfishes of the world: systematics, zoogeography, and behavioral ecology*. Stanford University Press, Stanford, California, 420 p.

CHAUNACIDAE

Sea toads

by J.H. Caruso, Tulane University, New Orleans, LA, USA

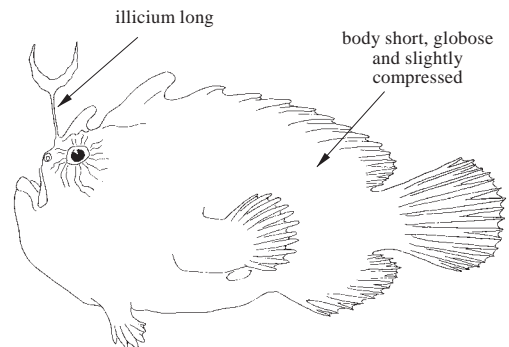
Diagnostic characters: Maximum size 35 cm, common to 15 cm; body rounded and very slightly compressed with very loose, flaccid skin; body tapers to small rounded tail. Head very large and globose, roughly cuboid and bearing especially prominent open lateral-line canals; eyes dorsolateral and covered with a clear 'window' of skin; mouth large, oblique to nearly vertical, with relatively small, sharp, slender teeth. Spinous dorsal fin represented by single short spine modified as angling apparatus (illicium) and located just behind snout in front of an ovoid, scaleless patch, or depression into which it can be retracted; bait (esca) consists of dense cluster of numerous, short, thread-like cirri giving angling apparatus the appearance of a short mop; 2 additional cephalic dorsal-fin spines present as embedded vestiges, and post-cephalic dorsal-fin spines absent; soft dorsal fin with 10 to 12 rays, anal fin with 5 to 7 soft rays, pectoral fins narrow and paddle-like, with 10 to 15 soft rays. Skin densely covered with small to minute spine-like scales that are somewhat similar both in shape and feel to the placoid scales of some sharks. Single open lateral-line canal on body joins conspicuous canals on head and extends posteriorly to proximal portion of caudal fin; lateral line proper with 17 to 42 neuromasts. **Colour:** generally pink, reddish, orange, or rose-coloured; some species with pale diffuse spots of yellow or olive green.



Habitat, biology, and fisheries: Bottom dwellers on hard to soft substrates of the continental slope at depths of 90 to 2 600 m.

Similar families occurring in the area

Antennariidae: illicium long, not short and mop-like; body short, globose, slightly compressed; teeth small, villiform.

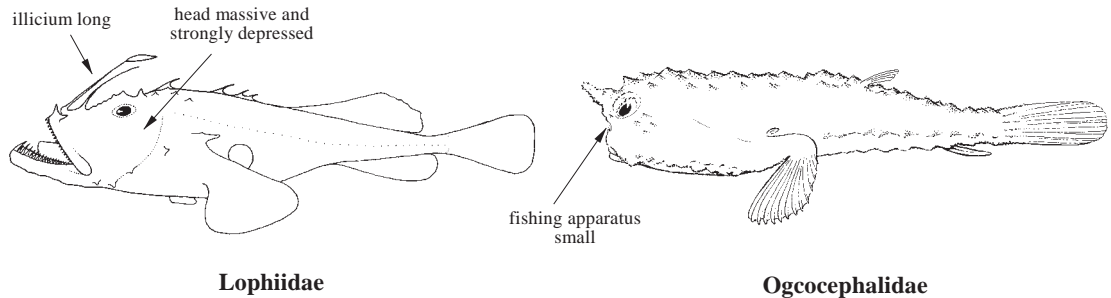


Antennariidae

Lophiidae: head massive and strongly depressed, appearing rounded from above; body depressed and tapering; mouth large, bearing long, slender, depressible teeth; fishing apparatus long and slender, other slender dorsal spines located on and behind head; skin scaleless and bearing fleshy tendrils.

Ogcocephalidae: fishing apparatus small, placed in a depression between snout tip and mouth; head broader and more strongly depressed, devoid of long, slender dorsal-fin spines; mouth very small, without long and sharp teeth; head and body covered with tight skin rather than loose, flabby skin, usually with large plate-like or blunt spine-like scales.

Bathypelagic anglerfish families: no pelvic fins; second and third dorsal fin spines greatly reduced or absent; colour dark, usually black or brown, not shades of red or orange.



Key to the species of Chaunacidae occurring in the area

- 1a. Illicial cavity (scaleless area behind illicium) dark brown or black and strongly concave; front surface of esca black, rear surface translucent or white ***Chaunax pictus***
- 1b. Illicial cavity (scaleless area behind illicium) pale, not differing from surrounding pigmentation, and flat or very slightly concave; esca pale or dusky with uniform pigmentation all around ***Chaunax suttkusi***

List of species occurring in the area

Chaunax pictus Lowe, 1846. To 35 cm, common 15 to 18 cm. South Carolina to Guatemala in W Atlantic, Madeira to Gambia in E Atlantic at depths ranging from 275 to 625 m.

Chaunax suttkusi Caruso, 1989. To 30 cm, common 15 to 18 cm. South Carolina to Rio Grande Plateau in W Atlantic, Ireland to Angola in E Atlantic; depth range: 220 to 1 060 m.

Reference

Caruso, J.H. 1989. Systematics and distribution of the Atlantic chaunacid anglerfishes (Pisces: Lophiiformes). *Copeia*, 1989(1): 153–165.

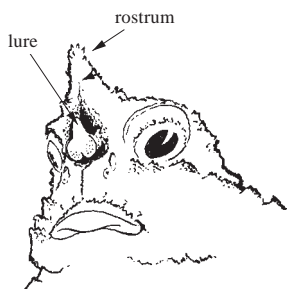
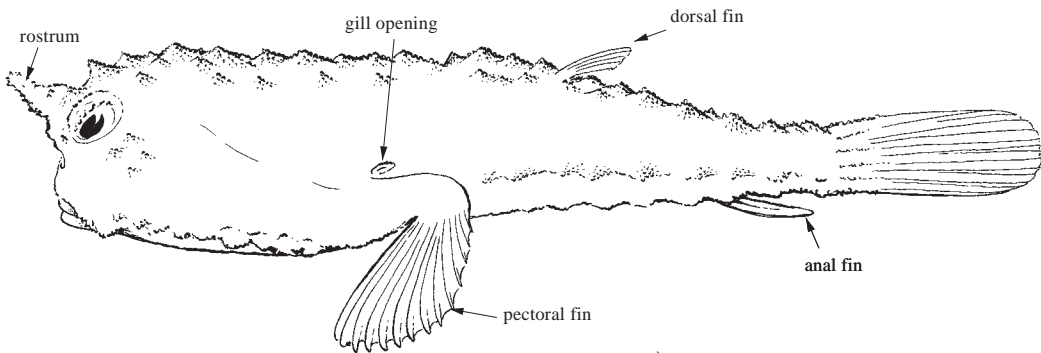
Pietsch, T.W. 2009. *Oceanic Anglerfishes: Extraordinary Diversity in the Deep-sea*. Berkeley and Los Angeles, University of California Press, xii + 557 pp.

OGCOCEPHALIDAE

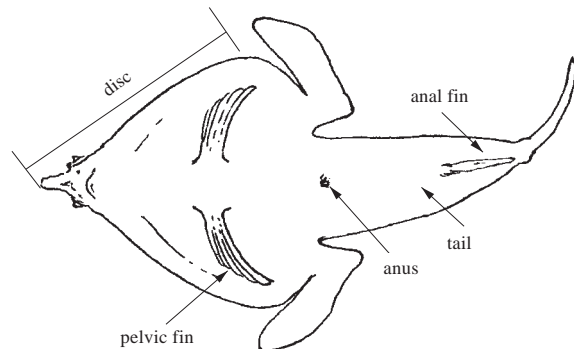
Batfishes

by M.G. Bradbury (†), Moss Landing Marine Laboratories, CA and
T.W. Pietsch, University of Washington, Seattle, WA, USA

Diagnostic characters: Head (disc) extremely large, strongly depressed, circular or triangular in outline. **A cavity just above mouth, containing a smooth-skinned, glandular lure (supported by a modified first dorsal-fin spine) that can be wriggled and extended a short distance in front of mouth. Roof of cavity usually extending forward in front of head, forming a rostrum of close-set bony tubercles, varying from short and shelf-like to long and horn-like.** Eye diameter about 7 to 15% standard length, visible in dorsal view, but directed anterolaterally, skin surrounding iris often covered with small, prickle-like scales. Mouth small, terminal, lips usually thickened, teeth minute, conical, arranged in bands on jaws. **Gill openings small, circular, directed dorsally, located in axil of pectoral fins.** Dorsal fin small, only 4 to 7 short rays, located on tail about halfway between disc and caudal fin. **Anal fin a small, elongate, fleshy lobe, with only 3 or 4 rays.** Tail short, cylindrical, caudal fin rounded, with 9 rays. **Pectoral fins mounted on elongate, arm-like pedicels, attached to posterolateral margins of disc, usually with 12 to 16 soft rays. Pelvic fins of 1 spine and 5 rays, attached to midventral surface of disc anterior to pectoral fins.** Scales highly modified, consolidated to form an armour of prominent conical tubercles, variable in size from minute prickles to large, spiny bucklers. In many species, scales on underside of body forming small, extremely close-set prickles. Short hair-like extensions of skin (cirri) often present, especially around edges of disc and sides of tail. Lateral-line organs represented by a series of free neuromasts that appear as fleshy knobs, most prominent on underside of disc and lateral margins of tail. **Colour:** species with a horn-shaped rostrum and triangular disc (*Ogcocephalus*, *Zalieutes* and *Malthopsis*) pale to dark grey or brown on dorsal surface, cream to orange or red beneath; pink to red coloration sometimes on lips and/or pectoral fins; often with spots or network pattern on face, shoulders, tail, and pectoral fins. Species with a small rostrum and more circular disc (*Halieutichthys* and *Dibranchius*) light tan to pinkish; dorsal surface of *Halieutichthys* often overlain by a dark network pattern; pectoral fins of *Halieutichthys* with intense black markings, background colour sometimes yellow. Sharp tips of conical bucklers of some species lighter or darker than background colour, giving a spotted appearance.



underside of head



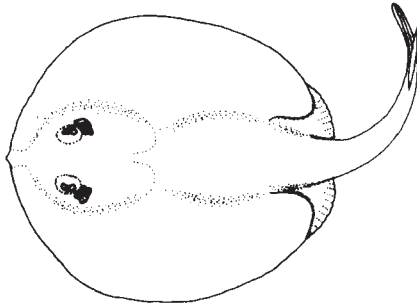
ventral view

Habitat, biology, and fisheries: Adolescents and adults of a few species found inshore on open bottoms among rocks or reefs to depths of about 90 m, but most found well offshore on mud or sand bottoms, usually in less than 200 m, a few species reaching 1 000 m or more. Diet includes small snails, clams, and scallops, a variety of worms and small crustaceans, and occasionally small fishes. As far as known, eggs, larvae, and postlarvae all pelagic, the postlarvae transparent, globular in shape, metamorphosing upon settling to the bottom, and attaining a maximum total length of about 25 cm. Captive batfishes seldom move, only wriggling their lures sporadically when food organisms are presented; lures appear to exude a chemical attractant, but it is not known what food organisms are enticed by such lures. Rarely eaten, and except for minor importance in the aquarium trade, they are of no commercial value.

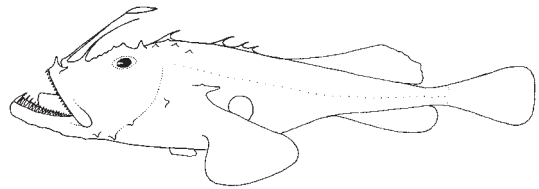
Similar families occurring in the area

Urolophidae (and other batoid fishes): distinguished from batfishes by having 5 pairs of gill openings on ventral surface of disc and by having pelvic fins posterior to pectoral fins, not situated ventrally on centre of disc.

Lophiidae: body strongly depressed (flattened); mouth enormous, nearly horizontal, teeth extremely large; skin smooth, tubercles or scales entirely absent; first dorsal fin of 6 spines, first spine long and slender, bearing a terminal bait, inserted on upper surface of snout, never nested within a cavity over the mouth.



Urolophidae

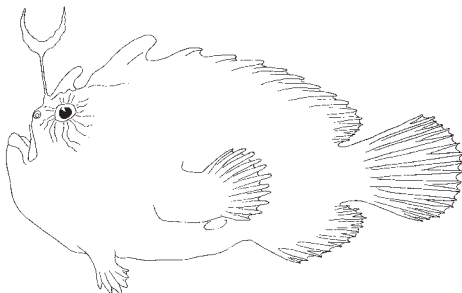


Lophiidae

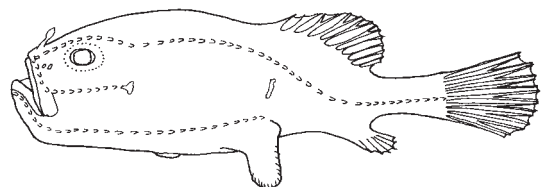
Antennariidae: body short, deep, laterally compressed; mouth large and oblique to nearly vertical; first dorsal fin of 3 separate spines, first spine bearing a terminal bait, second and third spines well developed and covered by thick skin; lure never nested within a cavity over the mouth.

Chaunacidae: body rounded or cuboid; mouth large, oblique to nearly vertical; skin rough, spinulose; bait visible on snout, nested within a shallow cavity above the mouth, but cavity never extending forward to form a rostrum; second and third dorsal-fin spines reduced and embedded beneath skin.

Meso- and bathypelagic anglerfish families: pelvic fins absent; second dorsal-fin spine greatly reduced, nearly always embedded beneath skin; third dorsal-fin spine absent.



Antennariidae



Chaunacidae

Key to species occurring in the area

- 1a. Ridges radiating from apical spine of tubercles of head and body edged with a row of spinules, especially largest tubercles, thus appearing multi-spined; small, simple tubercles evenly distributed over entire body forming a shagreen, with large, multi-spined tubercles interspersed ***Dibranchus atlanticus***
- 1b. Ridges radiating from apical spine of tubercles of head and body without spinules, each tubercle thus appearing single-spined; medium to large tubercles widely spaced on dorsal surface of body, without small tubercles forming a shagreen in between ***Dibranchus tremendus***

List of species occurring in the area

Dibranchus atlanticus Peters, 1876. To 14 cm SL. Tropical and temperate Atlantic.
Dibranchus tremendus Bradbury, 1999. To 20 cm SL. Tropical Atlantic.

References

Bradbury, M.G. 1967. The genera of batfishes (family Ogcocephalidae). *Copeia*, 1967(2): 399–422.

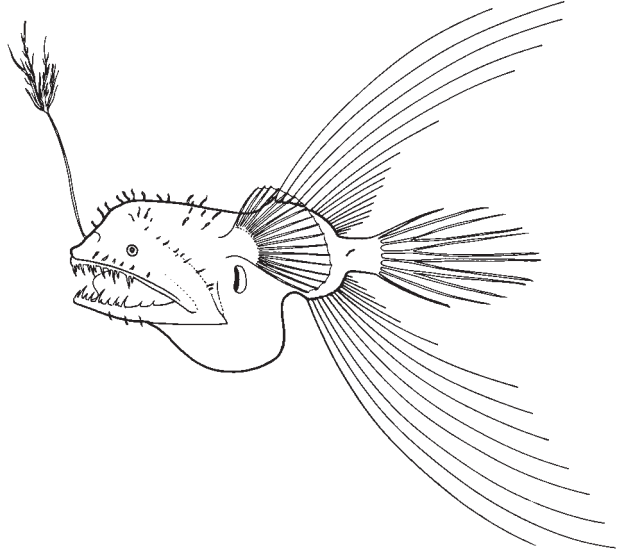
Bradbury, M.G. 1999. A review of the fish genus *Dibranchus*, with descriptions of new species and a new genus, *Solocisquama* (Lophiiformes: Ogcocephalidae). *Proceedings of the California Academy of Sciences*, 15(5): 259–310.

CAULOPHRYNIDAE

Fanfins

by T.W. Pietsch, University of Washington, Seattle, WA, USA

Diagnostic characters: Characterized by extreme sexual dimorphism in which males are dwarfed and reach only a fraction of the size of females. Soft dorsal fin with 6 to 22 rays; anal fin with 5 to 19 rays; **caudal rays 8**. Females with body short, globose; **first dorsal-fin spine (illicium) as long as 268.3% standard length, but usually less than standard length, sometimes bearing slender cutaneous filaments along its length and numerous branched filaments at its terminus, but lacking a bulbous, bacteria-filled bioluminescent bait (esca); dorsal- and anal-fin rays extremely long, apparently not interconnected by membrane; neuromasts of acoustico-lateralis system located at tips of long filaments. Adult males parasitic on females, with skin naked and denticular teeth of upper and lower jaw fused at base. Larvae and free-living males with well-developed pelvic fins; parasitic males and metamorphosed and adult females with pelvic fins absent. Colour: dark brown to black over entire surface of head, body, fins (except for the distal portion of the bait and sometimes the first dorsal-fin spine), and oral cavity; viscera unpigmented.**



Habitat, biology, and fisheries: Solitary, meso- and bathypelagic anglerfishes. Females passively attracting prey by means of a first dorsal-fin spine modified to serve as a luring device. Males actively seek mates by means of highly developed sense organs, attaching themselves to females by means of specialized tooth-bearing denticles born on the tips of the jaws, and becoming parasitic through fusion of tissue and apparently blood vessels. Females attain a maximum standard length of 18.3 cm, males 1.6 cm. They are of no economic interest.

Similar families occurring in the area

Other meso- and bathypelagic anglerfish families: caulophrynids are easily distinguished by having extremely long dorsal- and anal-fin rays, a luring apparatus that lacks a bulbous, bacteria-filled bioluminescent bait, and neuromasts of the acoustico-lateralis system located at the tips of long cutaneous filaments.

List of species occurring in the area

- Caulophryne jordani* Goode and Bean, 1896. Females to 15.5 cm SL, males unknown. Worldwide.
- Caulophryne pelagica* (Brauer, 1902). Females to 18.3 cm SL, males unknown. E Atlantic, Indo-Pacific, and Southern Ocean.
- Caulophryne polynema* Regan, 1930. Females to 14.2 cm SL, parasitic males to 1.6 cm SL. E Atlantic and NE Pacific.

Reference

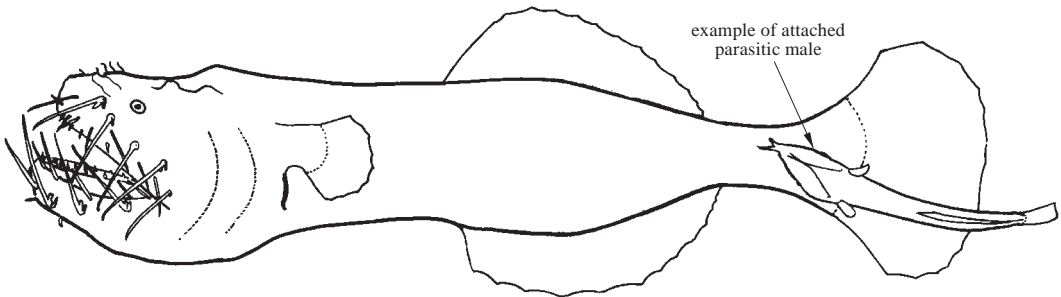
- Pietsch, T.W.** 1979. Systematics and distribution of ceratioid anglerfishes of the family Caulophrynidae with the description of a new genus and species from the Banda Sea. *Contributions in Science, Natural History Museum of Los Angeles County*, 310, 25 p.
- Pietsch, T.W.** 2009. *Oceanic Anglerfishes: Extraordinary Diversity in the Deep-sea*. Berkeley and Los Angeles, University of California Press, xii + 557 pp.

NEOCERATIIDAE

Bristlemouth anglerfishes

by T.W. Pietsch, University of Washington, Seattle, WA, USA

Diagnostic characters: Characterized by extreme sexual dimorphism in which males are dwarfed and reach only a fraction of the size of females. **Soft dorsal fin with 11 to 13 rays; anal fin with 10 to 13 rays; pelvic fins absent.** Females with body slender, elongate, slightly compressed; cleft of mouth horizontal, extending posteriorly beyond eyes; **2 or 3 series of mobile, hooked teeth on outer margin of jaws; first dorsal-fin spine (luring apparatus) absent; bioluminescent structures apparently absent;** lower jaw extending slightly beyond upper jaw; **a pair of prominent nasal papillae;** skin naked. **Adult males parasitic on females;** eyes and olfactory organs degenerate; lower denticular tooth-plate triradiate, each projection terminating in a double hook; upper denticular teeth absent; skin naked. **Colour:** dark red-brown to black over entire surface of head, body, and fins.



Habitat, biology, and fisheries: Solitary, meso- and bathypelagic anglerfishes. Females feeding in some unknown way (luring apparatus, and apparently bioluminescent structures, absent), perhaps snagging soft-bodied, passive invertebrates with their elongate, hooked, external jaw teeth. Males actively seek mates by some unknown mechanism (males with poorly developed sense organs, females apparently without bioluminescent structures), attaching themselves to females by means of specialized tooth-bearing denticles born on the tips of the jaws, and becoming parasitic through fusion of tissue and apparently blood vessels. Females attain a maximum standard length of 10.9 cm, males 1.9 cm. They are of no economic interest.

Similar families occurring in the area

Other meso- and bathypelagic anglerfish families: neoceratiids are easily distinguished by having a slender, elongate, slightly compressed body; 2 or 3 series of mobile, hooked teeth on the outer margin of the jaws; the first dorsal-fin spine (luring apparatus) absent; a pair of prominent nasal papillae; and naked skin.

List of species occurring in the area

Neoceratias spinifer Pappenheim, 1914. Females to 10.9 cm SL, parasitic males to 1.9 cm SL. Worldwide.

References

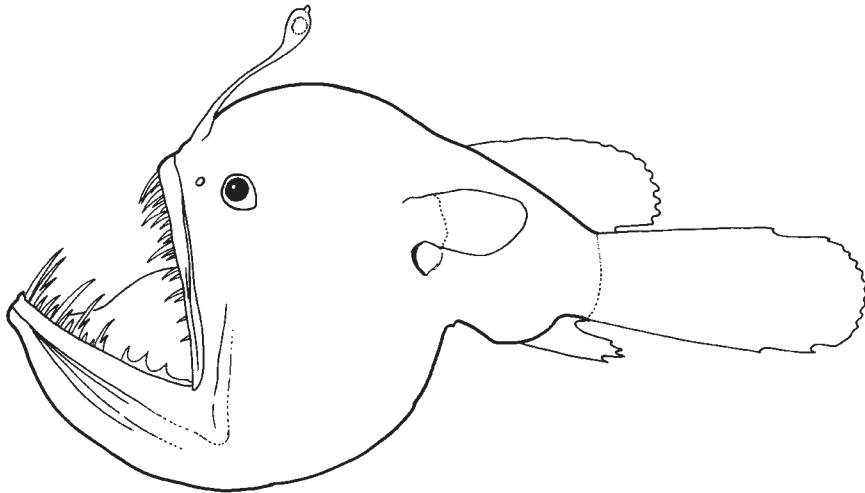
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- Pietsch, T.W.** 2009. *Oceanic Anglerfishes: Extraordinary Diversity in the Deep-sea*. Berkeley and Los Angeles, University of California Press, xii + 557 pp.

MELANOCETIDAE

Blackdevils

by T.W. Pietsch, University of Washington, Seattle, WA, USA

Diagnostic characters: Characterized by extreme sexual dimorphism in which males are dwarfed and reach only a fraction of the size of females. **Soft dorsal fin with 12 to 17 rays; anal fin with 4 rays (very rarely 3 or 5); pelvic fins absent.** Females with body short, deep, globose; **first dorsal-fin spine (illicium) less than 70% length of head and body, bearing a conspicuous terminal bioluminescent bait (esca); bait without filaments or appendages;** snout and chin smooth, without papillae; sphenotic spines absent; skin smooth, appearing naked. **Males free-living, not becoming parasitic on females,** with eyes large, elliptical, directed laterally; olfactory organs large; skin spinulose; a median series and 2 or 3 transverse series of denticular teeth on snout, all fused at base; lower denticular teeth in a median and 2 lateral groups fused at base. **Colour:** dark brown to black over entire surface of head and body (except for distal portion of bait); fins colourless in adolescent females.



Habitat, biology, and fisheries: Solitary, meso- and bathypelagic anglerfishes. Females passively attracting prey by means of a first dorsal-fin spine modified to serve as a luring device. Males actively seek mates by means of highly developed sense organs, apparently attaching themselves temporarily to females by means of specialized tooth-bearing denticles born on the tips of the jaws, but not becoming parasitic. Females attain a maximum standard length of 13.5 cm, males 2.8 cm. They are of no economic interest.

Similar families occurring in the area

Other meso- and bathypelagic anglerfish families: melanocetids are distinguished by having a combination of features that includes a short, deep, globose body; a long dorsal fin containing 12 to 17 rays; a short anal fin with 4 rays (very rarely 3 or 5); sphenotic spines absent; and skin smooth, appearing naked.

List of species occurring in the area

Melanocetus johnsonii Günther, 1864. Females to 13.5 cm SL, males to 2.8 cm SL. Worldwide.

Melanocetus murrayi Günther, 1887. Females to 12.4 cm SL, males to 2.0 cm SL. Worldwide.

Reference

Pietsch, T.W. & Van Duzer, J.P. 1980. Systematics and distribution of ceratioid anglerfishes of the family Melanocetidae, with the description of a new species from the eastern North Pacific Ocean. U.S. Fishery Bulletin, 78(1): 59–87.

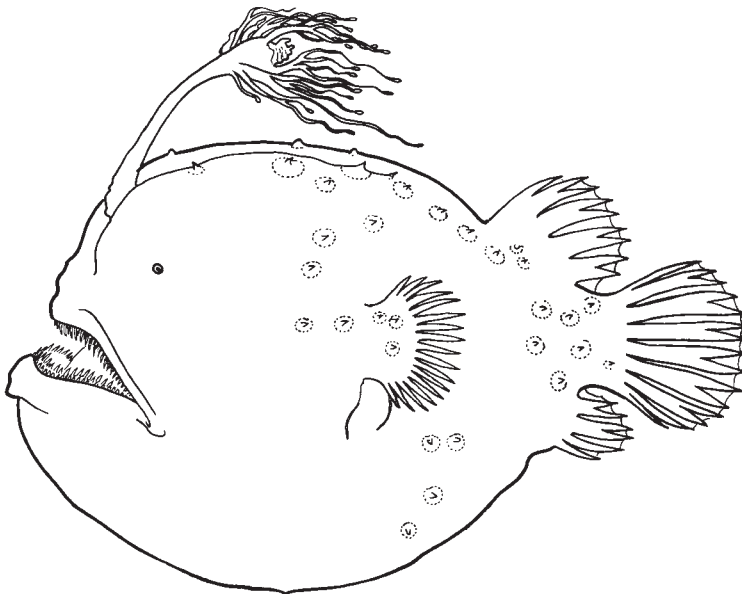
Pietsch, T.W. 2009. *Oceanic Anglerfishes: Extraordinary Diversity in the Deep-sea*. Berkeley and Los Angeles, University of California Press, xii + 557 pp.

HIMANTOLOPHIDAE

Footballfishes

by T.W. Pietsch, University of Washington, Seattle, WA, USA

Diagnostic characters: Characterized by extreme sexual dimorphism in which males are dwarfed and reach only a fraction of the size of females. Soft dorsal fin with 5 or 6 rays; anal fin with 4 or 5 rays; **pelvic fins absent**. Females with body short, deep, globose; **first dorsal-fin spine (illicium) stout, short, less than head length to nearly equal to length of head and body, bearing a conspicuous terminal bioluminescent bait (esca)**; snout and chin blunt, usually covered with small rounded papillae; sphenotic spines present; **skin of head and body with widely spaced, bony plates, each bearing a median spine**. **Males free-living, not becoming parasitic on females**; eyes large, directed laterally; olfactory organs large, skin spinulose; denticular teeth on upper and lower jaw in 2 to 4 transverse series, fused at base. **Colour:** dark brown to black over entire surface of head, body, fins (except for distal portion of bait), and oral cavity; irregular, white or faintly pigmented patches sometimes present on the snout, chin, and upper surface of the head and body.



Habitat, biology, and fisheries: Solitary, meso- and bathypelagic anglerfishes. Females passively attracting prey by means of a first dorsal-fin spine modified to serve as a luring device. Males actively seek mates by means of highly developed sense organs, apparently attaching themselves temporarily to females by means of specialized tooth-bearing denticles born on the tips of the jaws, but not becoming parasitic. Females attain a maximum standard length of 46.5 cm, males 3.9 cm. They are of no economic interest.

Similar families occurring in the area

Other meso- and bathypelagic anglerfish families: himantolophids are distinguished by having a combination of characters that includes a short, deep, globose body; the snout and chin blunt, usually covered with small rounded papillae; sphenotic spines present; and skin of the head and body with widely spaced, bony plates, each bearing a median spine.

List of species occurring in the area

- Himantolophus albinares* Maul, 1961. Females to 19.0 cm SL, males unknown. Tropical and subtropical Atlantic.
- Himantolophus brevirostris* group (males only). Males to 3.8 cm SL, females unknown. Worldwide.
- Himantolophus cornifer* Bertelsen and Krefft, 1988. Females to 20.8 cm SL, males unknown. Tropical Atlantic and Pacific.
- Himantolophus crinitus* Bertelsen and Krefft, 1988. Females to 8.3 cm SL, males unknown. Tropical Atlantic.
- Himantolophus groenlandicus* Reinhardt, 1837. Females to 46.5 cm SL, males unknown. Atlantic and possibly E Indian.
- Himantolophus macroceras* Bertelsen and Krefft, 1988. Females to 9.2 cm SL, males unknown. Tropical Atlantic.
- Himantolophus macroceratoides* Bertelsen and Krefft, 1988. Females to 18.0 cm SL, males unknown. Tropical Atlantic and W Indian.
- Himantolophus maui* Bertelsen and Krefft, 1988. Females to 15.5 cm SL, males unknown. N Atlantic.
- Himantolophus melanolophus* Bertelsen and Krefft, 1988. Females to 9.4 cm SL, males unknown. Tropical N Atlantic.
- Himantolophus multifurcatus* Bertelsen and Krefft, 1988. Females to 12.2 cm SL, males unknown. Tropical N Atlantic.
- Himantolophus paucifilosus* Bertelsen and Krefft, 1988. Females to 16.3 cm SL, males unknown. Tropical Atlantic.
- Himantolophus rostratus* group (males only). Males to 3.9 cm SL, females unknown. Tropical and subtropical Atlantic and Pacific.

Reference

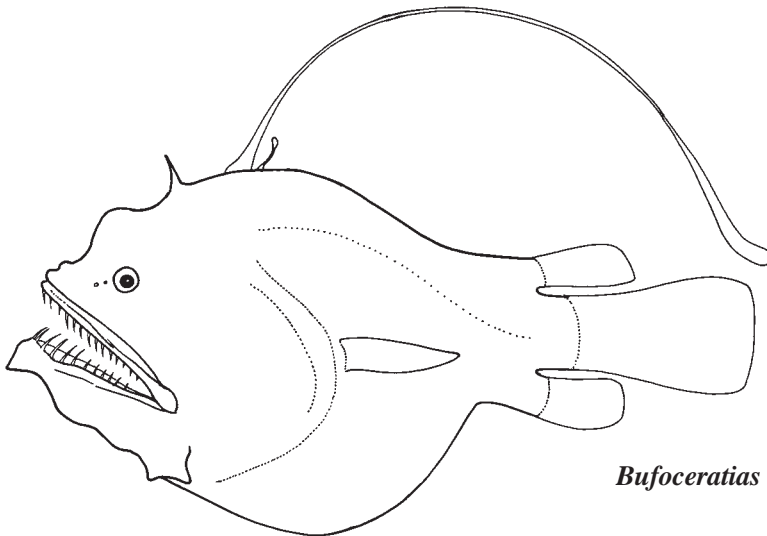
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DICERATIIDAE

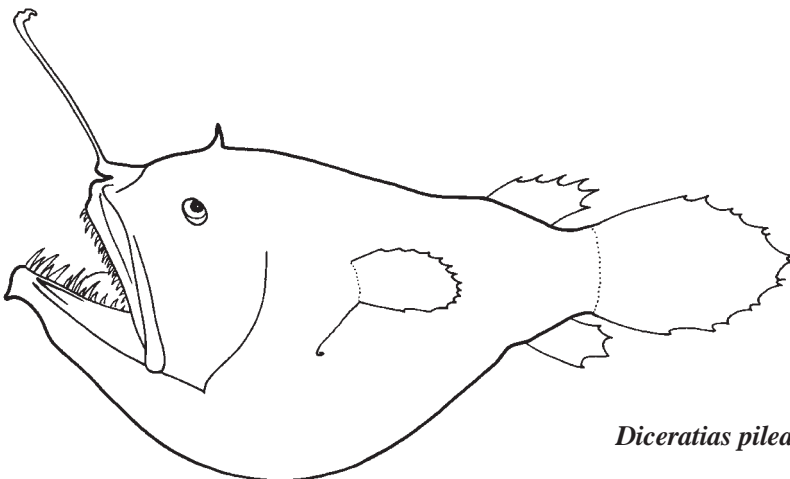
Double-spine seadevils

by T.W. Pietsch, University of Washington, Seattle, WA, USA

Diagnostic characters: Characterized by extreme sexual dimorphism in which males are dwarfed and reach only a fraction of the size of females. Soft dorsal fin with 5 to 7 rays; anal fin with 4 rays; **pelvic fins absent**. Females with body short, globose; **first dorsal-fin spine (illicium) emerging from tip of snout (*Diceratias*) or far back behind rear of cranium (*Bufoferatias*), less than half the length of head and body (*Diceratias*) to more than twice this length (*Bufoferatias*), bearing a conspicuous terminal bioluminescent bait (esca); a short, exposed second dorsal-fin spine present just behind base of first spine, bearing a terminal light organ (conspicuous in adolescents, but difficult to find in adults); strong sphenotic spines present; no caruncles (modified dorsal-fin rays, each bearing a bioluminescent gland) on back; skin rough, everywhere covered with minute, close-set spinules. **Males free-living, not becoming parasitic on females**; eyes large; olfactory organs small, well separated from eye; a pair of slender, curved denticular teeth on snout, nine similar denticular teeth on tip of lower jaw, all teeth mutually free without expanded connecting bases; skin spinulose. **Colour:** dark brown to black over entire surface of head, body, fins (except for distal portion of bait), and oral cavity.**



Bufoferatias wedli



Diceratias pileatus

Habitat, biology, and fisheries: Solitary, meso- and bathypelagic anglerfishes. Females passively attracting prey by means of a first dorsal-fin spine modified to serve as a luring device. Males actively seek mates by means of highly developed sense organs, apparently attaching themselves temporarily to females by means of specialized tooth-bearing denticles born on the tips of the jaws, but not becoming parasitic. Females attain a maximum standard length of 27.5 cm, males 1.4 cm. They are of no economic interest.

Similar families occurring in the area

Other meso- and bathypelagic anglerfish families: diceratiids are distinguished by having a combination of characters that includes a short, globose body; an exposed second dorsal-fin spine situated just behind the base of the first spine, bearing a terminal light organ; strong sphenotic spines; and the skin everywhere covered with minute, close-set spinules.

Key to females of species occurring in the area

- 1a. Length of illicium less than 50% standard length; pterygiophore of illicium emerging from snout, distance between point of emergence and symphysis of upper jaw less than 15% standard length *Diceratias pileatus*
- 1b. Length of illicium greater than 80% standard length; pterygiophore of illicium embedded beneath skin of head, illicium emerging from dorsal surface of head at rear of skull, distance between point of emergence and symphysis of upper jaw greater than 30% standard length *Bufoceratias wedli*

List of species occurring in the area

Bufoceratias wedli (Pietschmann, 1926). Females to 17.8 cm SL, males unknown. Tropical and subtropical N Atlantic.

Diceratias pileatus Uwate, 1979. Females to 27.5 cm SL, males unknown. Tropical and subtropical N Atlantic.

References

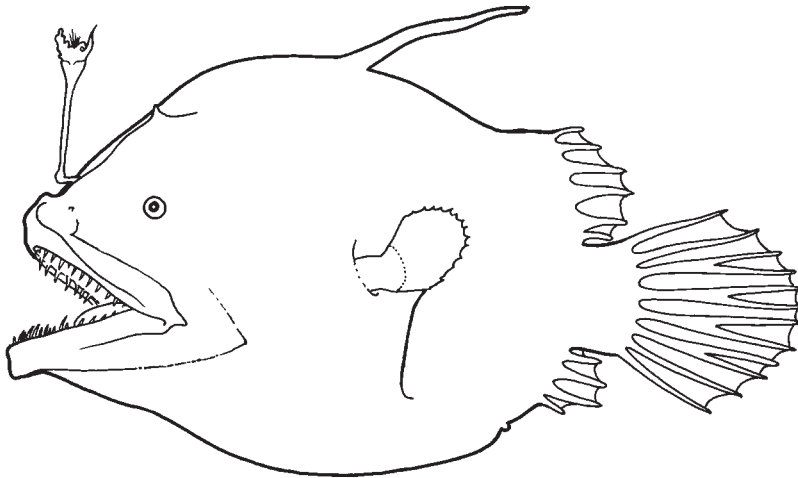
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ONEIRODIDAE

Dreamers

by T.W. Pietsch, University of Washington, Seattle, WA, USA

Diagnostic characters: Characterized by extreme sexual dimorphism in which males are dwarfed and reach only a fraction of the size of females. Soft dorsal fin with 4 to 8 rays; anal fin with 4 to 7 rays; **pelvic fins absent**. Females highly variable in shape, with body short and globose to elongate, slender, and compressed; first dorsal-fin spine (illicium) extremely short (bait nearly sessile on snout) to longer than total length of fish, bearing a conspicuous terminal bioluminescent bait (esca); **second dorsal-fin spine not exposed, embedded beneath skin of head**; strong sphenotic spines usually present (absent in *Chaenophryne*); no caruncles (modified dorsal-fin rays, each bearing a bioluminescent gland) on back; skin usually smooth, appearing naked (rough, everywhere covered with minute, close-set spinules in *Spiniphryne*). Males free-living, not becoming parasitic on females (except those of *Bertella* and *Leptacanthichthys*); eyes large, directed laterally; olfactory organs large, anterior nostrils close together, directed anteriorly; skin naked. **Colour:** dark brown to black over entire surface of head, body, fins (except for distal portion of bait), and oral cavity.



Habitat, biology, and fisheries: Solitary, meso- and bathypelagic anglerfishes. Females passively attracting prey by means of a first dorsal-fin spine modified to serve as a luring device; males actively seek mates by means of highly developed sense organs, apparently attaching themselves temporarily to females by means of specialized tooth-bearing denticles born on the tips of the jaws, but not becoming parasitic (except for those of *Bertella* and *Leptacanthichthys*). Females attain a maximum standard length of 37.0 cm (but to 21 cm in the area), males 1.8 cm. They are of no economic interest.

Similar families occurring in the area

Other meso- and bathypelagic anglerfish families: the numerous and highly diverse genera of the Oneirodidae are distinguished by having a combination of features that includes the first dorsal-fin spine emerging well behind the tip of the snout and bearing a well-developed bioluminescent bait; the second dorsal-fin spine greatly reduced, embedded beneath skin of the head; no caruncles (modified dorsal-fin rays, each bearing a bioluminescent gland) on back; no hyoid barbel; snout and chin smooth, not covered with close-set cutaneous papillae; soft dorsal and anal fins with 4 to 8 rays; and skin without conical bony plates.

Key to females of genera occurring in the area

- 1a. Sphenotic spines present; opercle deeply notched posteriorly; pelvic bones rod-shaped, with or without slight distal expansion → 2
- 1b. Sphenotic spines absent; opercle not deeply notched posteriorly; pelvic bones triradiate or greatly expanded distally. *Chaenophryne*

- 2a. Pectoral-fin lobe short and broad, shorter than longest pectoral-fin rays → **3**
 2b. Pectoral-fin lobe long and narrow, longer than longest pectoral-fin rays → **10**
- 3a. Skin covered with close-set dermal spinules ***Spiniphryne***
 3b. Skin naked or with minute, widely spaced dermal spinules (visible only with the aid of a microscope in cleared and stained specimens) → **4**
- 4a. Lower jaw with a symphyseal spine; caudal rays without internal pigment → **5**
 4b. Lower jaw without a symphyseal spine (ventral margin of dentaries at symphysis concave); caudal rays internally pigmented ***Pentherichthys***
- 5a. Illicial apparatus emerging near tip of snout, from between frontal bones → **6**
 5b. Illicial apparatus emerging from dorsal surface of head, between or behind sphenotic spines ***Lophodolos***
- 6a. Dorsal margin of frontal bones strongly convex → **7**
 6b. Dorsal margin of frontal bones nearly straight ***Dolopichthys***
- 7a. Caudal fin covered with darkly pigmented skin for some distance beyond fin base; anal-fin rays 5, rarely 4 → **8**
 7b. Caudal fin not covered by darkly pigmented skin except at base; anal-fin rays 4, rarely 5 ***Oneirodes***
- 8a. Fewer than 20 teeth in lower jaw; esca with 2 or 3 stout, non-tapering, internally pigmented appendages arising from dorsal surface; smaller specimens (approximately less than 100-mm standard length) with a pair of unpigmented leaf-like appendages on snout ***Phyllorhinichthys***
 8b. More than 25 teeth in lower jaw; esca without stout appendages arising from dorsal surface; no leaf-like appendages on snout → **9**
- 9a. Cleft of mouth extending past eye; length of esca bulb more than 1/2 length of illicial bone; dorsal end of subopercle broad and rounded ***Microlophichthys***
 9b. Cleft of mouth not extending past eye; esca bulb considerably shorter than 1/2 length of illicial bone; dorsal end of subopercle slender, tapering to a point ***Danaphryne***
- 10a. Sphenotic, quadrate, and articular spines long, piercing skin; length of pectoral-fin lobe less than 15% standard length; pectoral-fin rays 18 to 21 ***Leptacanthichthys***
 10b. Sphenotic, quadrate, and articular spines short, in some specimens not piercing skin; length of pectoral-fin lobe greater than 15% standard length; pectoral-fin rays 28 to 30 ***Ctenochirichthys***

List of species occurring in the area

Chaenophryne draco Beebe, 1932. Females to 12.3 cm SL, males unknown. Worldwide.

Chaenophryne longiceps Regan, 1925. Females to 19.0 cm SL, males to 2.0 cm SL. Worldwide.

Chaenophryne ramifera Regan and Trewavas, 1932. Females to 5.6 cm SL, males unknown. E Atlantic, Pacific, and Indian.

Ctenochirichthys longimanus Regan and Trewavas, 1932. Females to 3.7 cm SL, males to 1.2 cm SL. E Atlantic and E Pacific.

- Danaphryne nigrifilis* (Regan and Trewavas, 1932). Females to 10.5 cm SL, males unknown. N Atlantic and W Pacific.
- Dolopichthys allector* Garman, 1899. Females to 15.4 cm SL, males unknown. Atlantic and E Pacific.
- Dolopichthys danae* Regan, 1926. Females to 11.5 cm SL, males unknown. Tropical E Atlantic.
- Dolopichthys dinema* Pietsch, 1972. Females to 2.2 cm SL, males unknown. E Atlantic.
- Dolopichthys jubatus* Regan and Trewavas, 1932. Females to 8.9 cm SL, males unknown. E Atlantic, Pacific, and Indian.
- Dolopichthys longicornis* Parr, 1927. Females to 15.9 cm SL, males unknown. Worldwide.
- Dolopichthys pullatus* Regan and Trewavas, 1932. Females to 11.5 cm SL, males unknown. Worldwide.
- Leptacanthichthys gracilispinis* (Regan, 1925). Females to 10.3 cm SL, males to 0.8 cm SL. N Atlantic and Pacific.
- Lophodolos acanthognathus* Regan, 1925. Females to 7.3 cm SL, males unknown. Worldwide.
- Lophodolos indicus* Lloyd, 1909. Females to 7.7 cm SL, males unknown. E Atlantic, Pacific, and Indian.
- Microlophichthys microlophus* (Regan, 1925). Females to 10.6 cm SL, males to 1.8 cm SL. Worldwide.
- Oneirodes anisacanthus* (Regan, 1925). Females to 17.3 cm SL, males unknown. N Atlantic.
- Oneirodes carlsbergi* (Regan and Trewavas, 1932). Females to 15.9 cm SL, males unknown. Tropical Atlantic and Pacific.
- Oneirodes clarkei* Swinney and Pietsch, 1988. Females to 11.9 cm SL, males unknown. NE Atlantic.
- Oneirodes eschrichtii* Lütken, 1871. Females to 21.3 cm SL, males unknown. Worldwide.
- Oneirodes macrosteus* Pietsch, 1974. Females to 18.5 cm SL, males unknown. Atlantic.
- Oneirodes myrionemus* Pietsch, 1974. Females to 13.7 cm SL, males unknown. Tropical E Atlantic.
- Oneirodes theodoritissieri* Belloc, 1938. Females to 18.3 cm SL, males unknown. Tropical E Atlantic.
- Pentherichthys atratus* (Regan and Trewavas, 1932). Females to 11.9 cm SL, males to 1.4 cm SL. Atlantic, Pacific, and Indian.
- Phyllorhinichthys balushkini* Pietsch, 2004. Females to 16.8 cm SL, males unknown. Atlantic.
- Phyllorhinichthys micractis* Pietsch, 1969. Females to 14.0 cm SL, males unknown. Worldwide.
- Spiniphryne gladisfenae* (Beebe, 1932). Females to 13.7 cm SL, males unknown. Atlantic and W Pacific.

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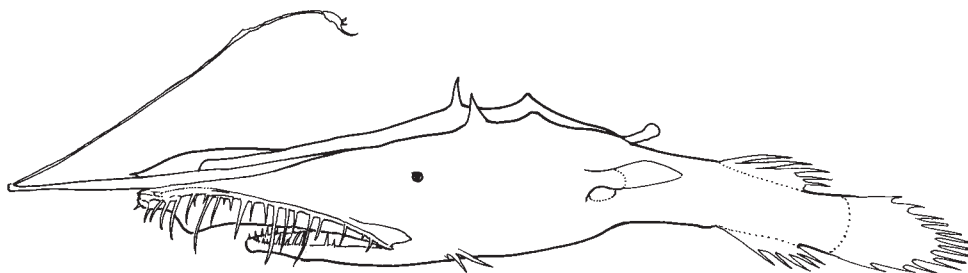
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THAUMATOICHTHYIDAE

Wonderfishes

by T.W. Pietsch, University of Washington, Seattle, WA, USA

Diagnostic characters: Characterized by extreme sexual dimorphism in which males are dwarfed and reach only a fraction of the size of females. Soft dorsal fin with 5 to 7 rays; anal fin with 4 or 5 rays; **pelvic fins absent**. Females with body slender, elongate; head narrow (*Lasiognathus*) or conspicuously depressed and broad (*Thaumatoichthys*); **upper jaw extending anteriorly far beyond lower jaw**; first dorsal-fin spine (illicium) long, with terminal bioluminescent bait (esca), emerging from dorsal surface of head (*Lasiognathus*), or extremely short, embedded in skin of snout, bait hanging from roof of mouth (*Thaumatoichthys*); **bait with 1 to 3 bony hook-like denticles**; skin naked (*Lasiognathus*), or spinulose on lower part of head and body (*Thaumatoichthys*). **Males free-living, most likely not becoming parasitic on females**; body elongate, slender; eyes large; olfactory organs very large; jaw teeth absent; snout with 4 separate denticles arranged in 2 pairs, one above the other; tip of lower jaw with 7 denticles, a lower transverse series of four and an upper transverse series of three, all fused at base. **Colour:** dark red-brown to black over entire surface of head, body, fins (except for distal portion of bait), and oral cavity.



Lasiognathus saccostoma

Habitat, biology, and fisheries: Solitary, bathypelagic (*Lasiognathus*), and benthic (*Thaumatoichthys*) anglerfishes. Females passively attracting prey by means of a first dorsal-fin spine modified to serve as a luring device. Males actively seek mates by means of highly developed sense organs, apparently attaching themselves temporarily to females by means of specialized tooth-bearing denticles born on the tips of the jaws, but not becoming parasitic. Adults collected in midwater trawls at depths of about 800 to 1 800 m (*Lasiognathus*) or in bottom trawls at depths of 1 100 to 3 200 m (*Thaumatoichthys*). Females attain a maximum standard length of 36.5 cm (in the area to 11 cm), males 3.2 cm. They are of no economic interest.

Similar families occurring in the area

Other meso- and bathypelagic anglerfish families: thaumatoichthyids are easily distinguished by having a slender, elongate body; the upper jaw extending anteriorly far beyond the lower; and the bait (either situated at the tip of an elongate first dorsal-fin spine, emerging from the dorsal surface of the head, or hanging from the roof of the mouth) with 1 to 3 bony hook-like denticles.

List of species occurring in the area

- Lasiognathus beebeyi* Regan and Trewavas, 1932. Females to 11.2 cm SL, males unknown. N Atlantic.
Lasiognathus saccostoma Regan, 1925. Females to 7.7 cm SL, males unknown. N Atlantic and NE Pacific.

References

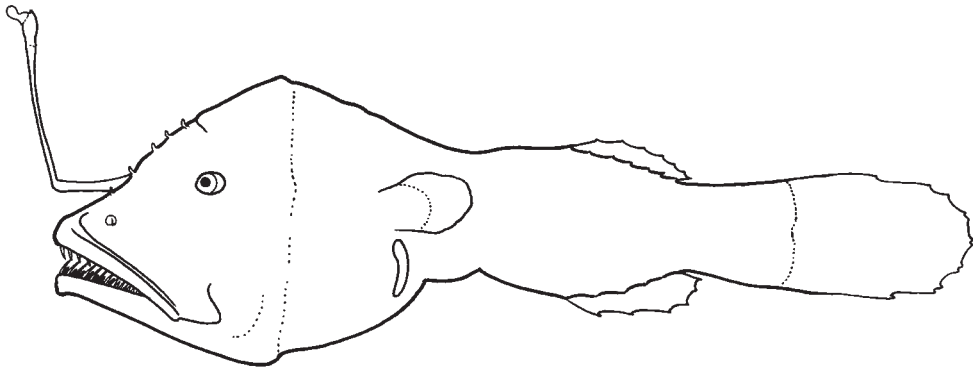
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CENTROPHRYNIDAE

Hollowcheek seadevils

by T.W. Pietsch, University of Washington, Seattle, WA, USA

Diagnostic characters: Characterized by extreme sexual dimorphism in which males are dwarfed and reach only a fraction of the size of females. Soft dorsal fin with 6 or 7 rays; anal fin with 5 or 6 rays; **pelvic fins absent. Females with body elongate, compressed; first dorsal-fin spine (illicium) shorter than standard length, bearing a conspicuous terminal bioluminescent bait (esca);** sphenotic spines absent; **no caruncles (modified dorsal-fin rays, each bearing a bioluminescent gland) on back;** skin rough, everywhere covered with small, close-set spinules. **Males free-living, most likely not becoming parasitic on females;** eyes small; olfactory organs large, directed laterally; 3 upper and 4 lower denticular teeth, fused at base; skin naked. **Males and juvenile females with a simple papilliform hyoid barbel.** **Colour:** dark red-brown to black over entire surface of head, body, fins (except for distal portion of bait), and oral cavity.



Habitat, biology, and fisheries: Solitary, meso- and bathypelagic anglerfishes. Females passively attracting prey by means of a first dorsal-fin spine modified to serve as a luring device. Males actively seek mates by means of highly developed sense organs, apparently attaching themselves temporarily to females by means of specialized tooth-bearing denticles born on the tips of the jaws, but not becoming parasitic. Females attain a maximum standard length of 24.7 cm, males 1.3 cm. They are of no economic interest.

Similar families occurring in the area

Other meso- and bathypelagic anglerfish families: centrophrynids are distinguished by a combination of characters that includes an elongate, slender, laterally compressed body; sphenotic spines absent; first dorsal-fin spine emerging from behind tip of snout; no caruncles (modified dorsal-fin rays, each bearing a bioluminescent gland) on back; skin rough, everywhere covered with small, close-set spinules.

List of species occurring in the area

Centrophryne spinulosa Regan and Trewavas, 1932. Females to 24.7 cm SL, males to 1.3 cm SL. Worldwide.

Reference

Pietsch, T.W. 1972. A review of the monotypic deep-sea anglerfish family Centrophrynidae: Taxonomy, distribution, and osteology. *Copeia*, 1972(1): 17–47.

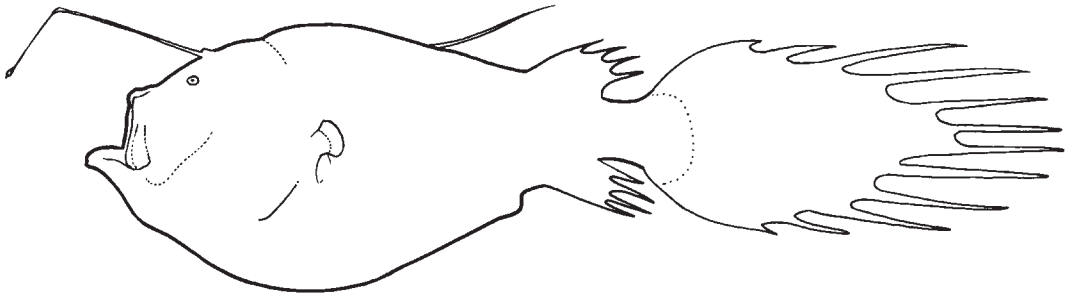
Pietsch, T.W. 2009. *Oceanic Anglerfishes: Extraordinary Diversity in the Deep-sea*. Berkeley and Los Angeles, University of California Press, xii + 557 pp.

CERATIIDAE

Seadevils

by T.W. Pietsch, University of Washington, Seattle, WA, USA

Diagnostic characters: Characterized by extreme sexual dimorphism in which males are dwarfed and reach only a fraction of the size of females. Soft dorsal fin with 3 to 5 rays; anal fin with 4 rays; **pelvic fins absent**; caudal rays 8 or 9. Females with body elongate, compressed; **first dorsal-fin spine (illicium) shorter than standard length, bearing a terminal bioluminescent bait (esca)**; **2 or 3 caruncles (modified dorsal-fin rays, each bearing a bioluminescent gland) on the dorsal midline of the trunk just anterior to the origin of the soft dorsal fin** (often inconspicuous in large adult females); skin rough, everywhere covered with numerous close-set dermal spines. **Adult males parasitic on females; eyes large, bowl-shaped, directed laterally**; nostrils minute; a pair of large denticular teeth on snout, 2 pairs of denticular teeth on tip of lower jaw; skin naked and unpigmented in free-living stages, spinulose and darkly pigmented in parasitic stages. **Colour:** dark red-brown to black over entire surface of head, body, fins (except for the distal portion of the bait), and oral cavity.



Habitat, biology, and fisheries: Solitary, meso- and bathypelagic anglerfishes. Females passively attracting prey by means of a first dorsal-fin spine modified to serve as a luring device; males actively seek mates by means of highly developed sense organs, attaching themselves to females by means of specialized tooth-bearing denticles born on the tips of the jaws, and becoming parasitic through fusion of tissue and apparently blood vessels. Females attain a maximum standard length of 77.0 cm, males 14.5 cm. They are of no economic interest.

Similar families occurring in the area

Other meso- and bathypelagic anglerfish families: ceratiids are distinguished by having a combination of characters that includes an elongate, compressed body; 2 or 3 caruncles (modified dorsal-fin rays, each bearing a bioluminescent gland) on the dorsal midline of the trunk just anterior to the origin of the soft dorsal fin; and skin covered with numerous close-set dermal spines.

Key to species of genera occurring in the area

- 1a. Illicium long, considerably longer than length of esca bulb; 2 caruncles on dorsal midline of trunk just anterior to origin of soft-dorsal fin; subopercle without anterior spine (*Ceratias*) → 2
- 1b. Illicium short, nearly completely enveloped by tissue of esca bulb; 3 caruncles on dorsal midline of trunk just anterior to origin of soft-dorsal fin; subopercle with an anterior spine *Cryptopsaras couesii*

- 2a. Esca with a single distal appendage; illicium length 15.1 to 37.8% standard length; vomerine teeth nearly always present in metamorphosed specimens less than approximately 80 mm standard length, rarely present in larger individuals ***Ceratias holboelli***
- 2b. Esca without distal appendages; illicium length 14.0 to 28.8% standard length; vomerine teeth absent ***Ceratias uranoscopus***

List of species occurring in the area

Ceratias holboelli Krøyer, 1845. Females to 77.0 cm SL, parasitic males to 14.5 cm SL. Worldwide.
Ceratias uranoscopus Murray, in Thomson, 1877. Females to 24.0 cm SL, parasitic males to 2.5 cm SL. Worldwide.
Cryptopsaras couesii Gill, 1883. Females to 35.8 cm SL, parasitic males to 9.9 cm SL. Worldwide

Reference

Pietsch, T.W. 1986. Systematics and distribution of bathypelagic anglerfishes of the family Ceratiidae (order: Lophiiformes). *Copeia*, 1986(2): 479–493.

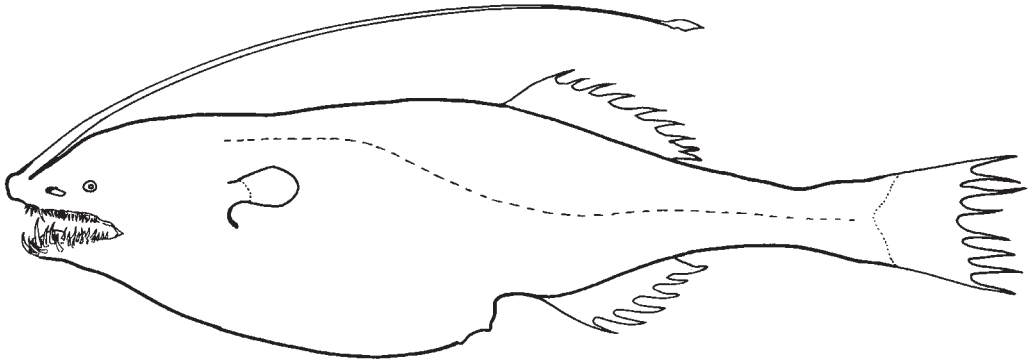
Pietsch, T.W. 2009. *Oceanic Anglerfishes: Extraordinary Diversity in the Deep-sea*. Berkeley and Los Angeles, University of California Press, xii + 557 pp.

GIGANTACTINIDAE

Whipnose anglerfishes

by T.W. Pietsch, University of Washington, Seattle, WA, USA

Diagnostic characters: Characterized by extreme sexual dimorphism in which males are dwarfed and reach only a fraction of the size of females. Soft dorsal fin with 4 to 10 rays; anal fin with 4 to 8 rays; **pelvic fins absent. Females with body slender, elongate, compressed**, head less than 35% length of head and body, **base of tail-fin long, greater than 20% length of head and body. First dorsal-fin spine (illicium) greater than half the length of head and body, emerging from extreme tip of snout, and usually bearing a conspicuous terminal bioluminescent bait (esca; absent in *Rhynchactis*)**. Upper jaw extending slightly beyond lower jaw; sphenotic spines absent; **no caruncles (modified dorsal-fin rays, each bearing a bioluminescent gland) on back**; skin rough, everywhere covered with small, close-set spinules. **Males free-living, not becoming parasitic on females**, with eyes minute, olfactory organs large, jaw teeth absent, denticular teeth all or nearly mutually free, not fused at base. **Colour:** dark red-brown to black over entire surface of head, body, fins (except for distal portion of bait), and oral cavity.



Habitat, biology, and fisheries: Solitary, meso- and bathypelagic anglerfishes. Females passively attracting prey by means of a first dorsal-fin spine modified to serve as a luring device. Males actively seek mates by means of highly developed sense organs, apparently attaching themselves temporarily to females by means of specialized tooth-bearing denticles born on the tips of the jaws, but not becoming parasitic. Females attain a maximum standard length of 43.5 cm, males 2.2 cm. They are of no economic interest.

Similar families occurring in the area

Other meso- and bathypelagic anglerfish families: female gigantactinids are distinguished by having a combination of characters that includes an elongate, slender, laterally compressed body; the first dorsal-fin spine length greater than half the body length and emerging from the extreme tip of the snout; the upper jaw extending slightly beyond the lower jaw; no caruncles (modified dorsal-fin rays, each bearing a bioluminescent gland) on the back; and the skin rough, everywhere covered with small, close-set spinules.

Key to females of genera occurring in the area

- 1a. Teeth of lower jaw well developed, in several rows; dorsal-fin rays 5 to 9, rarely 4 or 10; anal-fin rays 4 to 7, rarely 8; esca bulb present ***Gigantactis***
- 1b. Lower jaw teeth absent; dorsal-fin rays 3 or 4, rarely 5; anal-fin rays 3 or 4; esca bulb absent ***Rhynchactis***

List of species occurring in the area

- Gigantactis elsmanni* Bertelsen, Pietsch, and Lavenberg, 1981. Females to 43.5 cm SL, males unknown. E Atlantic and SE Pacific.
- Gigantactis gibbsi* Bertelsen, Pietsch, and Lavenberg, 1981. Females to 5.0 cm SL, males unknown. Tropical and subtropical N Atlantic.
- Gigantactis golovani* Bertelsen, Pietsch, and Lavenberg, 1981. Females to 17.9 cm SL, males unknown. Tropical E Atlantic.
- Gigantactis gracilicauda* Regan, 1925. Females to 8.2 cm SL, males unknown. Tropical N Atlantic.
- Gigantactis herwigi* Bertelsen, Pietsch, and Lavenberg, 1981. Females to 26.2 cm SL, males unknown. Tropical Atlantic.
- Gigantactis ios* Bertelsen, Pietsch, and Lavenberg, 1981. Females to 5.7 cm SL, males unknown. Tropical E Atlantic.
- Gigantactis longicirra* Waterman, 1939. Females to 22.1 cm SL, males to 1.4 cm SL. Atlantic and tropical E Pacific.
- Gigantactis vanhoeffeni* Brauer, 1902. Females to 39.5 cm SL, males unknown. Worldwide.
- Gigantactis watermani* Bertelsen, Pietsch, and Lavenberg, 1981. Females to 9.9 cm SL, males unknown. Tropical E Atlantic.
- Rhynchactis macrothrix* Bertelsen and Pietsch, 1998. Females to 13.0 cm SL, males unknown. Tropical Atlantic and W Indian.

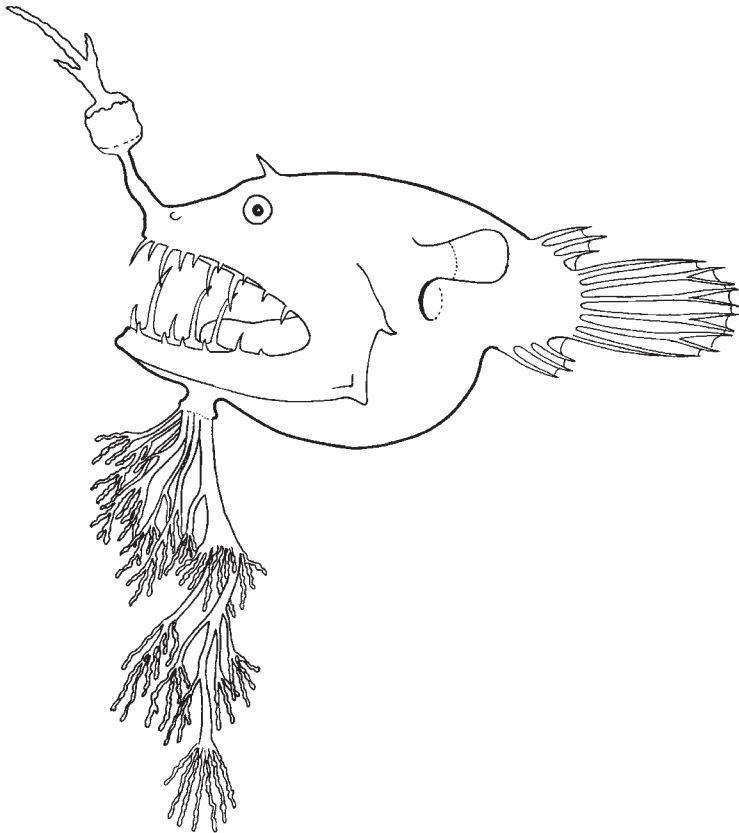
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- Bertelsen, E. & Pietsch, T.W.** 1998. Revision of the deep-sea anglerfish genus *Rhynchactis* Regan (Lophiiformes: Gigantactinidae), with descriptions of two new species. *Copeia*, 1998(3): 583–590.
- Pietsch, T.W.** 2009. *Oceanic Anglerfishes: Extraordinary Diversity in the Deep-sea*. Berkeley and Los Angeles, University of California Press, xii + 557 pp.

LINOPHRYNIDAE**Netdevils**

by T.W. Pietsch, University of Washington, Seattle, WA, USA

Diagnostic characters: Characterized by extreme sexual dimorphism in which males are dwarfed and reach only a fraction of the size of females. **Soft dorsal fin with 3 rays (rarely 2 or 4); anal fin with 3 rays (rarely 2 or 4); pelvic fins absent.** Females with body short, globose; **first dorsal-fin spine (illicium) short, less than length of head and body in most specimens, bearing a conspicuous terminal bioluminescent bait (esca); an elongate hyoid barbel** (absent in *Haplophryne* and *Photocorynus*), bearing numerous, small, globular light organs; sphenotic spines present; skin naked. **Adult males parasitic on females;** eyes large, slightly tubular, directed anteriorly; olfactory organs large; skin naked. **Colour:** dark brown to black over entire surface of head, body, fins (except for the distal portion of the bait) in *Linophryne* and *Photocorynus*; skin unpigmented in *Haplophryne*.



Habitat, biology, and fisheries: Solitary, meso- and bathypelagic anglerfishes. Females passively attracting prey by means of a first dorsal-fin spine modified to serve as a luring device. Males actively seek mates by means of highly developed sense organs, attaching themselves to females by means of specialized tooth-bearing denticles born on the tips of the jaws, and becoming parasitic through fusion of tissue and apparently blood vessels. Females attain a maximum standard length of 23 cm, males 2.9 cm. They are of no economic interest.

Similar families occurring in the area

Other meso- and bathypelagic anglerfish families: linophrynids are distinguished by having a combination of characters that includes a short, globose body; short soft dorsal and anal fins, consisting of only 3 rays (rarely 2 or 4); an elongate hyoid barbel (absent in *Haplophryne* and *Photocorynus*), bearing numerous, small, globular light organs; sphenotic spines present; and skin naked.

Key to females of genera occurring in the area

- 1a. Epiotic and posttemporal spines present; preopercle with 5 or 6 spines ***Photocorynus***
 1b. Epiotic and post-temporal spines absent; preopercle with 0 or 1 spines → 2
- 2a. Hyoid barbel present; preopercular spine simple or absent; skin darkly pigmented; teeth large and few. ***Linophryne***
 2b. Hyoid barbel absent; preopercular spines with 2-5 radiating cusps; skin unpigmented; teeth small and numerous ***Haplophryne***

List of species occurring in the area

- Haplophryne mollis* (Brauer, 1902). Females to 15.9 cm SL, parasitic males to 1.6 cm SL. Worldwide.
- Linophryne arborifera* Regan 1925. Females to 7.7 cm SL, parasitic males to 1.5 cm SL. Atlantic.
- Linophryne arcturi* (Beebe, 1926). Females to 5.1 cm SL, males unknown. NE Atlantic and E Pacific.
- Linophryne breviparabata* Beebe, 1932. Females to 10.0 cm SL, parasitic males to 1.9 cm SL. N Atlantic.
- Linophryne coronata* Parr, 1927. Females to 22.5 cm SL, parasitic males to 2.6 cm SL. N Atlantic.
- Linophryne lucifer* Collet, 1886. Females to 23.0 cm SL, parasitic males to 2.5 cm SL. N Atlantic and SE Indian.
- Linophryne maderensis* Maul, 1961. Females to 3.8 cm SL, males unknown. NE Atlantic.
- Linophryne pennibarabata* Bertelsen, 1980. Females to 4.7 cm SL, males unknown. N Atlantic and N Pacific.
- Linophryne polypogon* Regan, 1925. Females to 3.2 cm SL, males unknown. NE Atlantic.
- Linophryne racemifera* Regan and Trewavas, 1932. Females to 8.1 cm SL, males unknown. Atlantic and E Pacific.
- Linophryne sexfilis* Bertelsen, 1973. Females to 3.8 cm SL, males unknown. E Atlantic.
- Photocorynus spiniceps* Regan, 1925. Females to 6.9 cm SL, parasitic males to 0.74 cm SL. Atlantic, Indian, and E Pacific.

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- Bertelsen, E. 1980b. Notes on Linophrynidae VI: A new species of deep-sea anglerfish of the genus *Linophryne*, with notes of other *Linophryne* species with multi-stemmed barbels (Pisces, Ceratioidei). *Steenstrupia*, 6(15): 233–249.
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New Index

A

ANTENNARIIDAE	2051
Angler	2049
Anglerfish	2045,2055
ANTENNARIIDAE	2045,2054,2057

B

Batfishes	2056
Baudroie africaine	2050
Baudroie commune	2049
Baudroie rousse	2048
Baudroie épineuse	2047
<i>Bertella</i>	2066
Blackbellied angler	2048
Blackdevils	2061
Bristlemouth anglerfishes	2060
<i>Bufoceratias</i>	2064

C

CAULOPHYRIDAE	2059
CENTROPHYRIDAE	2070
CERATIIDAE	2071
CHAUNACIDAE	2054
<i>Chaenophryne</i>	2066
CHAUNACIDAE	2045,2052,2057
<i>Chirolophius kempfi</i>	2047

D

DICERATIIDAE	2064
<i>Dibranchus</i>	2056
<i>Diceratias</i>	2064
Double-spine seadevils	2064
Dreamers	2066

F

Fanfins	2059
Footballfishes	2062
Frogfishes	2051

G

GIGANTACTINIDAE	2073
Goosefishes	2044

H

HIMANTOLOPHIDAE	2062
<i>Halieutichthys</i>	2056

<i>Haplophryne</i>	2075-2076
--------------------------	-----------

<i>Histrio</i>	2051
Hollowcheek seadevils	2070

L

LINOPHYRIDAE	2075
---------------------------	------

LOPHIIDAE	2044
------------------------	------

LOPHIIFORMES	2044
---------------------------	------

<i>Lasiognathus</i>	2069
---------------------------	------

<i>Leptacanthichthys</i>	2066
--------------------------------	------

<i>Linophryne</i>	2075
-------------------------	------

Longspine African angler	2047
--------------------------------	------

LOPHIIDAE	2051,2055,2057
------------------------	----------------

<i>Lophiodes kempfi</i>	2047
-------------------------------	------

<i>Lophius budegassa</i>	2044,2048-2049
--------------------------------	----------------

<i>Lophius piscatorius</i>	2044,2048-2049
----------------------------------	----------------

<i>Lophius vaillanti</i>	2050
--------------------------------	------

M

MELANOCETIDAE	2061
----------------------------	------

<i>Malthopsis</i>	2056
-------------------------	------

Monkfishes	2044
------------------	------

N

NEOCERATIIDAE	2060
----------------------------	------

Netdevils	2075
-----------------	------

O

OGCOEPHALIDAE	2056
----------------------------	------

ONEIRODIDAE	2066
--------------------------	------

OGCOEPHALIDAE	2045,2052,2055
----------------------------	----------------

<i>Ogcocephalus</i>	2056
---------------------------	------

ONEIRODIDAE	2066
--------------------------	------

P

<i>Photocorynus</i>	2075-2076
---------------------------	-----------

R

Rape	2049
------------	------

Rape africano	2050
---------------------	------

Rape negro	2048
------------------	------

<i>Rhynchactis</i>	2073
--------------------------	------

S

<i>Sargassum</i>	2051
------------------------	------

Sea toads	2054
-----------------	------

Seadevils	2071
-----------------	------

Shortspine African angler	2050
---------------------------------	------

Spiniphryne 2066

T

THAUMATICHTHYIDAE 2069

Thaumaticthys 2069

U

UROLOPHIDAE 2057

W

Whipnose anglerfishes 2073

Wonderfishes 2069

Z

Zalieutes 2056

B

budegassa, Lophius 2044,2048-2049

K

kempi, Chirolophius 2047

kempi, Lophiodes 2047

P

piscatorius, Lophius 2044,2048-2049

V

vaillanti, Lophius 2050

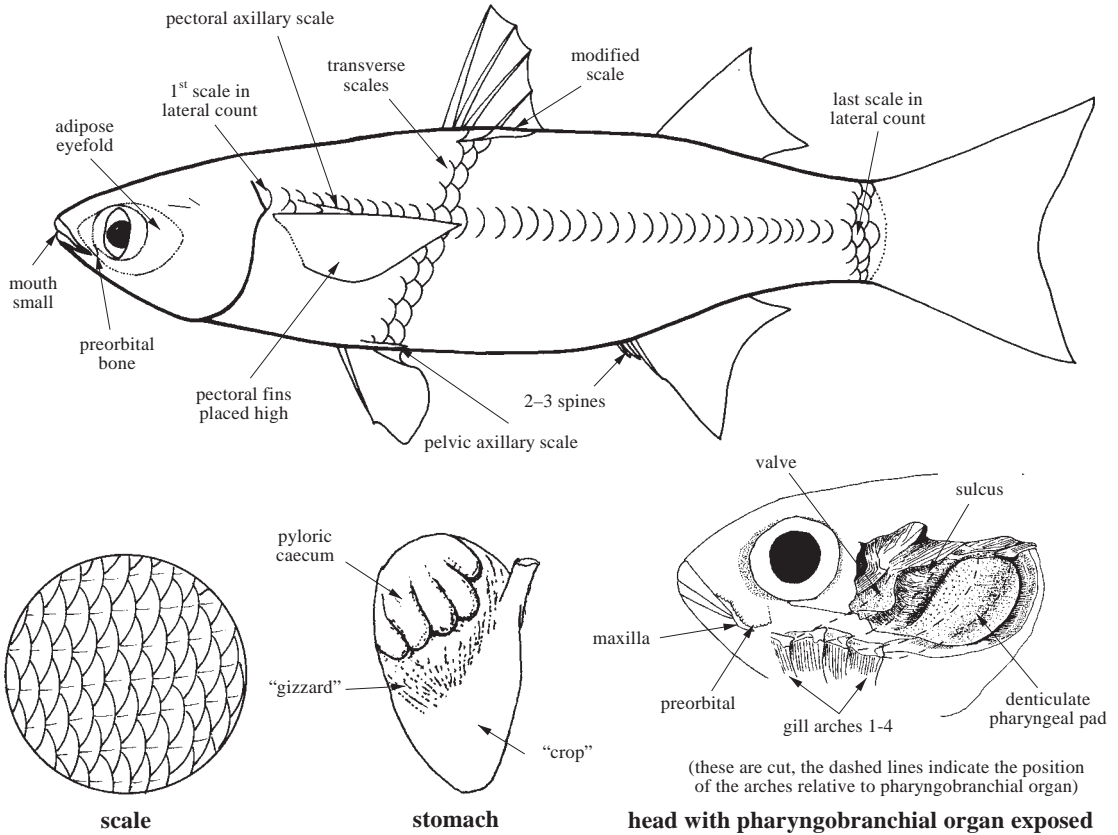
Order MUGILIFORMES

MUGILIDAE

Mulletts

I.J. Harrison, Department of Ichthyology, American Museum of Natural History, New York, NY 10024, USA

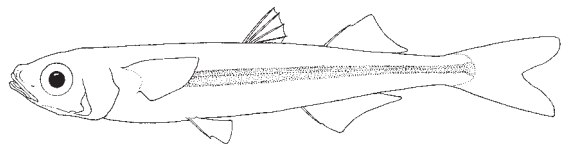
D **Diagnostic characters:** Medium- to large-sized fishes, reaching a maximum size of 120 cm standard length, but commonly to about 30 cm standard length; elongate with subcylindrical body. **Dorsal surface of head broad and flat across posterior interorbit in species from eastern central Atlantic. Translucent adipose tissue (adipose eyelid) present around margin of eye and may extend over most of the eye except for a small area over the pupil; the adipose eyefold can be seen by inserting a small pointer between the surface of the eye and the overlying adipose tissue.** Snout short; **mouth small or moderate in size, and terminal;** premaxillae protractile. **Teeth small, when present, attached to the edges of the lips; just visible or not visible to naked eye** (in eastern central Atlantic species). **Two short dorsal fins, well separated; first with 4 slender spines,** the second with 8 to 10 segmented rays; anal fin short with 3 spines and 7 to 12 segmented rays in adults (for species in eastern central Atlantic region); caudal fin forked in eastern central Atlantic species; **pectoral fins inserted high on body,** with a very short, spine-like ray (not a true spine) dorsal to the remaining, longer, segmented rays; pelvic fins with 1 spine and 5 segmented rays, **inserted subabdominally, about equidistant between insertion of pectoral fin and origin of first dorsal fin. Lateral line absent.** Scales moderate to large size, with 1 or more longitudinal rows of striae (grooves) on each scale; scales on flanks cycloid or ctenoid; scales on anterior predorsal and lateral parts of head usually cycloid. Scales in longitudinal series on midline 25 to 52, counted from just behind operculum, above pectoral fin, to point of caudal flexure (i.e. not including scales on caudal fin). Scales in rearward transverse series 8 to 17, counted from origin of pelvic fin to origin of first dorsal fin. Scales in circumpeduncular series entirely around caudal peduncle, just anterior to point of caudal flexure, 15 to 23; the circumpeduncular series starts at the scale row on the ventral surface of the caudal peduncle, and is taken vertically up the scale rows on one flank, over the dorsum, and vertically down the opposite flank (zig-zagging between adjacent, overlapping scale rows, so that all rows are included in the count). **Large, modified scales may be present at insertion of pectoral and pelvic fins (=axillary scales) and origin of first dorsal fin (=dorsal obbasal scales).** Oral and branchial filter-feeding mechanism involving gill rakers and a **specialized 'pharyngobranchial organ' comprising large, denticulate 'pharyngeal pad' and pharyngeal 'sulcus' on each side of pharyngobranchial chamber.** Pharyngobranchial organ may be seen by lifting operculum and pulling first 3 gill arches forward from fourth arch. The pharyngeal pad is a large, rounded structure with numerous, fine denticulate teeth giving an apparently "furry" surface. One or 2 flaps of tissue ("valves") are present on the lower to midpart of the sulcus and lying back against sulcus wall. Sulcus and valves best seen by pulling first 2 gill arches forward from third and fourth arches. **Stomach with muscular "gizzard"** and pyloric caeca positioned where gizzard joins intestine. Stomach and caeca can be seen by cutting the fish along the abdomen and removing the liver, lying ventral to the alimentary tract. **Intestine usually long and elaborately coiled.** Usually 24 vertebrae (including urostyle) in eastern central Atlantic species. **Colour:** dorsally greyish blue, or greyish green; head and operculum with bronze yellowish blotches in some species; **flanks silvery,** often with more or less distinct dark stripes (about 3 to 9) following rows of scales; ventral parts of body also silvery, or pale/yellowish; dorsal and caudal fins usually dusky (sometimes yellowish); anal and pelvic fins may be yellowish; dark spot sometimes dorsally at base of pectoral fins.



Habitat, biology, and fisheries: Most species are euryhaline; inhabiting coastal marine waters, brackish-water lagoons, estuaries, and may enter freshwaters; usually to depths of 20 m, but have been reported to depths of over 300 m. Spawning occurs offshore. Feeding: browsing on submerged surfaces and filtering large quantities of benthic detritus; ingesting micro-algae, detritus, small invertebrates, micro-organisms and particulate organic material. Relatively important foodfishes; caught with diverse net types. Small-scale and subsistence fisheries are probably also relatively large. According to FAO's FishStat Plus data sources, the total fishery production of mullets from the eastern central Atlantic was 30 257 tonnes in 2010. The hardiness, simple diet, and rapid growth of mullets has made some species the object of aquaculture. Nigeria produced from 200 to 1 512 tonnes of mullet in aquaculture between 1990 and 1995; no aquaculture production is recorded after 1995.

Similar families occurring in the area

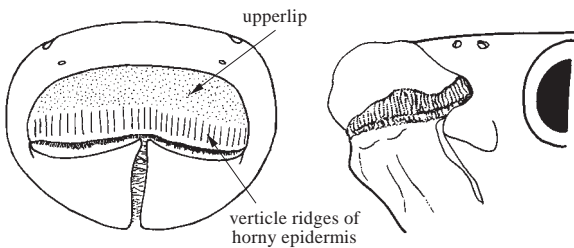
Atherinidae: body more slender with a prominent silvery stripe along the flanks; eyes larger; anal-fin rays usually more than 10 (usually, but not always, less than 10 in Mugilidae).



Atherinidae

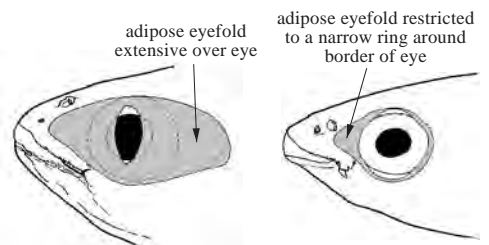
Key to species of Mugilidae occurring in the area

- 1a. Serrate, anteroventral edge of lachrymal with deep, concave notch adjacent to mouth; upper lip with numerous vertical ridges of horny epidermis. Lower lip projecting anteriorly, fringed with ridges of horny epidermis (Fig. 1); thick upper lip (depth 14 to 17% head length); lips deeply folded into lachrymal notch at corner of mouth (Fig. 2); at least 39 scales usually 44 to 49, in longitudinal series (excluding scales on caudal-fin base); ventral 1 or 2 pectoral-fin rays free from membrane ***Oedalechilus labeo***
- 1b. Serrate, anteroventral edge of lachrymal only slightly notched or straight (Fig. 3a and b); lower lip always smooth; upper lip smooth or bearing papillae, but without ridges of horny epidermis; upper lip 2.8 to 15% head length; lips not deeply folded into corners of mouth; 25 to 52 scales in longitudinal series (excluding scales on caudal-fin base); ventral pectoral-fin rays not free from membrane → 2



frontal view of head lateral view of head

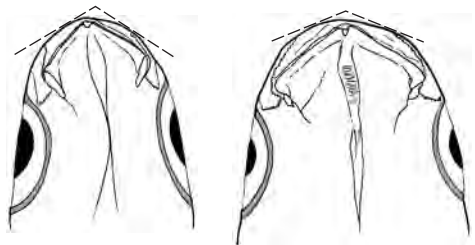
Fig. 1 *Oedalechilus labeo* Fig. 2 *Oedalechilus*



a) *Mugil cephalus* b) *Liza grandisquamis*

Fig. 3 lateral view of head

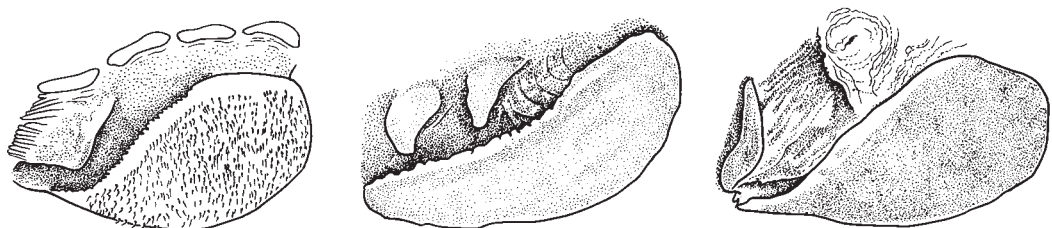
- 2a. Adipose eyefold extensive over eye in specimens over 30 mm standard length (Fig. 3a); mouth ogive in ventral view, with acute angle at dentary symphysis (Fig. 4a); maxilla straight, with posterior tip not extending below corner of mouth (Fig. 3a); serrate, anteroventral edge of lachrymal straight; ventral end of lachrymal slender and pointed (Fig 3a); pharyngobranchial organ with a single valve (Fig. 5a) (***Mugil***) → 3



a) *Mugil cephalus* b) *Liza grandisquamis*

Fig. 4 ventral view of mouth

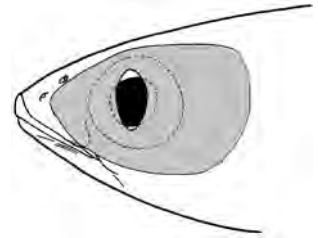
- 2b. Adipose eyefold restricted to a narrow ring around border of eye (Fig. 3b); mouth wide in ventral view, with an angle of 90° or more obtuse at dentary symphysis (Fig. 4b); posterior end of maxilla sigmoid, curved down below corner of mouth (Fig. 3b); serrate, anteroventral edge of lachrymal weakly concave or noticeably kinked; ventral end of lachrymal broad and squarish (Fig. 3b); pharyngobranchial organ usually with 2 valves (Fig. 5b and c) (sometimes 1) → 7



a) *Mugil cephalus* b) *Liza saliens* c) *Liza dumerili*

Fig. 5 lateral view pharyngobranchial organ

- 3a. Ventral end of lachrymal not reaching level of posterior tip of maxilla (Fig. 6); 43 to 47 scales in longitudinal series; pectoral fin extending to level of first dorsal fin or posteriorly beyond. ***Mugil capurrii***
- 3b. Ventral end of lachrymal reaching level of posterior tip of maxilla (Fig. 3a); 32 to 42 scales in longitudinal series; pectoral fin not reaching, or not quite reaching level of first dorsal fin → 4



lateral view of head

Fig. 6 *Mugil capurrii*

- 4a. Anal fins with 3 spines (first spine very short) and 9 (rarely 10) soft rays in adults, or 2 spines and 10 (rarely 11) soft rays in specimens less than about 30 mm standard length; scales covering entire second dorsal and anal fins in adults (Fig. 7b) (less heavily scaled in specimens under about 50 mm standard length) ***Mugil curema***
- 4b. Anal fins with 3 spines (first spine very short) and 8 (very rarely 9) soft rays in adults, or 2 spines and 9 (very rarely 10) soft rays in specimens less than about 50 mm standard length; scalation on dorsal and anal fins variable, but if 9 soft rays in anal fin of adults, then dorsal and anal fins always with few scales in adults (Fig. 7a) → 5

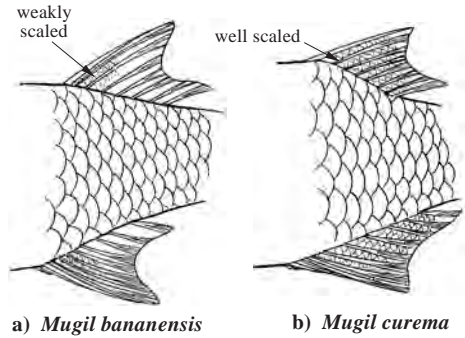
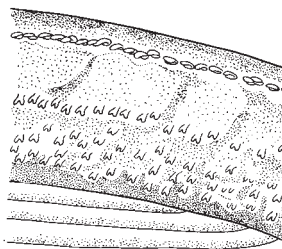
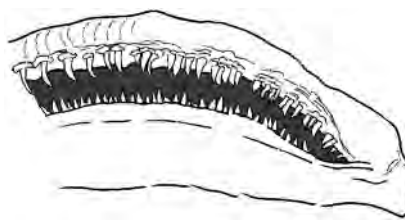


Fig. 7 second dorsal and anal fins

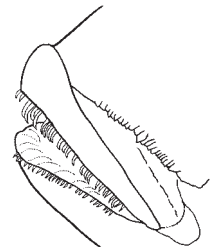
- 5a. Upper lip with an outer row of unicuspid teeth and 1 to 6 inner rows of bicuspid teeth (Fig. 8); 13 to 15 scales in rearward transverse series between pelvic and first dorsal fins; 50 or more gill rakers on lower part of first gill arch; pelvic fins, anal fin, and lower lobe of the caudal fin yellowish ***Mugil cephalus***
- 5b. Upper lip with 1 or 2 rows of unicuspid teeth but no rows of bicuspid teeth; 11 to 13 scales in rearward transverse series between pelvic and first dorsal fins; 48 or fewer gill rakers on lower part of first gill arch; pelvic fins, anal fin, and lower lobe of the caudal fin pale greyish, without yellowish colour → 6
- 6a. Scales covering entire second dorsal and anal fins in specimens over about 60 mm standard length (Fig. 7b); upper lip with outer row of long, recurved, unicuspid teeth, and inner row of smaller unicuspid teeth sometimes present (Fig. 9); lower lip with long, recurved unicuspid teeth (Fig. 10) ***Mugil curvidens***
Ascension Island
- 6b. Second dorsal and anal fins with scales on anterior and basal parts, otherwise naked (Fig. 7a); upper lip with single row of unicuspid teeth; teeth on lower lip minute (not visible to naked eye) or absent ***Mugil bananensis***
Africa



inner surface of upper lip
Fig. 8 *Mugil cephalus*



ventral view of upper lip (right side)
Fig. 9 *Mugil curvidens*



lateral view of mouth
Fig. 10 *Mugil curvidens*

- 7a. Upper lip deep in specimens of about 90 mm standard length or larger, its depth at the point of the snout 5.5 to 15% of head length (i.e., 6 to 18 times in the head length) (Fig. 11); lower third to half of the upper lip with 1 to 7 rows of cornified papillae (Fig. 12); 41 to 47 scales in longitudinal series (*Chelon*) → 8
- 7b. Upper lip usually thin, its depth at the point of the snout 4 to 8% of the head length (i.e. upper lip is 12 to 25 times in the head length) and always without papillae; 25 to 52 scales in longitudinal series (*Liza*) → 9
- 8a. In adults, upper lip 5.5 to 11% of head length (9 to 18 times in head length) (Fig 11a); lower third to half of upper lip with 1 to 5 rows of cornified papillae (Fig. 12); pectoral fin 75 to 86% head length; 13.5 to 15 scales in rearward transverse series between pelvic and first dorsal fins *Chelon labrosus*
- 8b. In adults, upper lip 14 to 15% of head length (6 to 7 times in head length) (Fig. 11b); lower third to half of upper lip with 5 to 7 rows of cornified papillae; pectoral fin 84 to 87% head length; 17 scales in rearward transverse series between pelvic and first dorsal fins *Chelon bispinosus*

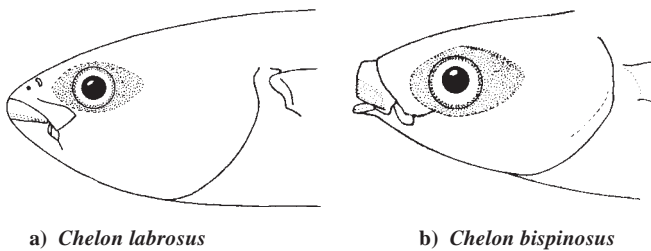


Fig. 11 lateral view of head

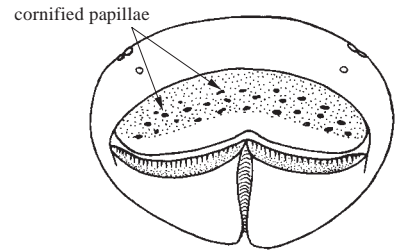


Fig. 12 *Chelon labrosus*

- 9a. Upper jaw with tricuspid teeth (Fig. 13) *Liza tricuspidens*
- 9b. Upper jaw without tricuspid teeth → 10
- 10a. Anal fin with at least 13 (usually 14) rays in total (usually 3 spines and 11 soft rays in adults); anterior rays of anal fin elongate, giving falciform appearance; usually 10 (rarely 9) rays in second dorsal fin; scales on flanks cycloid *Liza falcipinnis*
- 10b. Anal fin usually with 12 or fewer rays in total (usually 3 spines and 9 soft rays in adults); anal fin not falciform; usually 9 rays in second dorsal fin; scales on flanks usually ctenoid (may be cycloid in *L. richardsonii* with 12 anal rays in total) → 11

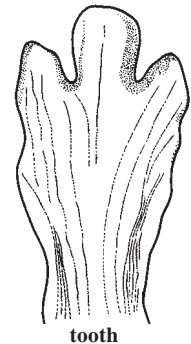


Fig. 13 *Liza tricuspidens*

- 11a. Scales 33 or less in longitudinal series (LL) (excluding scales on caudal-fin base), 12 scales or less in rearward transverse series (TR) between pelvic and first dorsal fins; if LL is 33 and TR is 11 or 12, then usually 1 but not more than 2 longitudinal grooves on predorsal and interdorsal scales → 12
- 11b. Scales 33 or more in longitudinal series (LL) (excluding scales on caudal-fin base), 11 to 16.5 in rearward transverse series (TR) between pelvic and first dorsal fins; if LL is 33 and TR is 11 or 12, then at least 2 (usually more) longitudinal grooves on predorsal and interdorsal scales → 13

12a. Scales 25 to 30 in longitudinal series (excluding scales on caudal-fin base), 8 to 10.5 in rearward transverse series between pelvic and first dorsal fins; dorsal, anal and caudal fins slightly but not distinctly yellowish *Liza grandisquamis*
Senegal to Republic of Congo

12b. Scales 32 or 33 in longitudinal series (excluding scales on caudal-fin base), 10.5 to 12 in rearward transverse series between pelvic and first dorsal fins; dorsal, anal and caudal fins distinctly yellowish *Liza bandialensis*
Senegal to Guinea Bissau

13a. Two or more longitudinal grooves on the predorsal and some interdorsal scales (Fig. 14); pyloric caeca arranged in a dorsal group of short caeca and a ventral group of long caeca (Fig. 15a) → **14**

13b. One (sometimes 2) longitudinal grooves on the predorsal and interdorsal scales (Fig. 16); pyloric caeca subequal (Fig. 15b) → **15**

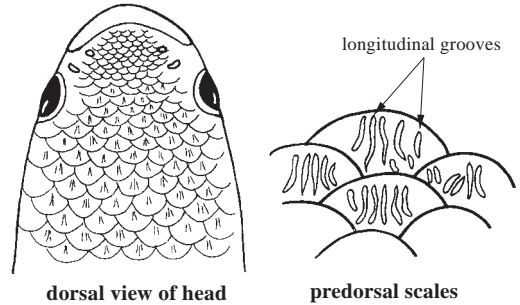


Fig. 14 *Liza saliens*

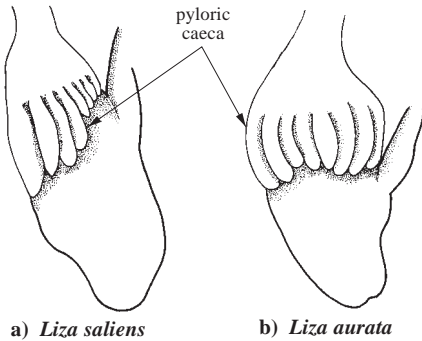


Fig. 15 pyloric caeca

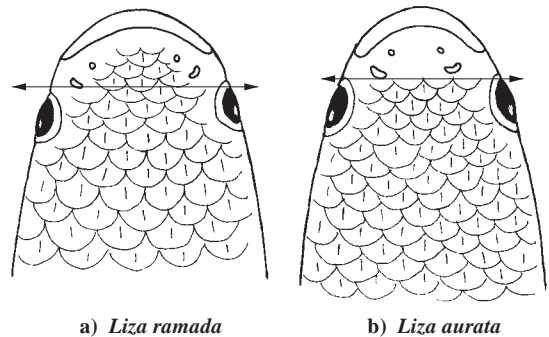


Fig. 16 dorsal view of head

14a. Forty-three to 48 scales in longitudinal series (excluding scales on caudal-fin base); 31 to 33 scales anterior to origin of second dorsal fin; pharyngobranchial organ with 2 valves, both similarly developed as small folds (Fig. 5b) *Liza saliens*
coast of Morocco and the Azores

14b. Thirty-three to 41 scales in longitudinal series (excluding scales on caudal-fin base); 24 or 25 scales anterior to origin of second dorsal fin; pharyngobranchial organ with 1 or 2 valves; anteroventral valve a semilunate flap; posterior valve usually only a small nodule or fold, or may be absent (Fig. 5c) *Liza dumerili*
west African coasts from Mauritania to Namibia

15a. Forty to 62 lower gill rakers on first gill arch; body depth at origin of first dorsal fin 25 to 30% standard length *Liza richardsonii*
west African coasts from Angola to South Africa

15b. Sixty to 113 lower gill rakers on first gill arch; body depth at origin of first dorsal fin 19 to 25% standard length → **16**
west African coasts from Azores, Madeira, and Morocco, northwards to the British Isles

16a. Body depth at origin of first dorsal fin in adults 19 to 20% of standard length; predorsal scales to level of anterior nostrils (Fig.16a); upper lip with outer row of very small teeth, close-set in a fine 'comb'; posteroventral corner of lachrymal truncate (Fig. 17a); pectoral fin 59 to 74% of head length; pectoral fin not reaching level of eye when bent forward; dark spot at origin of pectoral fin; gold patch on operculum diffuse ***Liza ramada***

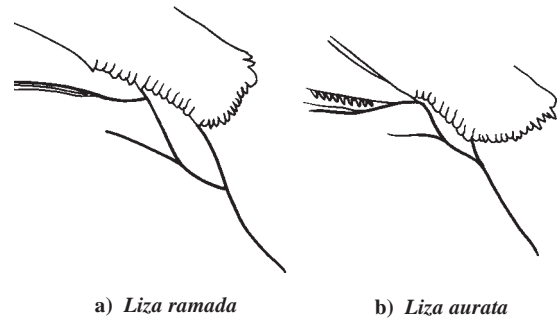




















Fig. 17 lachrymal

16b. Body depth at origin of first dorsal fin in adults 20 to 25% standard length; predorsal scales to level of posterior nostrils (Fig. 16b); upper lip with outer row of small to moderate size teeth, slightly separated from each other; posteroventral corner of lachrymal more or less pointed (Fig. 17b); pectoral fin 77 to 95% of head length; pectoral fin reaching at least to anterior margin of eye when bent forward; no dark spot at origin of pectoral fin; gold patch on operculum usually distinct ***Liza aurata***

List of species occurring in the area^{1/}

The symbol  is given when species accounts are included.

-  *Chelon bispinosus* (Bowdich, 1825).
-  *Chelon labrosus* (Risso, 1827).
-  *Liza aurata* (Risso, 1810).
-  *Liza bandialensis* Diouf, 1991.
-  *Liza dumerili* (Steindachner, 1870).
-  *Liza falcipinnis* (Valenciennes in Cuvier and Valenciennes, 1836).
-  *Liza grandisquamis* (Valenciennes in Cuvier and Valenciennes, 1836).
-  *Liza ramada* (Risso, 1827).
-  *Liza richardsonii* (Smith, 1846).
-  *Liza saliens* (Risso, 1810).
-  *Liza tricuspidens* (Smith, 1935).
-  *Mugil bananensis* (Pellegrin, 1927).
-  *Mugil capurrii* (Perugia, 1892).
-  *Mugil cephalus* Linnaeus, 1758.
-  *Mugil curema* Valenciennes in Cuvier and Valenciennes, 1836.
-  *Mugil curvidens* Valenciennes in Cuvier and Valenciennes, 1836.
-  *Oedalechilus labeo* (Cuvier, 1829).

^{1/} Durand *et al.* (2012) proposed genus level taxonomic changes to the Mugilidae based on a mitochondrial phylogenetic analysis. This included placing most of the Atlantic species of *Liza* in the genus *Chelon*, except for *Liza falcipinnis* (placed in the genus *Neochelon*) and *Liza grandisquamis* (placed in the genus *Parachelon*). While not disputing Durand *et al.*'s molecular results, they are at odds with morphological analyses, and the nomenclature does not seem to be well used in the commercial and research fisheries communities and by other applied fieldworkers who might not be familiar with the systematic literature. In order to make this key and associated species accounts most useful to a widest applied audience, the old nomenclature is retained and Durand *et al.*'s species names are listed in the synonyms. It will be very useful to conduct a morphological-molecular consensus driven analysis of the entire Mugilidae to assess the taxonomy and nomenclature of greater total evidence.

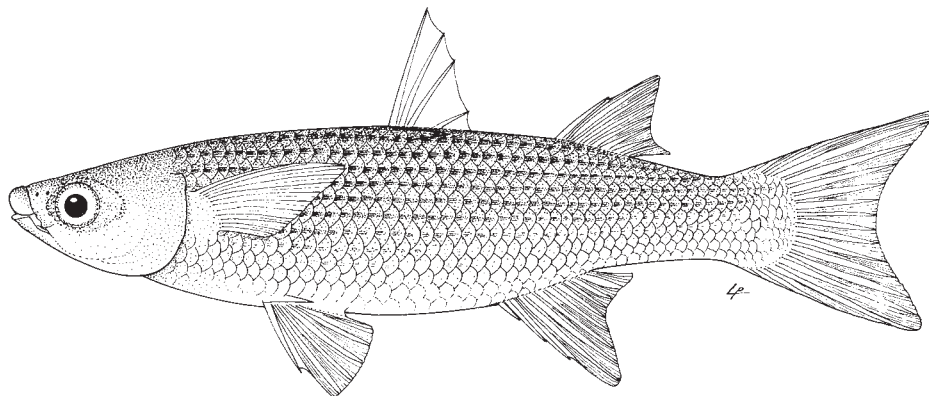
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Chelon bispinosus (Bowdich, 1825)

Frequent synonyms / misidentifications: *Mugil nigrostrigatus* Günther, 1861 / *Mugil provensalis* (Risso, 1810): Fowler, 1936: 594 (record from Cape Verde Islands).

FAO names: **En** – Cape Verde mullet; **Fr** – Mulet des îles Cap Vert; **Sp** – Lisa de Cabo Verde.



Diagnostic characters: Medium to large-sized species. Body moderately deep; body depth at first dorsal-fin origin, 24 to 28% standard length; depth at anal-fin origin, usually 22% or more of standard length. Mouth wide in ventral view, with an obtuse angle at dentary symphysis. **Upper lip thick in adults, 14 to 15% of head length. Lower third to half of upper lip carries 5 to 7 rows of cornified papillae, appearing as bumps in lip tissue in small specimens, and developing into small, flask-shaped flaps in large specimens. Papillae extend laterally towards corner of mouth; papillae in ventral rows, near edge of lip, larger than papillae in the dorsal rows. Upper lip of juvenile and adult fish (under microscope) with 2 rows of small, close-set, unicuspid teeth. Teeth absent on lower lip.** Anteroventral edge of the lachrymal serrate and weakly concave adjacent to mouth; ventral end of lachrymal broad and squarish. Posterior end of the maxilla sigmoid in adults, curving down over the premaxilla and extending below the corner of the mouth when the mouth is closed. **Translucent adipose eyefold weakly developed in adults, forming a narrow ring around the eye. Second dorsal and anal fins with small scales on anterior and basal parts, otherwise naked. Second dorsal fin with 9 segmented rays. Anal fin with 3 spines and 9 segmented rays in adults (first spine is very short and may be hidden by overlying scales). Pectoral fin with 1 short, spine-like ray dorsally and 16 or 17 longer, segmented rays; pectoral fin 84 to 87% head length. Pectoral axillary scale absent. Scales on flanks ctenoid. Longitudinal series scale count 41 or 42; 17 in rearward transverse series; 26 or 27 scales anterior to origin of second dorsal fin. Scales on dorsum usually with a single longitudinal groove, some with a double groove. Pharyngobranchial organ with 2 valves. Five or 6 subequal pyloric caeca. Colour:** adults dark dorsally; flanks silvery grey with several darker, longitudinal grey stripes; stripes on dorsal part of flanks darker and more conspicuous than those on ventral part. Abdomen off-white. Small goldish spot on operculum. Dorsal and caudal fins dark; anal fin dusky but less pigmented than dorsal fins. Pectoral fins dusky. Pelvic fins pale.

Size: Maximum reported standard length 18.4 cm.

Habitat, biology, and fisheries: Pelagic in shallow coastal waters. Caught with trammel nets and beach seines. Probably marketed fresh.

Distribution: Known from the Cape Verde Islands.

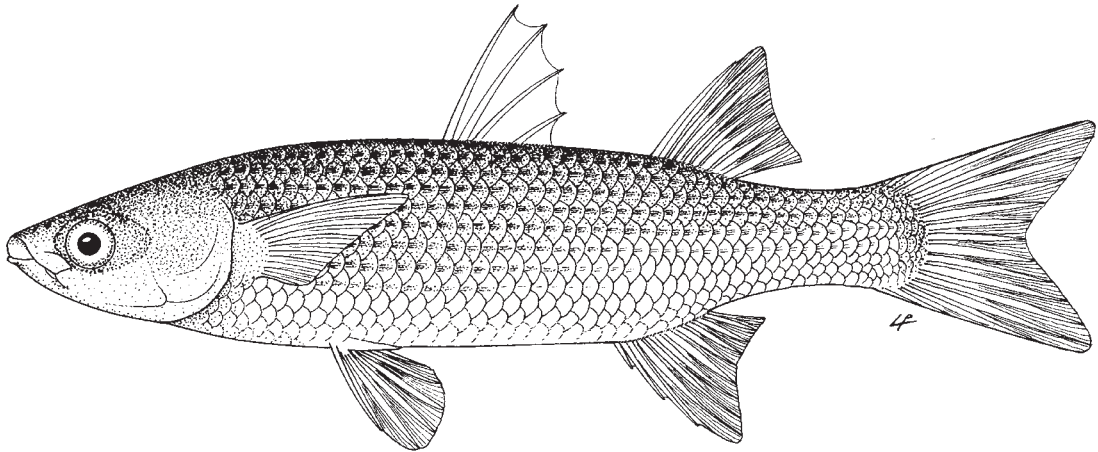
Remarks: The distinction between *Chelon bispinosus* and *C. labrosus* is unclear as *C. bispinosus* was not well described by Bowdich and there is no existing type material. These two nominal species might be conspecific, but synonymization is not recommended until a thorough review of eastern Atlantic and Mediterranean populations has been completed.



***Chelon labrosus* (Risso, 1827)**

Frequent synonyms / misidentifications: *Mugil labrosus* Risso, 1827; *M. chelo* Cuvier, 1829; *M. septentrionalis* Günther, 1861; *Crenimugil labrosus*: Wheeler, 1969 / *Oedalechilus labeo* (Cuvier, 1829).

FAO names: En – Thicklip grey mullet; Fr – Mulet lippu; Sp – Lisa negra.



Diagnostic characters: Medium to large-sized species. Body moderately deep; body depth at first dorsal-fin origin 24 to 26% standard length; depth at anal-fin origin 22 to 25% standard length. Mouth wide in ventral view, with an obtuse angle at dentary symphysis. **Upper lip thick in adults, 5.5 to 11% of head length. Lower third to half of upper lip carries 1 to 5 rows of cornified papillae, appearing as bumps in lip tissue in small specimens, and developing into small flaps with a fimbriate ventral edge in large specimens. Papillae in ventral rows, near edge of lip, larger than papillae in the dorsal rows. Upper lip of juvenile and adult fish (under microscope) with outer row of small, close-set, unicuspid teeth and 1 to 4 inner rows of smaller, unicuspid teeth. Teeth absent on lower lip.** Anteroventral edge of the lachrymal serrate and weakly concave adjacent to mouth; ventral end of lachrymal broad and squarish. Posterior end of maxilla sigmoid in adults, curving down over premaxilla and extending below corner of the mouth when mouth is closed. **Translucent adipose eyefold weakly developed in adults, forming a narrow ring around the eye.** Gill rakers on lower part of first gill arch 35 to 76. **Second dorsal and anal fins with small scales on anterior and basal parts, otherwise naked.** Second dorsal fin with 9 (rarely 10) of segmented rays. **Anal fin with 3 spines and 9 (very rarely 8) segmented rays in adults** (first spine is very short and may be hidden by overlying scales); usually 2 spines and 10 segmented rays in juveniles approximately 34 mm or less in standard length. Pectoral fin with 1 short, spine-like ray dorsally and 16 or 17 longer, segmented rays, not reaching level of origin of first dorsal fin; pectoral fin 18 to 22% standard length, **75 to 86% head length.** Pectoral axillary scale very small or absent. Scales on flanks ctenoid. **Longitudinal series scale count 41 to 47 (mode 43); 13.5 to 15 in rearward transverse series;** 26 to 29 scales anterior to origin of second dorsal fin; 20 (rarely 19) scales in circumpeduncular series. Scales on dorsum usually with a single longitudinal groove, some with a double groove. Predorsal scales extending to anterior nostrils or slightly beyond. Pharyngobranchial organ with 2 valves; a small to moderate size anteroventral valve that may have a papillate surface, and a larger, slightly bulbous, posterodorsal valve. Five to 8 (commonly 6 or 7) subequal pyloric caeca. **Colour:** adults dark greenish grey or blue dorsally; flanks silvery grey with 6 to 8 darker, longitudinal grey stripes; stripes on dorsal part of flanks darker and more conspicuous than those on ventral part. Abdomen off-white. Dorsal fins dark; anal fin dusky but less pigmented than dorsal fins. Pectoral fins pale with dark dorsal margin.

Size: Maximum reported standard length 60 cm.

Habitat, biology, and fisheries: Pelagic in coastal waters and brackish waters of lagoons and estuaries; may ascend far up rivers. Adults spawn offshore; fry remain offshore for a short period before migrating back inshore. Fry feed on zooplankton, such as zooplanktonic crustaceans and adult chironomids. Adults feed on epiphytic algae and detritus particles (usually 125 to 250 μm in size) covering submerged surfaces; also benthic diatoms, copepods, nematodes, gastropods and amphipods. Caught with gillnets, trammel nets, beach seines, cast nets and occasionally purse seines and handlines. Aquacultured in Mediterranean countries. Marketed fresh, frozen, salted, salted and dried, and smoked.

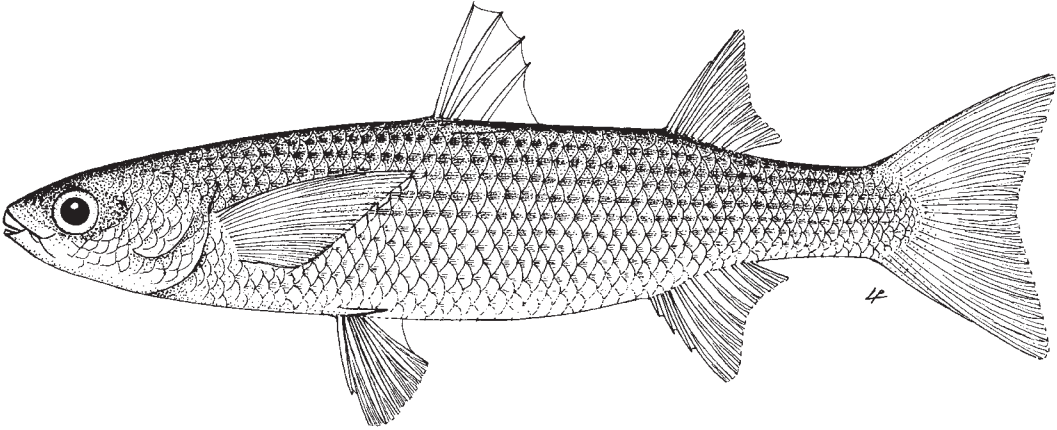
Distribution: Found in the eastern central Atlantic from Cape Verde Islands and Senegal to Gibraltar, and is a dominant component of the ichthyofauna of the Azores. Also found in the Black Sea, Mediterranean, and north eastern Atlantic to southern Norway, the Faeroes and the southern coast of Iceland.



***Liza aurata* (Risso, 1810)**

Frequent synonyms / misidentifications: *Chelon aurata* (Risso, 1810) / *Liza dumerili* (Steindachner, 1870); *L. ramada* (Risso, 1827).

FAO names: En – Golden grey mullet; Fr – Mulet doré; Sp – Galupe.



Diagnostic characters: Medium to large-sized species. Body moderately slender; **body depth at first dorsal-fin origin 20 to 25% standard length**; depth at anal-fin origin 19 to 20% standard length. Mouth wide in ventral view, with an obtuse angle at dentary symphysis. Lips thin; maximum depth of upper lip 7.1 to 7.9% head length. **Upper lip of juvenile and adult fish (under microscope) with outer row of small to moderate-size unicuspid teeth, slightly spaced from each; these teeth are just visible to the naked eye as a fine fringe. An inner row of smaller, sparsely distributed teeth is present or absent. Lower lip without teeth.** Anteroventral edge of the lachrymal serrate and weakly concave adjacent to mouth; ventral end of lachrymal broad and squarish **but with a pointed posteroventral corner (more than in *Liza ramada*)**. Posterior end of the maxilla sigmoid in adults, curving down over the premaxilla and extending below the corner of the mouth when the mouth is closed. **Translucent adipose eyefold weakly developed in adults, forming a narrow ring around the eye and extending anteriorly a short way onto the lateral part of the snout.** Gill rakers on lower part of first gill arch 68 to 103. **Second dorsal and anal fins with small scales on anterior and basal parts, otherwise naked.** Second dorsal fin with 9 (rarely 10) segmented rays. **Anal fin with 3 spines and 9 (rarely 8 or 10) segmented rays in adults** (first spine is very short and may be hidden by overlying scales); usually 2 spines and 10 segmented rays in juveniles approximately 30 mm or less in standard length. Pectoral fin with 1 short, spine-like ray dorsally and 16 to 18 (mode 17) longer, segmented rays, not quite reaching level of origin of first dorsal fin, **and reaching to at least anterior margin of eye when bent forward; pectoral fin 17 to 23% standard length, 77 to 95% head length.** Pectoral axillary scale absent. Scales on flanks ctenoid. **Longitudinal series scale count 41 to 47; 13.5 to 15 in rearward transverse series;** 26 to 28 scales anterior to origin of second dorsal fin; 20 scales in circumpeduncular series. Scales on dorsum usually with a single longitudinal groove. **Predorsal scales cycloid and extending to posterior nostrils. Pharyngobranchial organ with 2 valves;** relatively large and fleshy anteroventral valve, and a larger posterodorsal valve; valves decrease in size in adults, appearing as 2 small protuberances. Seven to 9 (rarely 6 or 10; mode 8) subequal pyloric caeca associated with stomach. **Colour:** bluish grey dorsally, flanks silvery grey with 6 or 7 dark longitudinal stripes; stripes on dorsal part of flanks darker and more conspicuous than those on ventral part of flanks; abdomen off-white. **Conspicuous goldish spot on the operculum and another just behind the eye.** Fins may be yellowish; dorsal fin finely speckled dark; anal and pelvic fins pale.

Size: Maximum reported total body length 55 cm, for specimens from northern Europe; common to 30 cm.

Habitat, biology, and fisheries: Pelagic in coastal waters, lagoons, and estuaries, over sandy and muddy bottoms with littoral vegetation; rarely moving into freshwaters. Adults spawn offshore; fry remain offshore for a short period before migrating back inshore. Fry feed on zooplankton and microphytobenthos. Adults feed on algae, detritus and sediment particles of 125 to 250 μm in size. Fisheries exploitation of *Liza aurata* in the eastern Atlantic might be high; extensive and semi-intensive aquaculture of this species is confined to the Mediterranean and Adriatic. Caught with gillnets, trammel nets, beach seines, cast nets and occasionally purse seines and handlines. Marketed fresh, frozen, salted, salted and dried, and smoked.

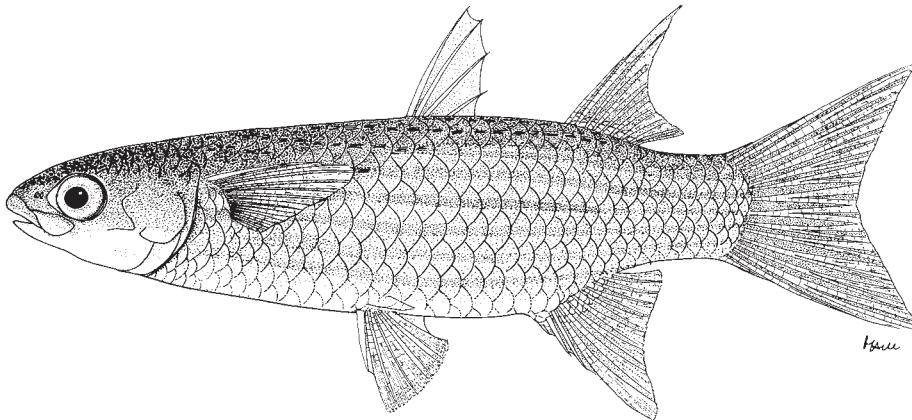
Distribution: Found in the eastern central Atlantic from the Azores and Madeira, and along the coast of Morocco, perhaps extending south to Mauritania, where it is rare. Reports of *L. aurata* from Senegal and further south on the African coast are probably misidentifications of *L. dumerili* or other species of *Liza*. It is also common through the Mediterranean and Black Sea.



Liza bandialensis Diouf, 1991

Frequent synonyms / misidentifications: *Chelon bandialensis* (Diouf, 1991) / *Liza grandisquamis* (Valenciennes, 1836).

FAO names: En – Diassanga mullet; Fr – Mulet diassanga; Sp – Lisa diassanga.



Diagnostic characters: Medium to large-sized species. Body deep; body depth at first dorsal-fin origin 24.2 to 28.5% standard length; depth at anal-fin origin 23 to 26.5% standard length. Mouth wide in ventral view, with an obtuse angle at dentary symphysis. Lips thin; maximum depth of upper lip 7.4% head length. **Upper and lower lips of juvenile and adult fish (under microscope) each with a single row of small, relatively well-spaced ciliiform teeth.** Anteroventral edge of the lachrymal serrate and distinctly concave adjacent to mouth; ventral end of lachrymal broad and squarish. Posterior end of the maxilla sigmoid in adults, curving down over the premaxilla and extending below the corner of the mouth when the mouth is closed. **Translucent adipose eyefold weakly developed in adults, forming a narrow ring around the eye and extending anteriorly a short way onto the lateral part of the snout. Second dorsal and anal fins with small scales on anterior and basal parts, otherwise naked.** Second dorsal fin with 9 segmented rays. **Anal fin with 3 spines and 9 segmented rays in adults** (first spine is very short and may be hidden by overlying scales). Pectoral fin with 1 short, spine-like ray dorsally and 15 or 16 longer, segmented rays, not reaching level of origin of first dorsal fin; pectoral fin 18.9 to 22.6% standard length, 76.2 to 92.6% head length. Pectoral axillary scale very small. Scales on flanks ctenoid. **Longitudinal series scale count 32 or 33; 10.5 to 12 in rearward transverse series;** 21 to 23 scales anterior to origin of second dorsal fin; 15 scales in circumpeduncular series. Scales on dorsum usually with 1 or 2 longitudinal grooves. Predorsal scales cycloid, extending at least to anterior nostrils. Pharyngobranchial organ with 2 valves; a flap-like anteroventral valve and smaller, finger-like posterior valve. Seven or 8 pyloric caeca, **which may be arranged in a group of short caeca and group of longer caeca.** **Colour:** adults greyish blue dorsally; flanks silvery grey; about 7 darkish longitudinal stripes on flanks; abdomen off-white. Dorsal and anal fins dusky; first dorsal slightly yellowish, **second dorsal and anal distinctly yellow.** Caudal fin darkish, also yellow. Pelvic fins pale and with yellow margin. Pectoral fin grey, darker and slightly yellow on dorsal parts.

Size: Maximum observed specimen 43.9 cm (Trape *et al.*, 2012) standard length; reported to attain 57.2 cm total length.

Habitat, biology, and fisheries: Found in inshore waters and estuaries, usually over sandy substrates. Reproduces in estuaries. A local fishery exists for this species.

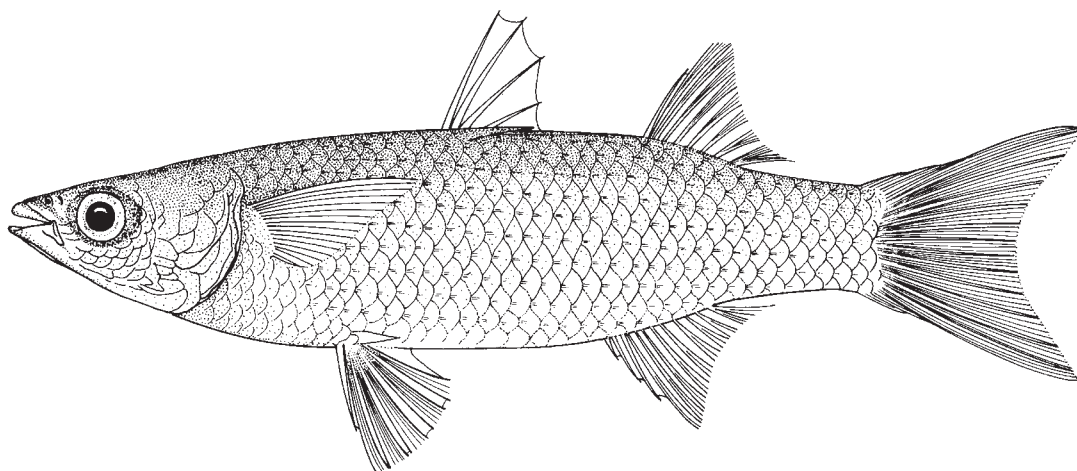
Distribution: Found in the coastal waters of Senegal, River, Senegal Gambia, and Guinea Bissau.



Liza dumerili (Steindachner, 1870)

Frequent synonyms / misidentifications: *Chelon dumerili* (Steindachner, 1870); *Mugil hoeferi* Steindachner, 1882; *M. canaliculatus* Smith, 1935; *Strializa canaliculatus*: Smith, 1948 / *Liza saliens* (Risso, 1810).

FAO names: **En** – Grooved mullet; **Fr** – Mulet bouri; **Sp** – Liza acanalada.



Diagnostic characters: Medium to large-sized species. Body moderately slender; body depth at first dorsal-fin origin 23 to 25% standard length; depth at anal-fin origin 21 to 25% standard length. Mouth wide but not as wide as in other *Liza*; angle of mouth at dentary symphysis 90° or more. Lips thin; maximum depth of upper lip 5 to 8% head length. **Upper lip of juvenile and adult fish (under microscope) with outer row of close-set teeth, which have slightly flattened, blunt unicuspid tips; up to 3 inner rows of teeth present (usually only a single row present; sometimes no inner rows visible); inner rows well-separated from outer row, and teeth usually smaller and more widely spaced than those in outer row and may be bicuspid. Teeth usually absent on the lower lip; rarely, the outer margin of the lip may bear sparse, minute ciliiform teeth.** Anteroventral edge of the lachrymal serrate and distinctly concave adjacent to mouth; ventral end of lachrymal broad and squarish with posteroventral corner of the lachrymal truncate. Posterior end of the maxilla sigmoid in adults, curving down over the premaxilla and extending below the corner of the mouth when the mouth is closed. **Translucent adipose eyefold weakly developed in adults, forming a narrow ring around the eye and extending anteriorly a short way onto the lateral part of the snout.** Gill rakers on lower part of first gill arch 33 to 48. **Second dorsal and anal fins with small scales on anterior and basal parts, otherwise naked.** Second dorsal fin with 9 segmented rays. **Anal fin with 3 spines and 9 (very rarely 8) segmented rays in adults** (first spine is very short and may be hidden by overlying scales); usually 2 spines and 10 segmented rays in juveniles approximately 30 mm or less in standard length. Pectoral fin with 1 short, spine-like ray dorsally and 14 to 17 (usually 15 or 16) longer, segmented rays, usually not reaching level of origin of first dorsal fin; **pectoral fin 20 to 24% standard length, 81 to 105% head length.** Pectoral axillary scale very small. Scales on flanks ctenoid. **Longitudinal series scale count 33 to 41 (usually 35 to 37); 11 to 14 (usually 11.5 to 12.5) in rearward transverse series; 24 or 25 scales anterior to origin of second dorsal fin; 15 to 20 scales in circumpeduncular series.** Predorsal scales cycloid, extending to anterior nostrils or slightly beyond. **In specimens of circa 30 mm standard length or more, some scales may have several radial grooves: 1 to 14 grooves on predorsal scales, 1 to 6 on scales between first and second dorsal fins, 1 to 4 on scales of dorsal and ventral parts of caudal peduncle, 1 to 5 on scales covering opercular and suborbital parts of the head, and 1 or 2 on some scales on ventral parts of body.** Scales on lateral parts of flanks usually with only 1 groove. Pharyngobranchial organ with 1 or 2 valves; **anteroventral valve is a semi-lunate flap; posterior valve usually only a small nodule or fold, and may be absent.** Four to 7 (usually 6) pyloric caeca which are not bifurcate; **ventral 2 or 3 caeca usually longer than dorsal caeca.** **Colour:** adults brownish dorsally; flanks

silvery grey with about 6 dark, longitudinal stripes; abdomen off-white. Yellowish gold spot on dorsal part of operculum. Pelvic fins pale; other fins dusky, particularly the anterior parts of the second dorsal and anal fins and distal parts of caudal fin. Anterodorsal parts of pectoral fins speckled with fine black pigmentation.

Size: Reported to attain almost 40 cm in South African waters; eastern tropical Atlantic specimens attain a maximum of 28 cm standard length and are common to 18 cm standard length.

Habitat, biology, and fisheries: Usually found in estuarine, brackish or marine waters but may also enter freshwater and supersaline environments. Adults feed on coarse sand, organic detritus, blue-green algae, diatoms, gastropods and forminifera. Caught with trammel nets, beach seines, and bottom trawls. Marketed fresh, smoked, and dried and salted.

Distribution: Found in the eastern central Atlantic from Mauritania to Namibia. It is also reported from the Cape and east coasts of Africa from Mossel Bay (South Africa) to Delagoa Bay (Mozambique).

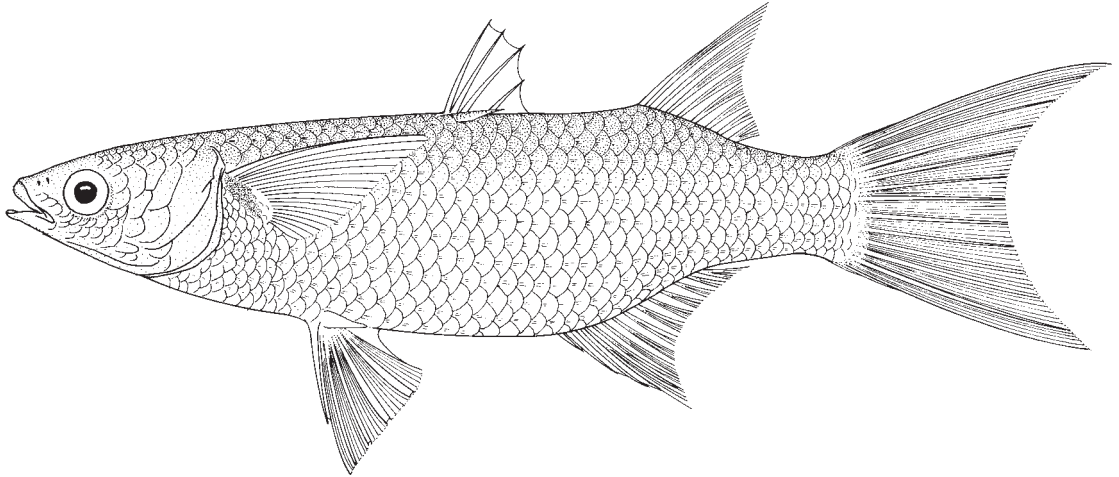
Remarks: Delais (1954) recognized the subspecies *Liza saliens dumerili* and *L. saliens hoefleri* from Mauritania and Senegal. *Liza saliens dumerili* was known from the north with 37 to 42 (mode 40) scales in lateral series; and *L. saliens hoefleri* from the south with 33 to 42 (mode 36) scales. Existing studies of scale counts indicate there is insufficient evidence to support a subspecific distinction for *dumerili* and *hoefleri*. Two subspecies have also been recognized on the basis of gill raker number: *L. dumerili dumerili* characterized by 37 to 41 gill rakers and distributed from Senegal to the Niger; and *L. d. canaliculatus* characterized by 45 to 55 gill rakers and distributed from the Congo to Mozambique (Trewavas and Ingham, 1972). Populations identified as *L. canaliculatus* from South Africa usually have more scale rows (LL, 38 to 40; TR 13 or 14; circumpeduncular series, 20). However, the differences in raker numbers and scale row counts are not consistent for all specimens examined from the western and southern ranges. Some variation has been detected in pharyngobranchial organ morphology for *L. dumerili* but this variation is not sufficient to define separate species or subspecies.



Liza falcipinnis (Valenciennes in Cuvier and Valenciennes, 1836)

Frequent synonyms / misidentifications: *Neochelon falcipinnis* (Valenciennes, 1836) / None.

FAO names: En – Sicklefim mullet; Fr – Mulet à grandes nageoires; Sp – Liza aletona.



Diagnostic characters: Medium to large-sized species. Body moderately deep; body depth at first dorsal-fin origin 25 to 30% standard length; depth at anal-fin origin 24 to 28% standard length. Mouth wide in ventral view, with an obtuse angle at dentary symphysis. Lips usually thin; maximum depth of upper lip 4 to 8% head length. **Upper lip of juvenile and adult fish (under microscope) with outer row of well-spaced teeth, usually unicuspid but may include some bicuspid teeth. Up to 10 inner rows of small, closer-set, bicuspid teeth may be present; usually well separated from the outer, unicuspid row. Teeth usually absent on lower lip, sometimes present as a single row of minute cilliiform teeth.** Anteroventral edge of the lachrymal serrate and very weakly concave adjacent to mouth; ventral end of lachrymal broad and squarish. Posterior end of the maxilla weakly sigmoid (or almost straight in small specimens), just curving down over the premaxilla and extending below the corner of the mouth when the mouth is closed. **Translucent adipose eyefold weakly developed in adults, forming a narrow ring around the eye and extending anteriorly a short way onto the lateral part of the snout.** Gill rakers on lower part of first gill arch 52 to 68. **Second dorsal and anal fins with small scales on anterior and basal parts, otherwise naked. Second dorsal fin with 10 (rarely 9) segmented rays. Anal fin with 3 spines and 11 (rarely 10 or 12) segmented rays in adults (first spine is very short and may be hidden by overlying scales); usually 2 spines and 12 segmented rays in juveniles approximately 30 mm or less in standard length. Anterior rays of second dorsal and anal fin are rather elongate, giving a falciform appearance.** Pectoral fin with 1 short, spine-like ray dorsally and 15 to 17 (usually 16) longer, segmented rays, not or only just reaching level of origin of first dorsal fin; **pectoral fin 21 to 24% standard length, 80 to 100% head length.** Pectoral axillary scale very small or absent. **Scales cycloid except for those on the dorsal and ventral parts of the caudal peduncle which are weakly ctenoid, and those on the ventral parts of the abdomen and thorax which are distinctly ctenoid. Longitudinal series scale count 35 to 40 (usually 36 or 37); 11.5 to 13.5 in rearward transverse series; 24 or 25 scales anterior to origin of second dorsal fin; 15 to 17 scales in circumpeduncular series.** Scales on dorsum usually with a single longitudinal groove, some with a double groove. Predorsal scales extending to posterior nostrils or slightly beyond. Pharyngobranchial organ usually with 2 valves. Anteroventral valve variable, appearing as a small, semi-lunate flap or reduced to a very small, digitate process; posterodorsal valve is a small, sometimes fimbriate fold, vestigial in some specimens. Several pyloric caeca, 15 to 18 according to Daget and Ittis (1965), with bifurcations at distal tips. **Colour:** adults greyish or brownish olive dorsally; flanks silvery grey; abdomen off-white. Dorsal fins and caudal fin dusky; anal fin dusky with whitish distal margin. Pelvic fins pale. Pectoral fins grey, sometimes yellowish, with a dark spot at base.

Size: Maximum observed fork length 41 cm, but may reach 50 cm (Albaret, 1992).

Habitat, biology, and fisheries: Adults are remarkably euryhaline, found in inshore marine waters, estuaries, and lagoons; also found several kilometres upstream in rivers. It favours areas with either sandy or muddy substrates (cf. *L. grandisquamis*). Spawning may occur in lagoons or at sea. Adults feed mainly on fine particulate organic matter, mud and sand particles usually 50 to 100 μm in size, diatoms, blue-green algae and green algae; other food items are coarse particulate organic matter, macro-red algae, dinoflagellates, microarthropods and free-living nematodes and polychaete worms. Caught with trammel nets, beach seines, and bottom trawls; also well-suited for aquaculture. Marketed fresh, smoked, and dried and salted.

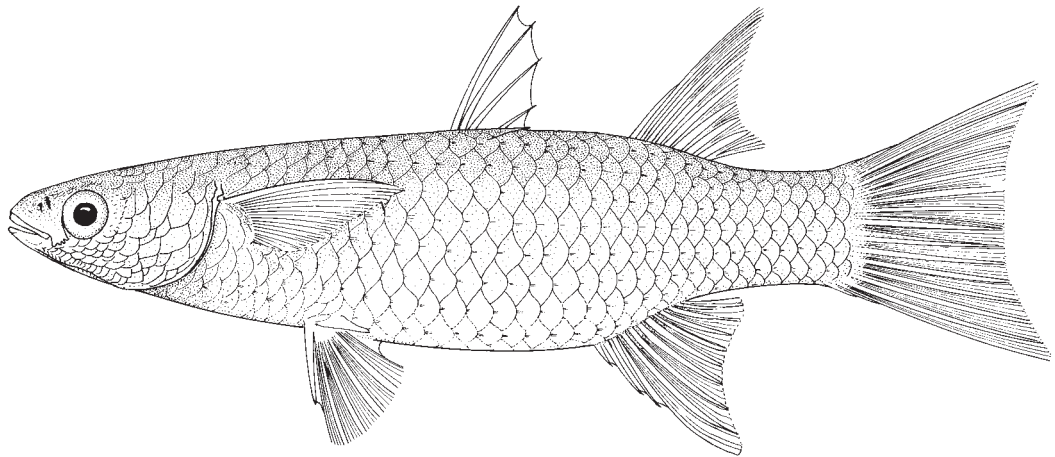
Distribution: Known from Senegal to the Democratic Republic of Congo, including the island of Bioko (Fernando Po), and possibly Angola.



Liza grandisquamis (Valenciennes in Cuvier and Valenciennes, 1836)

Frequent synonyms / misidentifications: *Mugil hypselopterus* Günther, 1861; *Parachelon grandisquamis* (Valenciennes, 1836) / None.

FAO names: En – Largescaled mullet; Fr – Mulet écailleux; Sp – Liza escamuda.



Diagnostic characters: Medium to large-sized species. Body deep; body depth at first dorsal-fin origin 25 to 28% standard length; depth at anal-fin origin 23 to 28% standard length. Mouth wide in ventral view, with an obtuse angle at dentary symphysis. Lips thin; maximum depth of upper lip 5.7 to 8.6% head length. **Teeth absent on upper and lower lips of juvenile and adult fish, or very small, ciliiform, well-spaced and in a single row, or rarely in two rows on the upper lip (viewed under microscope).** Anteroventral edge of the lachrymal serrate and distinctly concave adjacent to mouth; ventral end of lachrymal broad and squarish. Posterior end of maxilla sigmoid in adults, curving down over and extending below the corner of the mouth when the mouth is closed. **Translucent adipose eyefold weakly developed in adults, forming a narrow ring around the eye and extending anteriorly a short way onto the lateral part of the snout.** Gill rakers on lower part of first gill arch 44 or 55. **Second dorsal and anal fins with small scales on anterior and basal parts, otherwise naked.** Second dorsal fin with 9 (rarely 8 or 10) segmented rays; anterior rays of second dorsal fin may be elongate, giving a somewhat falciform appearance, but not as distinct as in *Liza falcipinnis*. **Anal fin with 3 spines and 9 segmented rays in adults** (first spine is very short and may be hidden by overlying scales); usually 2 spines and 10 segmented rays in juveniles approximately 30 mm or less in standard length. Pectoral fin with 1 short, spine-like ray dorsally and 13 to 16 (usually 15) longer, segmented rays, usually not reaching level of origin of first dorsal fin; **pectoral fin 21 to 25% standard length, 81 to 99% head length.** Pectoral axillary scale very small or absent. Scales on flanks ctenoid. **Longitudinal series scale count 25 to 30 (usually 27 to 29); 8 to 10.5 (usually 9.5) in rearward transverse series; 17 to 19 scales anterior to origin of second dorsal fin; 15 or 16 scales in circumpeduncular series.** Scales on dorsum usually with a single longitudinal groove, some with a double groove. Predorsal scales cycloid, extending anterior to nostrils or slightly beyond. Pharyngobranchial organ with 1 or 2 valves. Anteroventral valve usually a small, finger-like process which may have a fringe of smaller processes or papillae positioned ventrally at its base. Posterodorsal valve usually a small, squarish flap which is also fimbriate, terminating in 2 or 3 short filaments. Five to 10 pyloric caeca, which may be bifurcate, but not as extensively as in *Liza falcipinnis*. **Colour:** adults greyish or brownish olive dorsally; flanks silvery grey perhaps with some touches of yellow; abdomen off-white. Operculum darkish. Dorsal fins dusky; **caudal fin also dusky, lower lobe may be yellowish. Anal fin varies from pale to dusky and may be slightly yellowish at distal margin. Pelvic fins pale and may have yellow margin.** Pectoral fin grey, with dark spot at base.

Size: Maximum observed fork length 29.7 cm, but may reach 40 cm.

Habitat, biology, and fisheries: Usually found in brackish waters covering muddy substrates, eg. mangroves, creeks, estuaries and inundated mudflats. Spawning may occur in lagoons or at sea. Adults feed mainly on fine particulate organic matter, mud and diatoms; other food items are coarse particulate organic matter, sand, blue-green algae, red algae and green algae, dinoflagellates, microarthropods, foraminiferans and free-living nematodes. Caught with trammel nets, beach seines, and bottom trawls; also a potentially important species for aquaculture. Marketed fresh, smoked, and dried and salted.

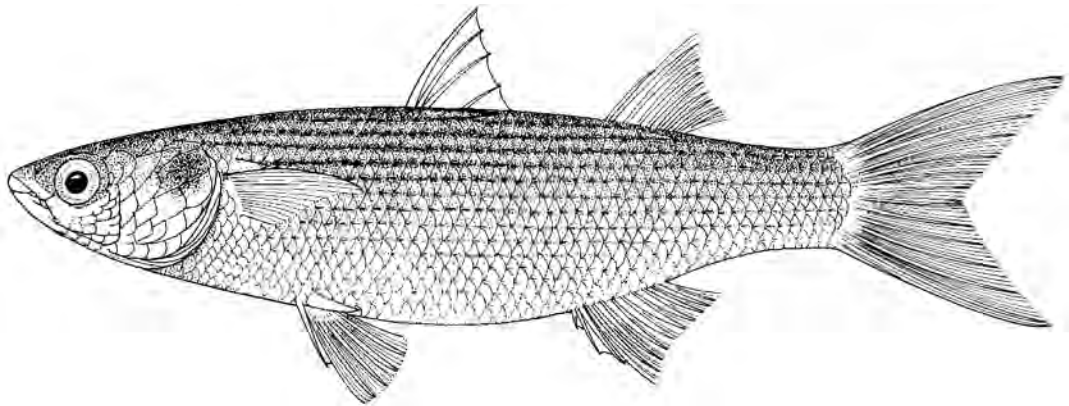
Distribution: Found along the coast of West Africa from Senegal to the Republic of Congo, and on the islands of Bioko (Fernando Po) and São Tomé.



Liza ramada (Risso, 1827)

Frequent synonyms / misidentifications: *Chelon ramada* (Risso, 1827); *Mugil capito* Cuvier, 1829 / *Liza dumerili* (Steindachner, 1870).

FAO names: **En** – Thinlip grey mullet; **Fr** – Mulet porc; **Sp** – Morragute.



Diagnostic characters: Medium to large-sized species. Body moderately slender; **body depth at first dorsal-fin origin 19 to 20% standard length**; depth at anal-fin origin 19 to 20% standard length. Mouth wide in ventral view, with an obtuse angle at dentary symphysis. Lips thin; maximum depth of upper lip 5 to 7.5% head length. **Upper lip of juvenile and adult fish (under microscope) with outer row of very small unicuspid teeth, close-set in a fine 'comb'; inner row of smaller teeth present or absent. Lower lip usually without teeth, but a single row may be present.** Anteroventral edge of the lachrymal serrate and weakly concave adjacent to mouth; ventral end of lachrymal broad and squarish, **with truncate posteroventral corner**. Posterior end of the maxilla sigmoid in adults, curving down over the premaxilla and extending below the corner of the mouth when the mouth is closed. **Translucent adipose eyefold weakly developed in adults, forming a narrow ring around the eye and extending anteriorly a short way onto the lateral part of the snout.** **Gill rakers on lower part of first gill arch 60 to 113. Second dorsal and anal fins with small scales on anterior and basal parts, otherwise naked.** Second dorsal fin with 9 (rarely 8 or 10) segmented rays. **Anal fin with 3 spines and 9 (very rarely 8) segmented rays in adults** (first spine is very short and may be hidden by overlying scales); usually 2 spines and 10 segmented rays in juveniles approximately 29 mm or less in standard length. Pectoral fin with 1 short, spine-like ray dorsally and 16 to 18 (very rarely 15) longer, segmented rays, not quite reaching level of origin of first dorsal fin, **and not reaching anterior margin of eye when bent forwards; pectoral fin 15 to 19% standard length, 59 to 74% head length.** Pectoral axillary scale very small. Scales on flanks ctenoid. **Longitudinal series scale count 41 to 46; 13 to 15 in rearward transverse series;** 26 to 28 scales anterior to origin of second dorsal fin; 20 scales in circumpeduncular series. Scales on dorsum usually with a single longitudinal groove. **Predorsal scales cycloid and extending to anterior nostrils. Pharyngobranchial organ with 2 valves,** varying in size from small protuberances to moderate size flaps. 6 to 9 (commonly 7 or 8) subequal pyloric caeca associated with stomach. **Colour:** bluish grey dorsally, flanks silvery grey with darker longitudinal stripes; stripes on dorsal part of flanks darker and more conspicuous than those on ventral parts; abdomen off-white. Diffuse gold spot on the operculum and another just behind the eye (not as distinct as in *Liza aurata*). Fins light grey or yellowish; **dark spot at origin of pectoral fin.**

Size: Maximum reported total body length 70 cm (50 cm standard length); common to 25 cm.

Habitat, biology, and fisheries: Pelagic in coastal waters and brackish waters of lagoons and estuaries; may ascend far up rivers. Adults spawn offshore; fry remain offshore for a short period before migrating back inshore. Fry feed on zooplanktonic crustaceans, adult chironomids, nematodes, larvae of polychaete worms and insects, and microphytobenthos. Adults feed on microalgae (particularly when in brackish water), plankton, fine detritus and inorganic sediment particles usually less than 63 μm in diameter. Caught with gillnets, trammel nets, beach seines, cast nets and occasionally purse seines and handlines. Experimental mono- and polyculture of *Liza ramada* in brackish waters has been conducted in Mediterranean countries. Marketed fresh, frozen, salted, salted and dried, and smoked.

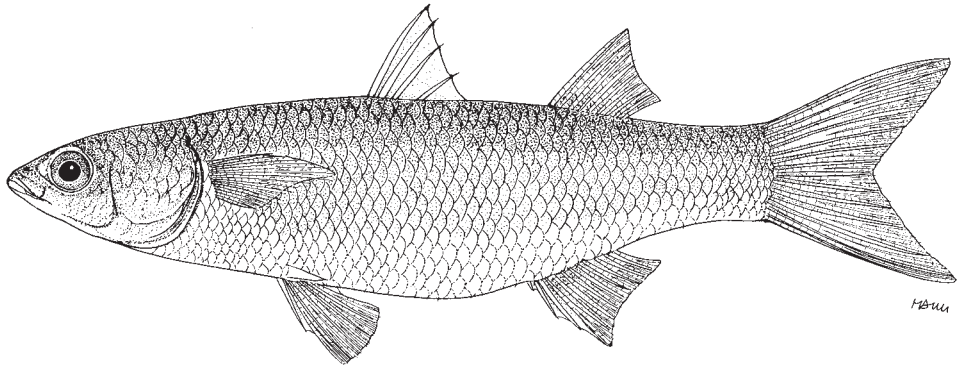
Distribution: Found in the eastern central Atlantic from the Azores, Madeira, and Morocco, northwards to the British Isles and Scandinavia. Reports of *L. ramada* from Senegal and further south along the African coast are probably misidentifications of *L. dumerili* or other species of *Liza*. It is also common through the Mediterranean and Black Sea.



Liza richardsonii (Smith, 1846)

Frequent synonyms / misidentifications: *Chelon richardsonii* (Smith, 1846) / None.

FAO names: **En** – South African mullet; **Fr** – Mulet sudafricain; **Sp** – Lisa sudafricana.



Diagnostic characters: Medium to large-sized species. Body deep; **body depth at first dorsal-fin origin 25 to 30% standard length**; depth at anal-fin origin 21 to 25% standard length. Mouth wide in ventral view, with an obtuse angle at dentary symphysis. Lips thin; maximum depth of upper lip 4 to 6.6% head length. **Upper lip of juvenile and adult fish (under microscope) with outer row of robust, slightly recurved unicuspid setiform teeth which are usually close set, and an irregular, inner row of smaller and less close-set teeth. Lower lip without teeth or with only a few small unicuspid teeth.** Anteroventral edge of the lachrymal serrate and moderately to distinctly concave adjacent to mouth; ventral end of lachrymal broad and squarish. Posterior end of the maxilla sigmoid in adults, curving down over the premaxilla and extending below the corner of the mouth when the mouth is closed. **Translucent adipose eyefold weakly developed in adults, forming a narrow ring around the eye and extending anteriorly a short way onto the lateral part of the snout.** Gill rakers on lower part of first gill arch 40 to 62. **Second dorsal and anal fins with small scales on anterior and basal parts, but distal parts may be less well scaled.** Second dorsal fin with 9 segmented rays. **Anal fin with 3 spines and 9 (rarely 8) segmented rays in adults** (first spine is very short and may be hidden by overlying scales); usually 2 spines and 10 segmented rays in juveniles approximately 30 mm or less in standard length. Pectoral fin with 1 short, spine-like ray dorsally and 16 or 17 (rarely 18) longer, segmented rays, not reaching or only just reaching level of origin of first dorsal fin; pectoral fin 15 to 18% standard length, 65 to 72% head length. Pectoral axillary scale small to moderate size. Scales on flanks usually ctenoid, sometimes weakly ctenoid or cycloid. **Longitudinal series scale count 42 to 46 (rarely 41); 14 to 16.5 in rearward transverse series**; 27 to 29 scales anterior to origin of second dorsal fin; 20 to 23 scales in circumpeduncular series. Scales on dorsum usually with a single longitudinal groove, some with a double groove. Predorsal scales cycloid and extending to anterior nostrils or just beyond. **Pharyngobranchial organ with 2 valves**; anterior one usually a small, finger-like process, and posterior valve a moderate size flap. 4 to 6 subequal pyloric caeca associated with stomach. **Colour:** bluish grey dorsally, flanks silvery grey and abdomen off-white.

Size: Maximum observed size 25 cm standard length; reported to attain 40 cm total length. Common to 28 cm.

Habitat, biology, and fisheries: Pelagic in coastal waters, lagoons, and estuaries; may also enter freshwaters. Adults browse on coarse sand, organic detritus, blue-green algae, diatoms, gastropods and forminifera. Caught with gillnets, trammel nets, and beach seines. Marketed fresh, salted and dried, and smoked.

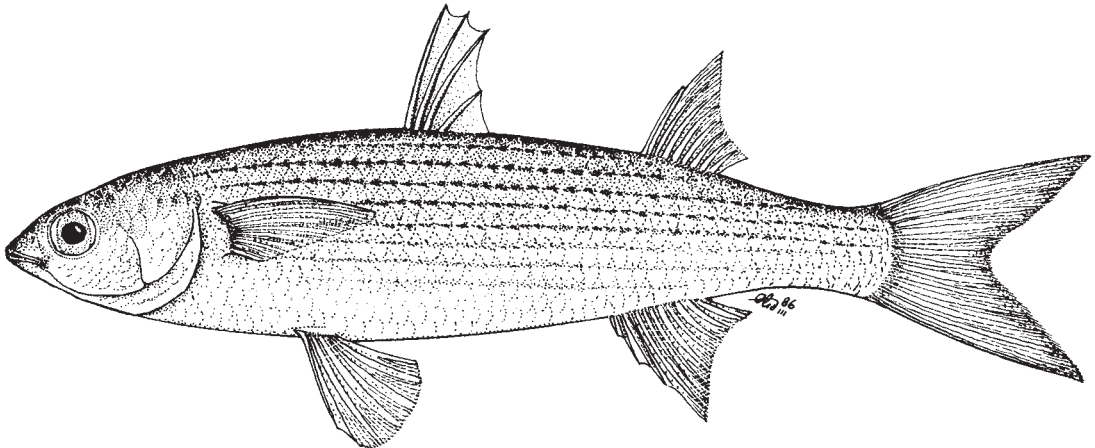
Distribution: Found along the Atlantic coast of Africa from the Baía dos Tigres in Angola, south to the Cape. Its range extends around the Cape to St Lucia on the east coast of South Africa.



Liza saliens (Risso, 1810)

Frequent synonyms / misidentifications: *Chelon saliens* (Risso, 1810) / *Liza dumerili* (Steindachner, 1870).

FAO names: En – Leaping mullet; Fr – Mulet sauteur; Sp – Galúa.



Diagnostic characters: Medium to large-sized species. Body moderately slender; body depth at first dorsal-fin origin 21 to 22% standard length; depth at anal-fin origin 18% standard length. Mouth wide in ventral view, with an obtuse angle at dentary symphysis. Lips thin; maximum depth of upper lip 4 to 7.6% head length. **Upper lip of juvenile and adult fish (under microscope) with an outer row of moderate size teeth that are slightly spaced from each other; 1 or 2 inner rows of smaller teeth present or absent. Lower lip without teeth.** Anteroventral edge of the lachrymal serrate and distinctly concave adjacent to mouth; ventral end of lachrymal broad and squarish **with posteroventral corner of the lachrymal pointed.** Posterior end of the maxilla sigmoid in adults, curving down over the premaxilla and extending below the corner of the mouth when the mouth is closed. **Translucent adipose eyefold weakly developed in adults, forming a narrow ring around the eye and extending anteriorly a short way onto the lateral part of the snout.** Gill rakers on lower part of first gill arch 38 to 46. **Second dorsal and anal fins with small scales on anterior and basal parts, but distal parts may be less well scaled.** Second dorsal fin with 9 (rarely 8) segmented rays. **Anal fin with 3 spines and 9 (very rarely 8) segmented rays in adults** (first spine is very short and may be hidden by overlying scales); usually 2 spines and 10 segmented rays in juveniles approximately 40 mm or less in standard length. Pectoral fin with 1 short, spine-like ray dorsally and 15 to 17 (mode 16) longer, segmented rays, not reaching or only just reaching level of origin of first dorsal fin; **pectoral fin 18 to 22% standard length, 84 to 90% head length.** Pectoral axillary scale very small or absent. Scales on flanks ctenoid. **Longitudinal series scale count 43 to 48; 13 to 15 in rearward transverse series; 31 to 33 scales anterior to origin of second dorsal fin; 18 to 20 scales in circumpeduncular series. Predorsal scales cycloid, with 2 to 5 (perhaps up to 8) longitudinal grooves; scales on the dorsum between first and second dorsal fins may have 2 or 3 grooves; suborbital region, dorsal parts of the flanks and caudal peduncle, and ventral parts of the body cavity may have some scales with 2 grooves; all other scales have a single groove.** Predorsal scales extending to anterior nostrils. **Pharyngobranchial organ with 2 well-developed valves in fish over 40 mm standard length; in larger specimens the posterior valve may appear smaller than anterior valve.** Six to 9 (commonly 8) pyloric caeca, **arranged in a dorsal group of 3 to 5 short caeca and a ventral group of 3 to 5 long caeca.** **Colour:** adults grey-brown dorsally; flanks silvery grey; about 7 dark, longitudinal stripes on flanks; stripes on dorsal part of the flanks darker and more conspicuous than those on ventral part of the flanks; abdomen off-white, perhaps with a yellow tinge. A more or less fragmented, goldish spot on the operculum. Origin of each pectoral fin lacks a dark spot (cf. *Liza ramada*).

Size: Maximum reported standard length is 40 cm.

Habitat, biology, and fisheries: Pelagic, inhabiting coastal marine and brackish waters, and entering freshwaters. Adults spawn offshore; fry remain offshore for a short period before migrating back inshore. Fry feed on zooplanktonic crustaceans and adult chironomids; adults feed on algae, detritus, and sediment with a large grain size of 250 to 500 μm in diameter. Caught with gillnets, trammel nets, beach seines, cast nets, handlines, and occasionally purse seines. Marketed fresh, frozen, and salted.

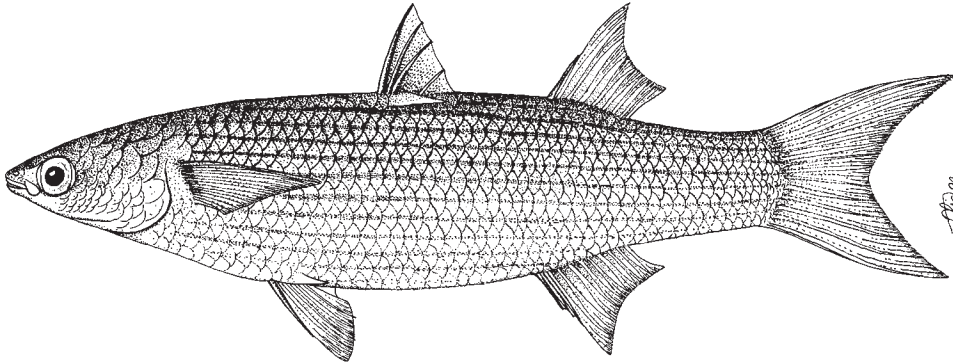
Distribution: Found in the eastern central Atlantic from the Azores, Morocco, and northwards to the Bay of Biscay. Reports of *L. saliens* from as far south as Angola are probably misidentifications of *L. dumerili*. It is also common through the Mediterranean and Black Sea.



Liza tricuspidens (Smith, 1935)

Frequent synonyms / misidentifications: *Chelon tricuspidens* (Smith, 1948); *Heteromugil tricuspidens* Smith 1948 / None.

FAO names: En – Striped springer mullet; Fr – Mulet tident; Sp – Lisa tridente.



Diagnostic characters: Medium to large-sized species. Body moderately deep; body depth at first dorsal-fin origin 23 to 27% standard length; depth at anal-fin origin 25% standard length. Mouth wide in ventral view, with an obtuse angle at dentary symphysis. Lips thin, maximum depth of upper lip 7% head length. **Upper lip of juvenile and adult fish (under microscope) with one or two rows of small, tricuspid teeth (teeth just visible to naked eye). Lower lip without teeth.** Anteroventral edge of the lachrymal serrate and weakly concave adjacent to mouth; ventral end of lachrymal broad and squarish. Posterior end of maxilla sigmoid in adults, curving down over premaxilla and extending below corner of the mouth when mouth is closed. Posterior end of the maxilla sigmoid in adults, curving down over the premaxilla and extending below the corner of the mouth when the mouth is closed. **Translucent adipose eyefold weakly developed in adults, forming a narrow ring around the eye and extending anteriorly a short way onto the lateral part of the snout.** Gill rakers on lower part of first gill arch usually 45 to 68 (rarely 40 to 44). **Second dorsal and anal fins with small scales on anterior and basal parts, otherwise naked.** Second dorsal fin with 9 segmented rays. **Anal fin with 3 spines and 9 segmented rays in adults** (first spine is very short and may be hidden by overlying scales); usually 2 spines and 10 segmented rays in juveniles. Second dorsal and anal fins slightly falciform. Pectoral fin with 1 short, spine-like ray dorsally and 17 or 18 longer, segmented rays, not reaching level of origin of first dorsal fin; pectoral fin about 19% standard length, 80 to 89% head length. Pectoral axillary scale very small or absent. Scales on flanks ctenoid. **Longitudinal series scale count 43 to 52; 14 or 15 in rearward transverse series;** 28 or 29 scales anterior to origin of second dorsal fin; 20 scales in circumpeduncular series. Scales on dorsum usually with a single longitudinal groove, some with a double groove. Predorsal scales cycloid and extending to posterior nostrils or slightly beyond. Pharyngobranchial organ with 2 large valves. Six pyloric caeca associated with stomach.

Colour: brownish on dorsum; dark greenish dorsally on flanks, with 3 to 6 indistinct, longitudinal dark stripes; whitish on abdomen. First dorsal fin greyish, second dorsal fin yellowish grey with dusky margin; anal fin also with dusky margin; caudal fin bluish with black margin; pectoral fin yellowish and may have a blue spot at fin origin.

Size: Maximum reported size 75 cm; more commonly attains up to 33 cm standard length.

Habitat, biology, and fisheries: Found in shallow coastal waters, lagoons, estuaries, and freshwaters. Caught with dragnets and hook-and-line gear.

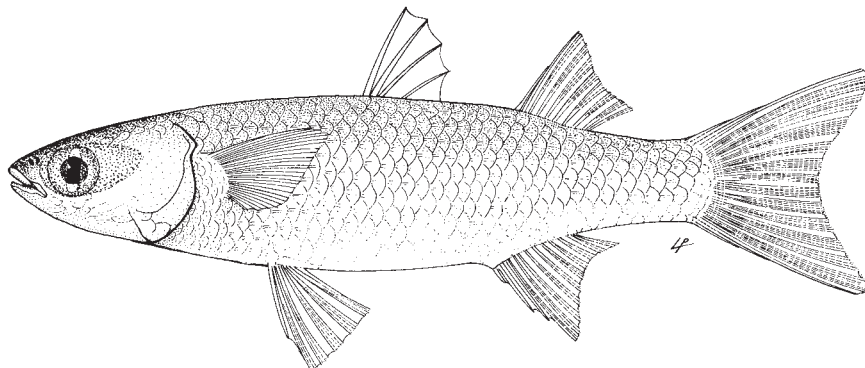
Distribution: Found along the Atlantic coast of Africa from southern Angola (Baia de Santa Maria) south to the Cape. Also found along the south coast of Africa from Mossel Bay to Kosi Estuary.



Mugil bananensis (Pellegrin, 1927)

Frequent synonyms / misidentifications: None / *Mugil cephalus* Linnaeus, 1758.

FAO names: En – Banana mullet; Fr – Mulet banae; Sp – Liza banana.



Diagnostic characters: Medium-sized species. Body moderately deep; body depth at first dorsal-fin origin 23 to 27% standard length; depth at anal-fin origin 21 to 25% standard length. Mouth ogive in ventral view, with an acute angle at dentary symphysis. Lips thin; maximum depth of upper lip 3.5 to 8.8% head length. **Teeth on upper lip usually just visible to naked eye (except in small specimens). Upper lip (under microscope) with single row of moderately long, recurved, unicuspid teeth (longer than in other eastern central Atlantic species of *Mugil* except *M. curvidens*). Teeth on lower lip minute (not visible to naked eye) and ciliiform, or absent.** Ventral part of lower lip often bears circa 5 or 6 rows of small papillae, in band around the margin of the lip. Anteroventral edge of the lachrymal serrate but straight; **ventral end of lachrymal slender and pointed, reaching level of posterior tip of maxilla.** Maxilla straight and slender, with posterior tip not extending below corner of mouth. **Translucent adipose eyefold extensive over iris (except in specimens about 30 mm or less in standard length).** **Gill rakers on lower part of first gill arch 22 to 46. Second dorsal and anal fins with small scales on anterior and basal parts, otherwise naked.** Second dorsal fin with 9 segmented rays. **Anal fin with 3 spines and 8 (very rarely 9) segmented rays in adults** (first spine very short, and may be hidden by overlying scales); usually 2 spines and 9 segmented rays in juveniles approximately 35 mm or less in standard length. Pectoral fin with 1 short, spine-like ray dorsally and 14 to 16 (mode 15) longer, segmented rays, not reaching level of origin of first dorsal fin; pectoral fin 18 to 23% standard length, 69 to 78% head length. Long pectoral axillary scale. Scales on flanks ctenoid. **Longitudinal series scale count 33 to 39 (usually 36 or 37); 11 to 13 (usually 12) in rearward transverse series;** 23 or 24 scales anterior to origin of second dorsal fin; 17 to 20 (usually 17 or 18) scales in circumpeduncular series. Scales on dorsum usually with a single longitudinal groove. Predorsal scales cycloid and extending to anterior nostrils or slightly beyond. Pharyngobranchial organ with **single, large valve, often longer than the depth of its base. Two pyloric caeca associated with stomach.** **Colour:** greyish dorsally; flanks more silvery than *M. cephalus* with dark longitudinal bands present or absent (usually fewer than in *M. cephalus*). Dorsal fins dusky; pectoral, pelvic, and anal fins paler or slightly whitish; caudal fin pale, particularly on lower lobe. Pelvic, anal and caudal fins not yellowish. Dark spot at origin of pectoral fin.

Size: Maximum reported standard length 26 cm; commonly reaches 20 cm standard length.

Habitat, biology, and fisheries: Adults inhabit inshore marine waters, estuaries, and lagoons in marine and brackish waters. Caught using trammel nets, trawls and beach seines. Marketed fresh, smoked, and dried-salted.

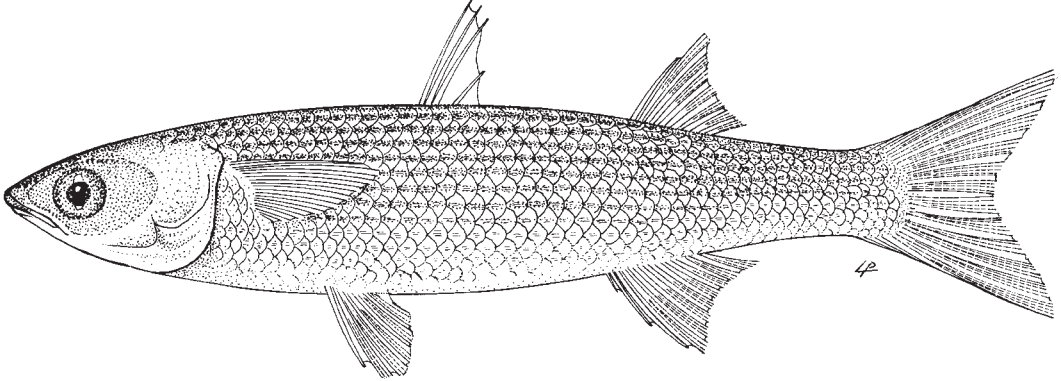
Distribution: From Senegal to Angola, including the island of Bioko (Fernando Po).



Mugil capurrii (Perugia, 1892)

Frequent synonyms / misidentifications: *Mugil monodi* Chabanaud, 1926 / *Myxus curvidens*: Steindachner, 1882 (not Valenciennes *in* Cuvier and Valenciennes, 1836).

FAO names: En – Leaping African mullet; Fr – Mulet sauteur d'Afrique; Sp – Galúa africana.



Diagnostic characters: Medium to large-sized species. Body moderately deep; body depth at first dorsal-fin origin 24 to 26% standard length; depth at anal-fin origin 19 to 23% standard length. Mouth ogive in ventral view, with an acute angle at dentary symphysis. Lips thin; maximum depth of upper lip 3.3 to 4.9% head length. **Upper lip of juvenile and adult fish (under microscope) with single row of moderately well-spaced, long unicuspid teeth. Lower lip (under microscope) with single row of sparse unicuspid teeth.** Anteroventral edge of the lachrymal serrate but straight; ventral end of lachrymal slender and pointed; **lachrymal distinctly shorter than maxilla, so that ventral end of lachrymal does not reach level of posterior tip of maxilla.** Maxilla straight and slender, with posterior tip not extending below corner of mouth. **Translucent adipose eyefold extensive over iris (except in specimens about 30 mm or less in standard length).** Gill rakers on lower part of first gill arch 50 to 60. **Second dorsal and anal fins with small scales on anterior and basal parts, otherwise naked.** Second dorsal fin with 9 segmented rays. **Anal fin with 3 spines and 9 segmented rays in adults** (first spine very short, and may be hidden by overlying scales); usually 2 spines and 10 segmented rays in juveniles. Pectoral fin with 1 short, spine-like ray dorsally and 14 to 17 (mode 16) longer, segmented rays, extending to level of origin of first dorsal fin or posteriorly beyond; pectoral fin 18 to 19% standard length, 58 to 67% head length. Moderate-size or long pectoral axillary scale. Scales on flanks appearing cycloid or with fine, ctenoid membranous margin to scales. **Longitudinal series scale count 43 to 47;** 14.5 to 16 in transverse series; 26 to 28 scales anterior to origin of second dorsal fin; **20 to 23 scales in circumpeduncular series.** Scales on dorsum usually with a single longitudinal groove, some with a double groove. Predorsal scales cycloid and extending to anterior nostrils or slightly beyond. Pharyngobranchial organ with **single, large valve.** **Two pyloric caeca associated with stomach.** **Colour:** greyish brown dorsally, flanks silvery and abdomen off-white. Fins greyish except for pelvic and anal fins which are whitish. Pectoral fins have a dark spot at origin.

Size: Maximum reported body size is 48 cm standard length (Trape and Durand, 2011); common to 30 cm.

Habitat, biology, and fisheries: Adults inhabit shallow inshore coastal waters. Caught with beach seines and trammel nets. Probably marketed fresh, smoked, and dried-salted.

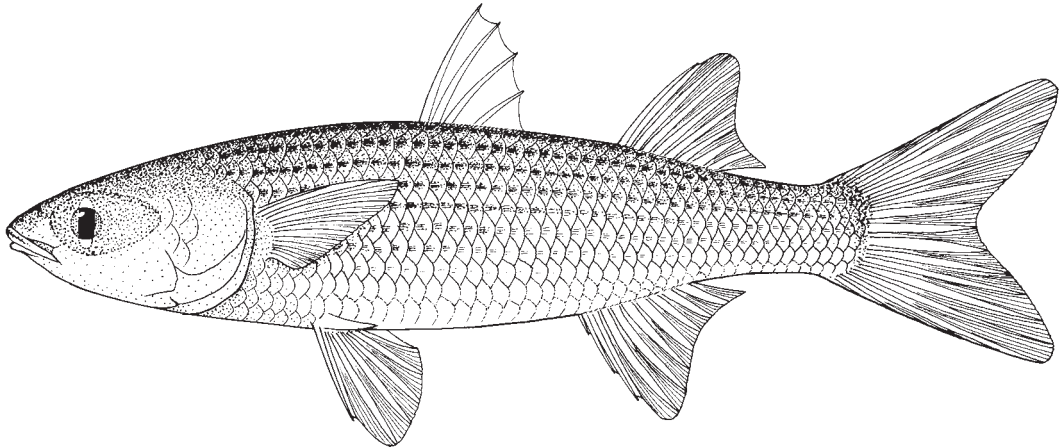
Distribution: Commonly reported from Morocco to Senegal, but records from Togo suggest the species distribution might extend along the entire West African coast between Morocco and Togo.



***Mugil cephalus* Linnaeus, 1758**

Frequent synonyms / misidentifications (for eastern central Atlantic region): *Mugil our* (Forsskål, 1775); *M. ashanteensis* Bleeker, 1863; *M. cephalus ashanteensis* Cadenet, 1954 | *Mugil bananensis* (Pellegrin, 1928).

FAO names: **En** – Flathead grey mullet (AFS: Striped mullet); **Fr** – Mulet à grosse tête; **Sp** – Pardete.



Diagnostic characters: Medium to large-sized species. Body moderately deep; body depth at first dorsal-fin origin 24 to 28% standard length; depth at anal-fin origin 20 to 24% standard length. Mouth ogive in ventral view, with an acute angle at dentary symphysis. Lips thin; maximum depth of upper lip 2.8 to 5.8% head length. **Upper lip of juvenile and adult fish (under microscope) with outer row of moderately close-set unicuspid teeth; 1 to 6 inner rows (usually 1 or 2 rows) of smaller, bicuspid teeth. These teeth just visible to the naked eye as a fine fringe. Lower lip (under microscope) with outer row of unicuspid teeth and 1 to 4 rows of smaller, bicuspid teeth present or absent (if present, usually represented by only a single row).** Anteroventral edge of the lachrymal serrate but straight; ventral end of lachrymal slender and pointed, reaching level of posterior tip of maxilla. Maxilla straight and slender, with posterior tip not extending below corner of mouth. **Translucent adipose eyefold extensive over iris (except in specimens about 30 mm or less in standard length).** Gill rakers on lower part of first gill arch 50 to 80. **Second dorsal and anal fins with small scales on anterior and basal parts, otherwise naked.** Second dorsal fin with 9 segmented rays. **Anal fin with 3 spines and 8 (rarely 9) segmented rays in adults** (first spine very short, and may be hidden by overlying scales); usually 2 spines and 9 segmented rays in juveniles approximately 35 mm or less in standard length. Pectoral fin with 1 short, spine-like ray dorsally and 15 to 17 (mode 16) longer, segmented rays, usually not reaching level of origin of first dorsal fin; pectoral fin 16 to 22% standard length, 61 to 83% head length. Long pectoral axillary scale. Scales on flanks ctenoid. **Longitudinal series scale count 36 to 42 (usually 38 or 39); 13 to 15 in rearward transverse series;** 23 to 26 scales anterior to origin of second dorsal fin; 19 to 21 scales in circumpeduncular series. Scales on dorsum usually with a single longitudinal groove. Predorsal scales cycloid and extending to anterior nostrils or slightly beyond. Pharyngobranchial organ with **single, large valve, which is often shorter than the depth of its base.** **Two pyloric caeca associated with stomach.** **Colour:** specimens caught from sea greyish olive or greyish brown dorsally, flanks silvery with **about 7 to 10 longitudinal dark stripes along flanks, following rows of scales; stripes on dorsal part of flanks darker and more conspicuous than those on ventral part of the flanks;** abdomen off-white. Fish from estuarine waters may be a duller blue or dirty brown dorsally and the flanks are duller. Fins dusky with numerous fine black speckles, particularly on the dorsal and caudal fins. Pelvic fins paler than other fins. **Pelvic fins, anal fin, and lower lobe of the caudal fin yellowish in specimens from tropical Atlantic coast of Africa.** Pelvic fins paler than other fins. Dark spot at origin of pectoral fin.

Size: Maximum reported length for eastern central Atlantic specimens is 120 cm standard length but the species commonly reaches 50 cm standard length.

Habitat, biology, and fisheries: Adults inhabit inshore marine waters, estuaries, lagoons and rivers; tolerant of wide ranges in temperature (5° to 37°C) and salinity (0 to 8‰; i.e. freshwater to hypersaline). Adults form schools which migrate offshore to spawn; larvae migrate back inshore. Adults may migrate up rivers. Larvae and juveniles feed on plankton, and diet switches to filtration of organic detritus, microscopic algae, and small particulate materials in fish of about 3 cm or larger. Feeding occurs at surface, or by browsing over submerged surfaces, and by gulping sediment. Caught using trawls, trammel nets, and beach seines. Marketed fresh, salted, and frozen; roe sold fresh or smoked.

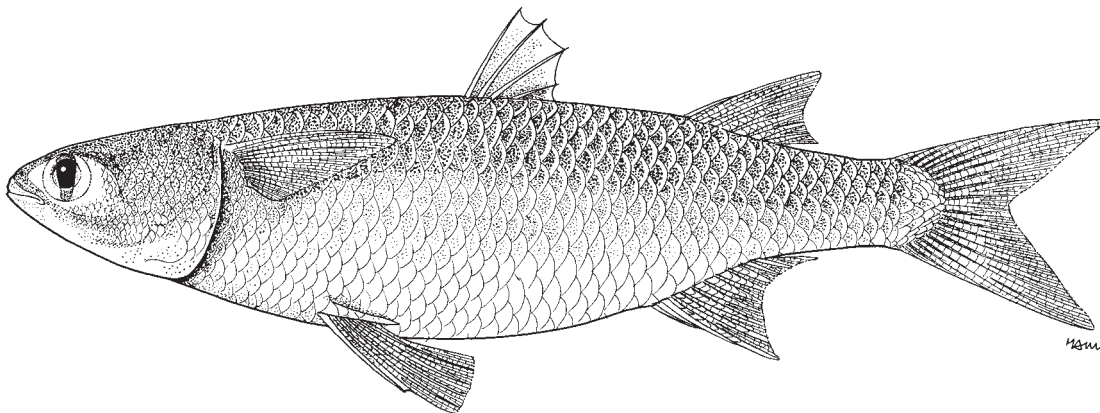
Distribution: Worldwide in tropical, subtropical and warm temperate waters from 51°N to 42°S, although less abundant in tropics. Present along entire Atlantic coast of Africa and may be found on islands of eastern central Atlantic.



Mugil curema Valenciennes in Cuvier and Valenciennes, 1836

Frequent synonyms / misidentifications (for eastern central Atlantic region): *Mugil metzelaari* Chabanaud, 1926 / None.

FAO names: En – White mullet; Fr – Mulet blanc; Sp – Lisa blanca.



Diagnostic characters: Medium to large-sized species. Body moderately deep; body depth at first dorsal-fin origin 26 to 30% standard length; depth at anal-fin origin 21 to 27% standard length. Mouth ogive in ventral view, with an acute angle at dentary symphysis. Lips thin; maximum depth of upper lip 5.0 to 9.5% head length. **Upper lip of juvenile and adult fish (under microscope) with outer row of moderately close-set, unicuspid teeth (these teeth sometimes visible to the naked eye as a fine fringe); an inner row of less closely-set, smaller teeth may be present just posterior to the outer row. Lower lip (under microscope) with single row of unicuspid teeth, which are usually smaller than teeth in outer row on upper lip.** Anteroventral edge of the lachrymal serrate but straight; ventral end of lachrymal slender and pointed, **reaching level of posterior tip of maxilla.** Maxilla straight and slender, with posterior tip not extending below corner of mouth. **Translucent adipose eyefold extensive over iris (except in specimens about 30 mm or less in standard length).** Gill rakers on lower part of first gill arch 43 to 71. **Scales covering entire second dorsal and anal fins in adults; less heavily scaled in specimens under approximately 50 mm standard length.** Second dorsal fin with 9 segmented rays. **Anal fin with 3 spines and 9 (rarely 10) segmented rays in adults** (first spine is very short and may be hidden by overlying scales); usually 2 spines and 10 segmented rays in juveniles approximately 30 mm or less in standard length. Pectoral fin with 1 short, spine-like ray dorsally and 14 to 17 longer, segmented rays, not quite reaching level of origin of first dorsal fin; pectoral fin 18 to 24% standard length, 70 to 85% head length. Long pectoral axillary scale. Scales on flanks ctenoid. **Longitudinal series scale count 32 to 39 (usually 35 or 36); 12 or 13 in rearward transverse series;** 22 to 25 scales anterior to origin of second dorsal fin; 16 to 19 scales in circumpeduncular series. Scales on dorsum usually with a single longitudinal groove. Predorsal scales cycloid and extending to anterior nostrils or slightly beyond. Pharyngobranchial organ with **single, large valve, which is often longer than the depth of its base. Two pyloric caeca associated with stomach.** **Colour:** specimens caught from the sea bluish green or olive dorsally, flanks silvery, and abdomen off-white. Yellowish blotch between eye and upper edge of the operculum. Dorsal fins have numerous, fine black speckles on and between rays; second dorsal fin may be slightly darker than first dorsal fin. Caudal fin yellowish at origin with fine black speckles on and between the rays, and blackish distal margin. Anal and pelvic fins paler than the dorsal fins, sometimes yellowish. Pectoral fin also paler than dorsal fins but speckled with fine black spots; dark spot dorsally at the origin of the pectoral fin.

Size: Maximum reported total length about 91 cm (for western central Atlantic specimens); eastern central Atlantic specimens may reach 35 cm total length, and may commonly reach 25 cm total length.

Habitat, biology, and fisheries: Adults inhabit inshore marine waters and estuaries; found in salinities of 15‰ but preferring salinities of 25 to 30 ‰, and not usually found in freshwaters. Adults form schools and probably migrate out to sea before spawning. Larvae and juveniles feed on plankton; diet switches to filtration of sand grains, organic detritus, diatoms and green algae in adults. Caught using trawls, beach seines and trammel nets. Marketed fresh, dried salted, and smoked.

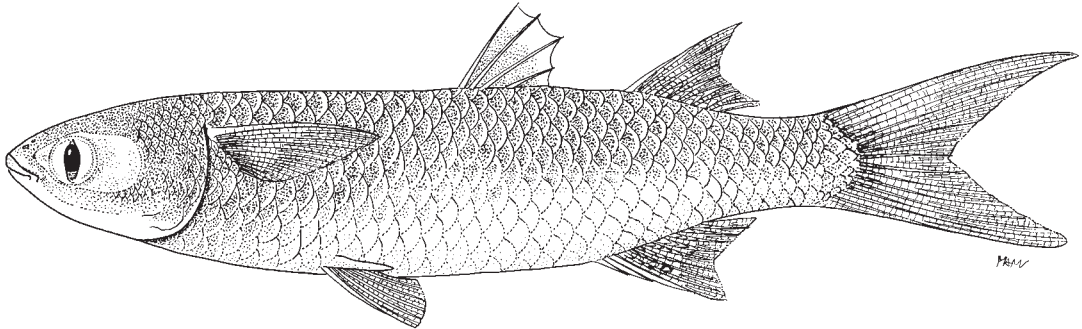
Distribution: Known from Senegal to Namibia at about 20°S. It is also found in the western Atlantic and Caribbean between Cape Cod and Brazil, and in the eastern Pacific from Baja California to Chile.



Mugil curvidens Valenciennes in Cuvier and Valenciennes, 1836

Frequent synonyms / misidentifications: *Myxus curvidens* (Valenciennes in Cuvier and Valenciennes, 1836); *Querimana curvidens* (Valenciennes in Cuvier and Valenciennes, 1836) / *Mugil trichodon* Poey, 1875.

FAO names: En – Dwarf mullet; Fr – Mulet mignon; Sp – Lisa enana.



Diagnostic characters: A small or perhaps medium-sized species. Body moderately deep; body depth at first dorsal-fin origin 25 to 29% standard length; depth at anal-fin origin 21 to 25% but may reach 27% standard length. Mouth ogive in ventral view, with an acute angle at dentary symphysis. Lips thin; maximum depth of upper lip 3.8 to 5.7% head length. **Upper lip (under microscope) with outer row of close-set, long, unicuspid teeth with tips recurved towards mouth (these teeth usually visible to naked eye as fringe along the lip); 1 inner row of less closely-set, and smaller unicuspid teeth. Lower lip (under microscope) with single row of close-set, long, unicuspid teeth with recurved tips (teeth on lower lip sometimes smaller than those on upper lip). Anteroventral edge of lachrymal serrate but straight; ventral end of lachrymal slender and pointed, reaching level of posterior tip of maxilla. Maxilla straight and slender, with posterior tip not extending below corner of mouth. Translucent adipose eyefold extensive over iris (except in specimens about 30 mm or less in standard length). Gill rakers on lower part of first gill arch 32 to 48. Scales covering entire second dorsal and anal fins in specimens over 60 mm standard length; in specimens under 60 mm standard length the distal parts of the fins may not be scaled. Second dorsal fin with 9 soft rays. Anal fin with 3 spines and 8 (rarely 7) soft rays in adults (first spine very short, and may be hidden by overlying scales); 2 spines and 9 soft rays in some specimens under 58 mm standard length. Pectoral fin with 1 short, spine-like ray dorsally and 14 or 15 (rarely 16) longer, segmented rays, not quite reaching level of origin of first dorsal fin; pectoral fin 20 to 23% standard length, 70 to 80% head length. Small pectoral axillary scale. Scales on flanks ctenoid. **Longitudinal series scale count 34 to 37 (mode 35), rarely 33 or 38; 11.5 to 12.5 in rearward transverse series;** 22 to 24 scales anterior to origin of second dorsal fin; 18 (rarely 17) scales in circumpeduncular series. Scales on dorsum usually with a single longitudinal groove. Predorsal scales cycloid and extending to anterior nostrils. Pharyngobranchial organ with **single, large valve. Colour:** dark bluish grey dorsally, flanks silvery and abdomen off-white. Pectoral fins have a dark bluish spot at origin.**

Size: Largest observed standard length 18 cm; apparently a 27 cm specimen has been collected from near Rio de Janeiro, Brazil. More common under 10 cm.

Habitat, biology, and fisheries: An uncommon species. Perhaps caught incidentally with other mullets.

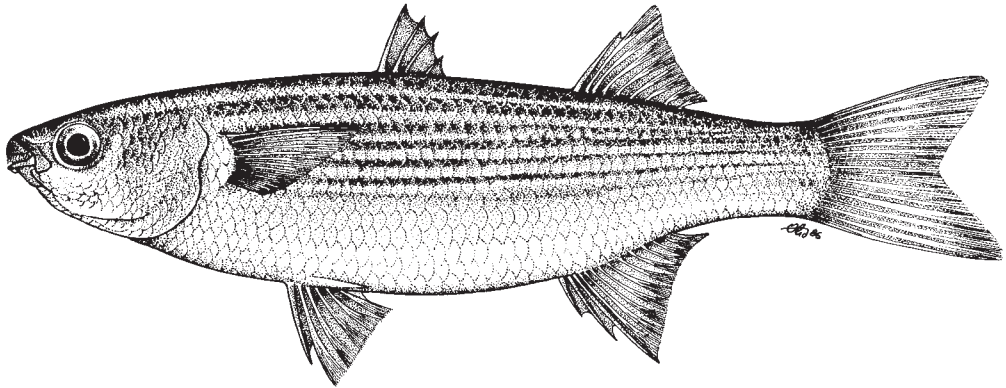
Distribution: Ascension Island in the mid-Atlantic. In the western Atlantic from Bermuda, Bahamas, the Antilles and south to Rio de Janeiro, Brazil.



Oedalechilus labeo (Cuvier, 1829)

Frequent synonyms / misidentifications: None / None.

FAO names: En – Boxlip mullet; Fr – Mulet labéon; Sp – Caluga.



Diagnostic characters: Medium to large-sized species. Body moderately deep; body depth at first dorsal-fin origin 24 to 27% standard length; depth at anal-fin origin 21 to 24% standard length. Mouth wide in ventral view, with an obtuse angle at dentary symphysis. **Upper lip thick in adults, 14 to 17% head length (6 or 7 times in head length). Upper lip with numerous vertical ridges of horny epidermis. Lower lip thin, projecting anteriorly, fringed with ridges of horny epidermis. Both lips have folds tucked under the lachrymal at the corners of the mouth. Lips without teeth.** Anteroventral edge of the lachrymal serrate, with distinct concave notch adjacent to the corner of the mouth, and expanded into a broad, squarish, posteroventral tip. Posterior end of the maxilla weakly sigmoid in adults, curving down over the premaxilla and extending below the corner of the mouth when the mouth is closed. **Translucent adipose eyefold weakly developed in adults, forming a very narrow ring around the eye.** Gill rakers on lower part of first gill arch 34 to 40. **Second dorsal and anal fins with small scales on anterior and basal parts, otherwise naked.** Second dorsal fin with 9 or 10 segmented rays. **Anal fin with 3 spines and 11 segmented rays in adults** (first spine is very short and may be hidden by overlying scales); usually 2 spines and 12 segmented rays in juveniles approximately 30 mm or less in standard length. Pectoral fin with 1 short, spine-like ray dorsally and 16 longer, segmented rays; **ventral 1 or 2 segmented rays more or less free from fin membrane;** pectoral fin not reaching level of origin of first dorsal fin; pectoral fin 22% standard length, 90 to 100% head length. Pectoral axillary scale very small or absent. Scales on flanks ctenoid. **Longitudinal series scale count usually 44 to 49 (rarely as few as 39); 13.5 to 15 in rearward transverse series;** 29 to 31 scales anterior to origin of second dorsal fin; 18 or 19 scales in circumpeduncular series. Scales on dorsum usually with a single longitudinal groove. Predorsal scales extending to posterior nostrils. **Pharyngobranchial organ with 2 small valves,** appearing as finger-like processes. Six or 7 (rarely 5) pyloric caeca. **Colour:** adults greyish blue dorsally; flanks silvery grey, slightly goldish, with darker longitudinal stripes; abdomen off-white.

Size: Maximum reported standard length 36 cm. (Thomson, 1997).

Habitat, biology, and fisheries: Found in coastal waters, not entering estuaries. Adults form schools and probably migrate out to sea before spawning. Young feed on zooplankton, crustaceans, insects, arachnids, polychaetes, and gastropods.

Distribution: Known from Morocco to Gibraltar. Also found in the Mediterranean.



New Index

A**ATHERINIDAE** 2078**B**

Banana mullet 2103

Boxlip mullet 2110

C

Caluga 2110

Cape Verde mullet 2085

Chelon aurata 2088*Chelon bandialensis* 2090*Chelon bispinosus* 2085*Chelon dumerili* 2091*Chelon labrosus* 2085-2086*Chelon ramada* 2097*Chelon richardsonii* 2099*Chelon saliens* 2100*Chelon tricuspidens* 2102*Crenimugil labrosus* 2086**D**

Diassanga mullet 2090

Dwarf mullet 2109

F

Flathead grey mullet 2105

G

Galupe 2088

Galúa 2100

Galúa africana 2104

Golden grey mullet 2088

Grooved mullet 2091

H*Heteromugil tricuspidens* 2102**L**

Largescaled mullet 2095

Leaping African mullet 2104

Leaping mullet 2100

Lisa blanca 2107

Lisa de Cabo Verde 2085

Lisa diassanga 2090

Lisa enana 2109

Lisa negra 2086

Lisa sudafricana 2099

Lisa tridente 2102

Lisa acanalada 2091

Lisa aletona 2093

Liza aurata 2088,2097

Lisa banana 2103

Liza bandialensis 2090*Liza dumeril* 2089*Liza dumerili* . 2088,2091,2097-2098,2100-2101*Liza dumerili canaliculatus* 2092*Liza dumerili dumerili* 2092

Lisa escamuda 2095

Liza falcipinnis 2093,2095*Liza grandisquamis* 2090,2094-2095*Liza ramada* 2088,2097,2100*Liza richardsonii* 2099*Liza saliens* 2091,2100*Liza saliens dumerili* 2092*Liza saliens hoeferli* 2092*Liza tricuspidens* 2102**M****MUGILIDAE** 2077**MUGILIFORMES** 2077

Morragute 2097

Mugil ashanteensis 2105*Mugil bananensis* 2103,2105*Mugil canaliculatus* 2091*Mugil capito* 2097*Mugil capurrii* 2104*Mugil cephalus* 2103,2105*Mugil cephalus ashanteensis* 2105*Mugil chelo* 2086*Mugil curema* 2107*Mugil curvidens* 2103,2109*Mugil hoeferli* 2091*Mugil hypselopterus* 2095*Mugil labrosus* 2086*Mugil metzelaari* 2107*Mugil monodi* 2104*Mugil nigrostrigatus* 2085*Mugil our* 2105*Mugil provensalis* 2085*Mugil septentrionalis* 2086*Mugil trichodon* 2109

Mulet banae 2103

Mulet blanc 2107

Mulet bouri	2091
Mulet des îles Cap Vert	2085
Mulet diassanga	2090
Mulet doré	2088
Mulet labéon	2110
Mulet lippu	2086
Mulet mignon	2109
Mulet porc	2097
Mulet sauteur	2100
Mulet sauteur d'Afrique	2104
Mulet sudafricain	2099
Mulet tident	2102
Mulet à grandes nageoires	2093
Mulet à grosse tête	2105
Mulet écailleux	2095
Mullets	2077
<i>Myxus curvidens</i>	2104,2109
N	
<i>Neochelon falcipinnis</i>	2093
O	
<i>Oedalechilus labeo</i>	2086,2110
P	
<i>Parachelon grandisquamis</i>	2095
Pardete	2105
Q	
<i>Querimana curvidens</i>	2109
S	
Sicklefin mullet	2093
South African mullet	2099
<i>Strializa canaliculatus</i>	2091
Striped mullet	2105
Striped springer mullet	2102
T	
Thicklip grey mullet	2086
Thinlip grey mullet	2097
W	
White mullet	2107
A	
<i>ashanteensis, Mugil</i>	2105
<i>ashanteensis, Mugil cephalus</i>	2105
<i>aurata, Chelon</i>	2088
<i>aurata, Liza</i>	2088,2097

B

<i>bananensis, Mugil</i>	2103,2105
<i>bandialensis, Chelon</i>	2090
<i>bandialensis, Liza</i>	2090
<i>bispinosus, Chelon</i>	2085

C

<i>canaliculatus, Liza dumerili</i>	2092
<i>canaliculatus, Mugil</i>	2091
<i>canaliculatus, Strializa</i>	2091
<i>capito, Mugil</i>	2097
<i>capurrii, Mugil</i>	2104
<i>cephalus ashanteensis, Mugil</i>	2105
<i>cephalus, Mugil</i>	2103,2105
<i>chelo, Mugil</i>	2086
<i>curema, Mugil</i>	2107
<i>curvidens, Mugil</i>	2103,2109
<i>curvidens, Myxus</i>	2104,2109
<i>curvidens, Querimana</i>	2109

D

<i>dumerili canaliculatus, Liza</i>	2092
<i>dumerili dumerili, Liza</i>	2092
<i>dumerili, Chelon</i>	2091
<i>dumerili, Liza</i>	2088-2089,2091,2097-2098,2100-2101
<i>dumerili, Liza dumerili</i>	2092
<i>dumerili, Liza saliens</i>	2092

F

<i>falcipinnis, Liza</i>	2093,2095
<i>falcipinnis, Neochelon</i>	2093

G

<i>grandisquamis, Liza</i>	2090,2094-2095
<i>grandisquamis, Parachelon</i>	2095

H

<i>hoefleri, Liza saliens</i>	2092
<i>hoefleri, Mugil</i>	2091
<i>hypslopterus, Mugil</i>	2095

L

<i>labeo, Oedalechilus</i>	2086,2110
<i>labrosus, Chelon</i>	2085-2086
<i>labrosus, Crenimugil</i>	2086
<i>labrosus, Mugil</i>	2086

M

<i>metzelaari, Mugil</i>	2107	<i>richardsonii, Liza</i>	2099
<i>monodi, Mugil</i>	2104		
N		S	
<i>nigrostrigatus, Mugil</i>	2085	<i>saliens dumerili, Liza</i>	2092
O		<i>saliens hoefleri, Liza</i>	2092
<i>our, Mugil</i>	2105	<i>saliens, Chelon</i>	2100
P		<i>saliens, Liza</i>	2091,2100
<i>provencalis, Mugil</i>	2085	<i>septentrionalis, Mugil</i>	2086
R		T	
<i>ramada, Chelon</i>	2097	<i>trichodon, Mugil</i>	2109
<i>ramada, Liza</i>	2088,2097,2100	<i>tricuspidens, Chelon</i>	2102
<i>richardsonii, Chelon</i>	2099	<i>tricuspidens, Heteromugil</i>	2102
		<i>tricuspidens, Liza</i>	2102

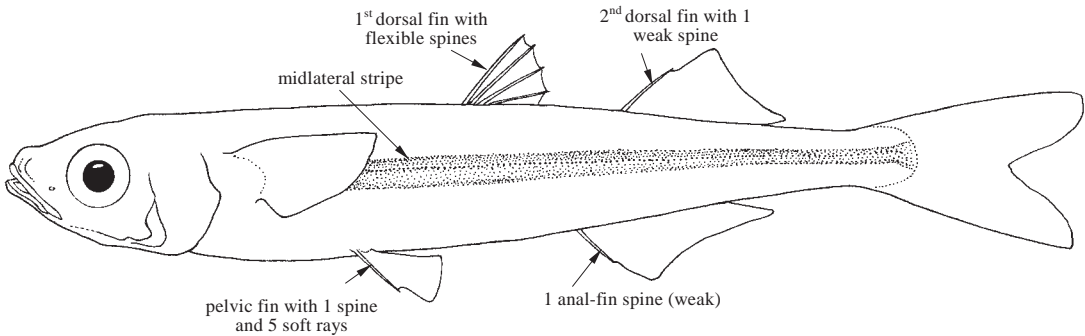
Order ATHERINIFORMES

ATHERINIDAE

Silversides

by L. Tito de Morais, IRD/LEMAR, University of Brest, Plouzané, France; M. Sylla, Centre de Recherches Océanographiques de Dakar-Thiaroye (CRODT), Senegal and W. Ivantsoff (retired), Biology Science, Macquarie University NSW 2109, North Ryde, Australia

Diagnostic characters: Small, elongate fish, rarely exceeding 15 cm in length. Body elongate and somewhat compressed. Short head, generally flattened dorsally, large eyes, sharp nose, mouth small, oblique and in terminal position, jaws subequal, reaching or slightly exceeding the anterior margin of the eye; premaxilla with ascending process of variable length, with lateral process present or absent; ramus of dentary bone elevated posteriorly or indistinct from anterior part of lower jaw; fine, small and sharp teeth on the jaws, on the roof of mouth (vomer, palatine, pterygoid) or on outside of mouth; 10 to 26 gill rakers long and slender on lower arm of first gill arch. Two well-separated dorsal fins, the first with 6 to 10 thin, flexible spines, located approximately in the middle of the body; the second dorsal and anal fins with a single small weak spine, 1 unbranched soft ray and a variable number of soft rays. Anal fin always originating slightly in advance of second dorsal fin; pectoral fins inserted high on the flanks, directly behind posterior rim of gill cover, with spine greatly reduced and first ray much thicker than those following. Abdominal pelvic fins with 1 spine and 5 soft rays; forked caudal fin; anus away from the origin of the anal fin. Relatively large scales, cycloid (smooth). Lateral line absent. **Colour:** back greenish to bluish speckled with black dots, translucent with scales delineated by small chromatophores above mid-lateral band; sides of head and body, as well as abdomen silvery, flanks often iridescent; brilliant mid-lateral sideband, sometimes highlighted in black, running along the middle of the body from upper margin of pectoral fin to the base of the caudal fin.



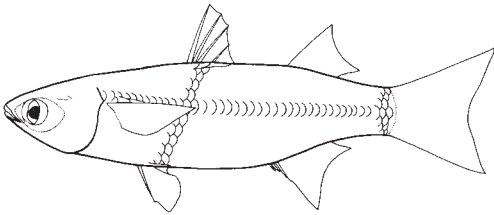
Habitat, biology, and fisheries: Silversides inhabit the surface and coastal waters of all tropical and temperate seas, near the surface to about 1 to 2 m, often forming large schools. They penetrate estuaries and brackish waters, while others live also in freshwater (*Atherina boyeri*). They feed on plankton at sea and on small benthic invertebrates in the coastal lagoons. Eggs are moderately large (up to about 1 mm) and have many filaments with which they adhere in compact mass to algae, rocks or bottom sand. Although edible, silversides are minimally consumed due to their small size, but are still caught for use as bait. They are caught in artisanal fisheries using beach seines, lift nets, gillnets and traps. Outside the area, silversides are found regularly in the markets of Italy, France, Spain and Turkey, and are also occasionally marketed pickled. Only 2 Old World species (*Atherina breviceps*, *Atherinomorus lacunosus*) are large enough to be valuable for human consumption; other species are important as forage for commercial fisheries and used as bait and in dried cat food.

Remarks: The genus *Atherina* is distributed in the eastern Atlantic Ocean and the Mediterranean Sea, extending south along the African coast into the Indian Ocean. There has been much confusion with atherinid species, possibly due to their small size, with lack of commercial importance leading to insufficient attention to this group. They are small silvery fishes which are superficially similar in size, coloration, and external morphology. Distinct differences, however, do occur in some measurements, counts, and in osteology. A recent revision recognized 5 species in the genus *Atherina* but strongly suggested that *Atherina boyeri* is a multi-species complex with 3 forms, of which the 2 new forms are restricted to the Mediterranean. *Atherina mochon* is cited by some authors in Morocco, but is not a valid species and is most likely *A. boyeri*.

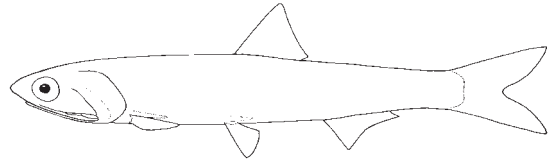
Similar families occurring in the area

Mugilidae: broad and flat head with blunt snout; eyes surrounded and more or less covered by adipose lids; first dorsal fin with 4 slender spines, anal fins with up to 3 spines. Sometimes with rough ctenoid scales on the sides of the head; no silver stripe on the sides.

Engraulidae: a single dorsal fin, no unsegmented spines in fin; pectoral fins low on the body; very large mouth in inferior position; blunt and projecting snout; the maxillary often extending to the edge of the operculum.



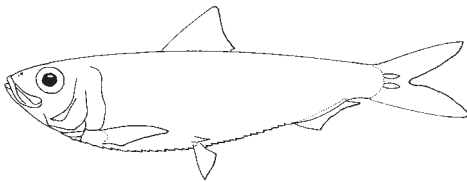
Mugilidae



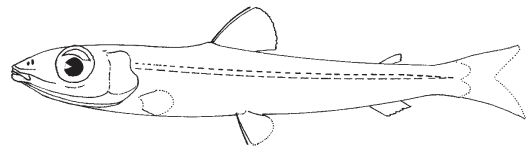
Engraulidae

Clupeidae: a single dorsal fin, no unsegmented fin rays; pectoral low on the body.

Argentiniidae: 1 short dorsal fin and 1 adipose fin; mouth small; pectoral fins low on body; anal fin near caudal fin.



Clupeidae



Argentiniidae

Key to species occurring in the area

- 1a. Premaxilla with ascending process longer than the horizontal toothed part, reaching the upper edge of the eye; more than 58 mid-lateral scales (Fig. 1) ***Atherina hepsetus***
- 1b. Premaxilla with ascending process shorter than the horizontal toothed part, and not reaching the upper edge of the eye; less than 58 mid-lateral scales (Fig. 2) → 2
- 2a. More than 50 mid-lateral scales; ectopterygoid bone toothless ***Atherina presbyter***
- 2b. Less than 50 mid-lateral scales; ectopterygoid bone with teeth → 3

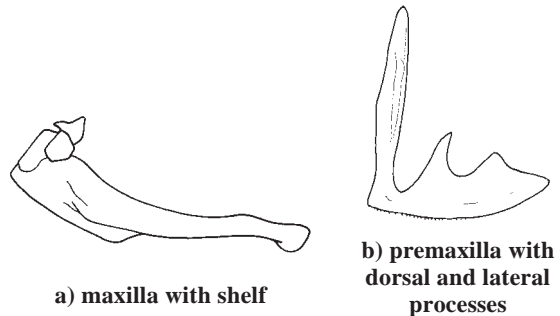


Fig. 1 *Atherina hepsetus*

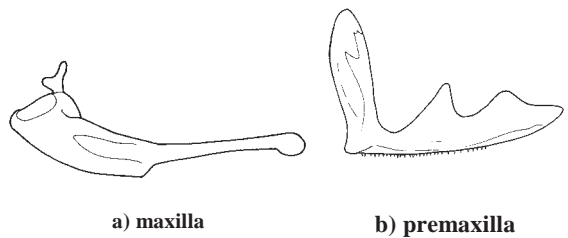


Fig. 2 *Atherina presbyter*

- 3a. Thirty-nine to 49 mid-lateral scales, 40 to 47 vertebrae (haemal arches expanded), 21 to 39 gill rakers *Atherina boyeri*
- 3 b. Forty-three to 48 mid-lateral scales, 40 to 43 vertebrae (haemal arches not expanded), 15 to 20 gill rakers . . . *Atherina lopeziana*

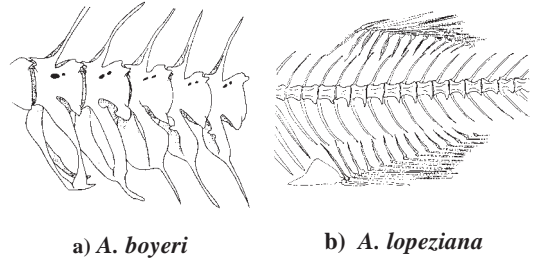






Fig. 3 haemal arches

List of species occurring in the area

The symbol  is given when species accounts are included.

-  *Atherina boyeri* Risso, 1810.
-  *Atherina hepsetus* Linnaeus, 1758.
-  *Atherina lopeziana* Rossignol and Blache, 1961.
-  *Atherina presbyter* Cuvier, 1829.

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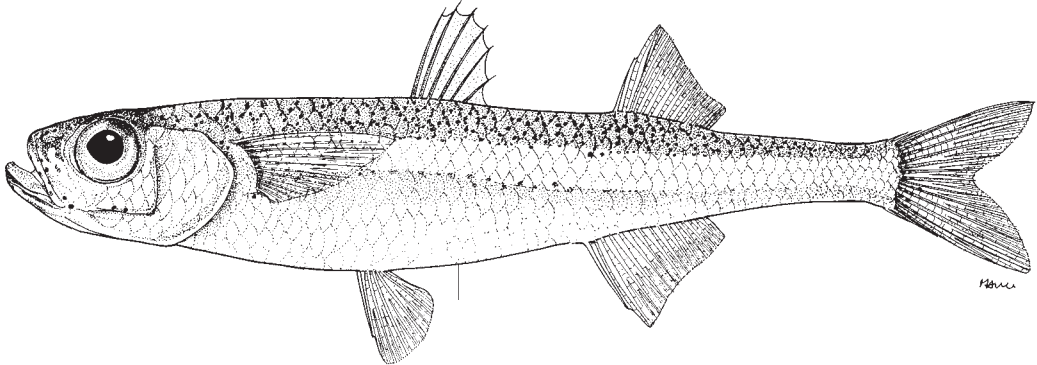
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***Atherina boyeri* Risso, 1810**

Frequent synonyms / misidentifications: *Atherina hepsetus* Delaroche, 1809 (not Linnaeus, 1758); *A. mochon* Cuvier 1829; *A. presbyter* var. *pontica* Eichwald, 1831; *A. risso* Valenciennes, 1835; *A. sarda* Valenciennes, 1835; *A. lacustris* Bonaparte, 1836; *A. hyalosoma* Cocco, 1885; *A. riqueti* Roule, 1902; *A. sardinella* Fowler, 1903; *A. bonapartii* Boulenger, 1907; *Hepsetia boyeri* (Risso, 1810); *Atherina caspia* Eichwald, 1838 / *Atherina presbyter*.

FAO names: **En** – Big-scale sand smelt; **Fr** – Joël; **Sp** – Pejerrey mediterráneo.



Diagnostic characters: Head length 4 times or less in total length. Dorsal fin rays with 6 to 9 flexible spines (generally 7 or 8) in the first dorsal fin and 9 to 15 (generally 10 to 13) soft rays in the second dorsal fin; anal-fin rays with 1 spine and 12 to 18 soft rays (generally 13 to 15). Scales in longitudinal series (39) 44 to 48 (49). Gill rakers 21 to 39. Vertebrae 40 to 47; haemal arches expanded. (Important variations in meristic characters according to various environmental conditions). **Colour:** usually yellowish translucent body. Back greenish grey with small black dots, white belly, with a silver stripe along the side. Fins clear, almost colourless. Animals living in lagoons are brownish or grey brownish on back.

Size: Up to 13 cm, usually 7 to 9 cm..

Habitat, biology, and fisheries: Found in littoral, lagoons and inshore stations; land-locked populations in coastal lagoons, very euryhaline fish, occurring in hyperhaline water (77 psu in Corsicca) to freshwater (in Morocco). Diet is mostly planktivore. At sea, it feeds on zooplankton but in lagoons, it consumes also small benthic invertebrates. Reproduction occurs from April to June in brackish (2 psu) and hyperhaline (42 psu) waters. Sexually mature when 1 year old. Spawning occurs in the spring, and there may be several clutches. Eggs are demersal and have filaments to adhere to the aquatic vegetation, the larvae are pelagic. Longevity of 3 years. Caught for bait with beach seines, bottom and pelagic trawls, lift nets, bottom gillnets and traps.

Distribution: Mediterranean, Black Sea, Atlantic from south of Spain possibly to Mauritania, including the Canary Islands and Madeira (presence at Madeira appears very doubtful). Isolated populations in brackish coastal lagoons in Morocco (Sidi Bou Ghaba Lake, Oued Sebou, oxbows of Oued Beht and Dayet Erroumi) and along the coasts of United Kingdom and the Netherlands.

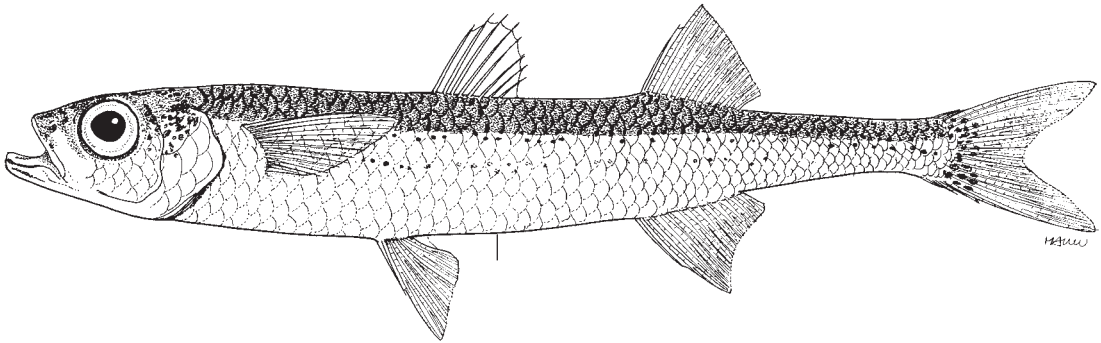
Remarks: There are a number of variable characteristics which should be used with caution in any system of classification. This is true, for instance, of the number of vertebrae, the shape of the haemal arches, gill rakers, body proportions, etc. This polymorphism undoubtedly accounts for the number of synonyms assigned to the species.



***Atherina hepsetus* Linnaeus, 1758**

Frequent synonyms / misidentifications: *Atherina (Atherina) hepsetus* Linnaeus, 1758; *A. atherina* Nardom, 1827 / None.

FAO names: **En** – Mediterranean sand smelt; **Fr** – Sauclet or Siauclet; **Sp** – Chucleto.



Diagnostic characters: Body elongate, subcylindrical or compressed. Head length more than 4 times in total length. No teeth on pterygoid bones. Dorsal fin rays with 7 to 10 spines in the first dorsal fin and 1 spine and 10 to 12 soft rays in the second dorsal fin; anal-fin rays with 1 spine and 11 to 13 soft rays. Scales in longitudinal series 59 to 65. Gill rakers 30 to 36. Vertebrae 53 to 57. **Colour:** silver, greenish grey, with a lateral stripe extending from head to tail.

Size: Up to 20 cm, usually 15 cm.

Habitat, biology, and fisheries: Pelagic littoral, often near shore, sometimes in marine lagoons and estuaries. Gregarious. Feeds on pelagic copepods and benthic crustaceans. Reproduction occurs from December to May (Mediterranean: France, Italy). Longevity from 3 to 4 years. Caught in beach seines, bottom and pelagic trawls, lift nets and bottom gillnets.

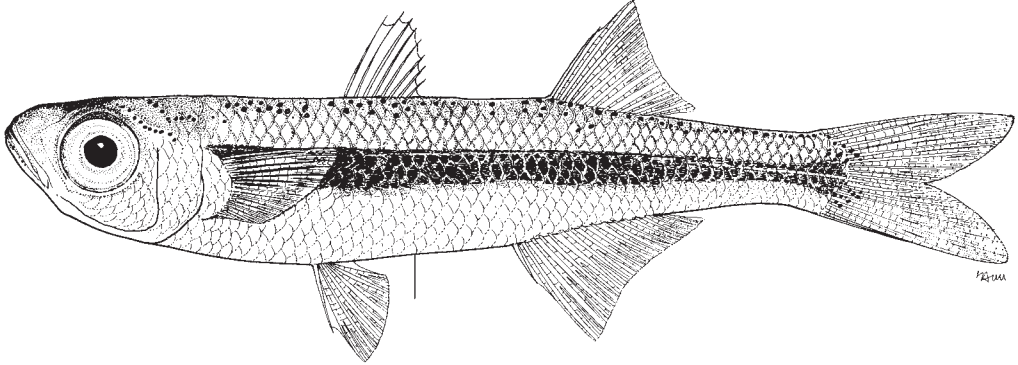
Distribution: Mediterranean, Black Sea and Caspian Sea (common, locally abundant). Eastern Atlantic, from Spain to Morocco including the Canary Islands and Madeira (rather rare).



Atherina lopeziana Rossignol and Blache, 1961

Frequent synonyms / misidentifications: *Atherina boyeri* (non Risso, 1810 in Osório, 1893, 1898); *A. hepsetus* (non Linnaeus, 1758 in Fowler, 1936 and Lozano-Cabo, 1961) / *Atherina presbyter*.

FAO names: En – Lopez's sand smelt.



Diagnostic characters: Elongate body, fusiform and compressed. Total length less than 1.2 times in standard length. Body height at the origin of the ventral fin 5.3 to 5.6 times in standard length and 6.4 to 6.7 times in total length. Mouth oblique and slightly protruding inferior jaw. Vertebrae 40 to 42; haemal arches not expanded. First dorsal fin rays with 6 to 8 spines; second dorsal fin rays with 1 spine and 11 to 13 soft rays, anal-fin rays with 1 spine and 14 to 17 soft rays. Scales in lateral line 43 to 48. Predorsal scales 18 to 23. Gill rakers 15 to 20 (lower arc 13 to 16; upper arc 2 to 4). **Colour:** body more or less translucent on living individuals, with a greenish back; large lateral silvery band from the operculum to the base of the tail; head silver-grey. On formalin-fixed individuals the lateral band fades and reveals a narrow black side band which ends with a grey triangular mark close to the origin of the caudal rays.

Size: Up to 8 cm.

Habitat, biology, and fisheries: This coastal species is very poorly known.

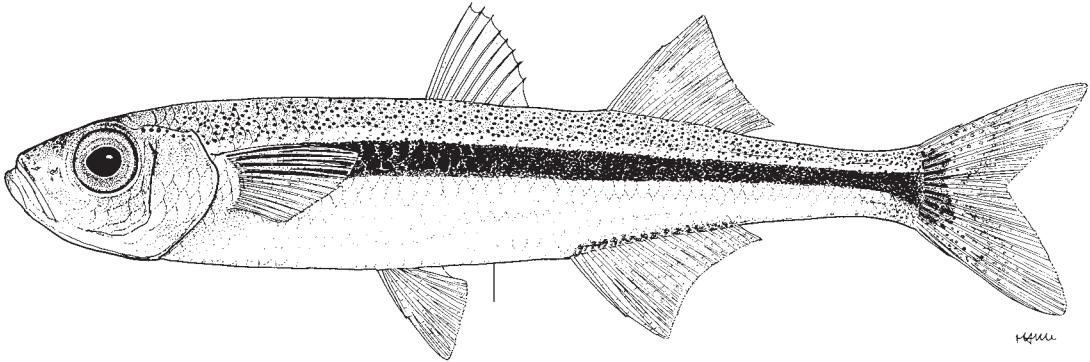
Distribution: Gulf of Guinea to Bay of Biafra and offshore islands, including São Tomé Island. Also reported from littoral of Gulf of Arguin and Cape Verde.



***Atherina presbyter* Cuvier, 1829**

Frequent synonyms/misidentifications: *Atherina (Hepsetia) presbyter* Cuvier, 1829, *Hepsetia presbyter* (Cuvier, 1829) / *Atherina boyeri*.

FAO names: En – Sand smelt; Fr – Prêtre; Sp – Abichón.



Diagnostic characters: Head length more than 4 times in total length. Dorsal-fin rays with 7 to 9 spines in the first dorsal, and 1 spine and 11 to 14 soft rays in the second; anal fin with 1 spine and 14 to 17 soft rays. Scales in longitudinal series 52 to 57. Gill rakers 28 to 22. Vertebrae 46 to 52 (Morocco 46 to 49, the Netherlands 49 to 52). **Colour:** bright stripe running the whole length of its side from head to tail, often outlined in black. No true lateral line.

Size: Up to 20 cm, usually 12 to 16 cm.

Habitat, biology, and fisheries: Pelagic fish inhabiting littoral waters, sometimes in low-salinity water, occasionally enters estuaries and coastal lagoons. A schooling fish. Seasonal migrations along Atlantic coasts. Carnivorous (small crustaceans, fish larvae). Maximum age from 3 to 4 years. Caught in bottom gillnets and lift nets. In the Canary Islands, *A. presbyter* is fished both as commercial target and as bait in the seasonal live-bate tuna fishery. This species is captured near surface in the littoral zone, mainly with beach seines and liftnets. It is caught consistently year-round without significant seasonal differences in landings.

Distribution: Atlantic coast from Kattegat Strait (rare) and Scotland to Morocco, Canary Islands, Azores and Madeira. Also reported from littoral of Gulf of Arguin in Mauritania and Cape Verde (doubtful record). Rare in the Mediterranean (found off the Straits of Gibraltar; France: Port-Vendres, Marseilles; Tunisia: Tunis).

Remarks: Historically there has been considerable confusion between *Atherina presbyter* or *A. boyeri* leading to a proposed synonymy of the 2 species. However, recent studies have demonstrated differences between populations, consistent with the existence of 2 species.



New Index

A

ATHERINIDAE	2111
ATHERINIFORMES	2111
Abichón	2118
<i>Atherina</i>	2111
<i>Atherina (Atherina) hepsetus</i>	2116
<i>Atherina (Hepsetia) presbyter</i>	2118
<i>Atherina athaerina</i>	2116
<i>Atherina bonapartii</i>	2115
<i>Atherina boyeri</i>	2111,2115,2117-2118
<i>Atherina breviceps</i>	2111
<i>Atherina caspia</i>	2115
<i>Atherina hepsetus</i>	2115-2117
<i>Atherina hyalosoma</i>	2115
<i>Atherina lacustris</i>	2115
<i>Atherina lopeziana</i>	2117
<i>Atherina mochon</i>	2111,2115
<i>Atherina presbyter</i> var. <i>pontica</i>	2115
<i>Atherina presbyter</i>	2115,2117-2118
<i>Atherina riqueti</i>	2115
<i>Atherina risso</i>	2115
<i>Atherina sarda</i>	2115
<i>Atherina sardinella</i>	2115
<i>Atherinomorus lacunosus</i>	2111

B

Big-scale sand smelt	2115
--------------------------------	------

C

Chucleto	2116
CLUPEIDAE	2112

H

<i>Hepsetia boyeri</i>	2115
<i>Hepsetia presbyter</i>	2118

J

Joël	2115
----------------	------

L

Lopez's sand smelt	2117
------------------------------	------

M

Mediterranean sand smelt	2116
MUGILIDAE	2112

P

Pejerrey mediterráneo	2115
Prêtre	2118

S

Sand smelt	2118
Sauclet	2116
Siauclet	2116
Silversides	2111

A

<i>athaerina, Atherina</i>	2116
--------------------------------------	------

B

<i>bonapartii, Atherina</i>	2115
<i>boyeri, Atherina</i>	2111,2115,2117-2118
<i>boyeri, Hepsetia</i>	2115
<i>breviceps, Atherina</i>	2111

C

<i>caspia, Atherina</i>	2115
-----------------------------------	------

H

<i>hepsetus, Atherina</i>	2115-2117
<i>hepsetus, Atherina (Atherina)</i>	2116
<i>hyalosoma, Atherina</i>	2115

L

<i>lacunosus, Atherinomorus</i>	2111
<i>lacustris, Atherina</i>	2115
<i>lopeziana, Atherina</i>	2117

M

<i>mochon, Atherina</i>	2111,2115
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P

<i>pontica, Atherina presbyter</i> var.	2115
<i>presbyter</i> var. <i>pontica, Atherina</i>	2115
<i>presbyter, Atherina</i>	2115,2117-2118
<i>presbyter, Atherina (Hepsetia)</i>	2118
<i>presbyter, Hepsetia</i>	2118

R

<i>riqueti, Atherina</i>	2115
<i>risso, Atherina</i>	2115

S

<i>sarda, Atherina</i>	2115
<i>sardinella, Atherina</i>	2115

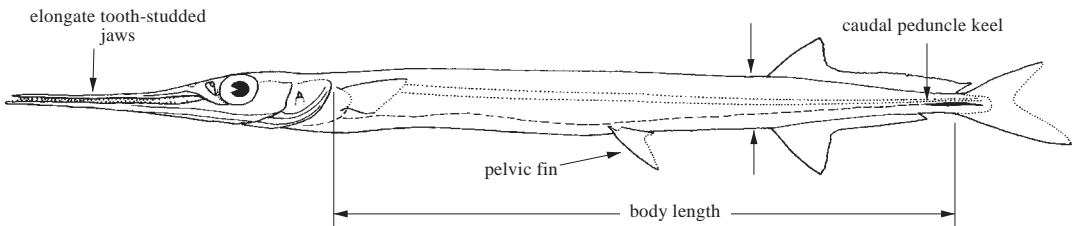
Order BELONIFORMES

BELONIDAE

Needlefishes

by B.B. Collette, National Marine Fisheries Service Systematics Laboratory,
National Museum of Natural History, Washington, DC, USA

Diagnostic characters: Small to large-sized (up to 2 m) elongate fishes with **both upper and lower jaws extended into long beaks filled with sharp teeth**; nostrils in a pit anterior to eyes. No spines in fins; dorsal, with 11 to 43 rays, and anal fins, with 12 to 39 rays, are posterior in position; pelvic fins located in abdominal position and with 6 soft rays; pectoral fins short, with 5 to 15 rays. Lateral line running ventrally from pectoral-fin origin and then posteriorly along ventral margin of body. Scales small, cycloid, easily detached. Vertebrae 52 to 97. Bones and fin rays green due to presence of biliverdin. **Colour:** these fishes live at the surface and are protectively coloured for this mode of life by being green or blue on the back and silvery white on the lower sides and belly. Usually, a dusky or dark blue stripe along sides; tip of lower jaw frequently red or orange.

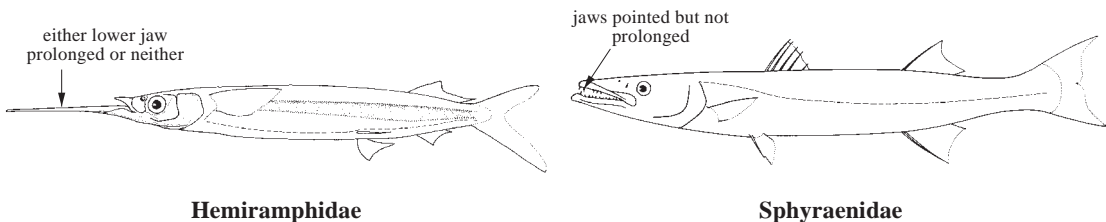


Habitat, biology, and fisheries: Most species are marine, but some occur in freshwaters. Carnivorous, feeding largely on small fishes which they catch sideways in their beaks. Needlefishes are all oviparous. There is a tendency for the right gonad to be reduced or even lost completely in some species, particularly in females. Eggs are large and covered with well-developed sticky chorionic filaments. Most needlefishes go through a "halfbeak" stage where the lower jaw elongates before the upper jaw. Needlefishes tend to leap and skitter at the surface and some people have been injured when accidentally struck by them, particularly at night when the fishes are attracted by lights. Caught by casting or trolling surface or near-surface lures. Flesh excellent in flavour and needlefishes are popular foodfishes in some parts of the world although some people have misgivings about eating them due to the green colour of the bones.

Similar families occurring in the area

Hemiramphidae (halfbeaks): only the lower jaw prolonged or none of the jaws prolonged (*Oxyporhamphus*) and lacking the needle-sharp teeth that stud the needlefishes upper and lower jaws.

Sphyraenidae (barracudas): jaws pointed but not prolonged into a beak; 2 dorsal fins, the first spiny; pelvic fins in thoracic position.



Key to the species of Belonidae occurring in the area

Out of 10 genera and 34 species in the family, 9 species and subspecies belonging to 5 genera occur in the eastern central Atlantic.

1a. Dorsal-fin rays 12 to 16; anal-fin rays 15 to 20; pectoral-fin rays 9 to 12 → **2**

1b. Dorsal-fin rays 16 to 26; anal-fin rays 19 to 28; pectoral-fin rays 11 to 15 → **3**

2a. Caudal peduncle strongly depressed (flattened dorsoventrally) and with well-developed lateral keels; least depth of caudal peduncle about half the width (Fig. 1); gill rakers present ***Platybelone argalus***

2b. Caudal peduncle not strongly depressed, no lateral keels on caudal peduncle; caudal peduncle deeper than wide; gill rakers absent ***Strongylura senegalensis***

3a. Dorsal-fin rays 16 to 20; gill rakers present, 27 to 40 on first gill arch ***Belone acus***

3b. Dorsal-fin rays 20 to 26; gill rakers absent → **4**

4a. Body strongly laterally compressed and marked with a series of vertical bars (Fig. 2); no keels on caudal peduncle; anal-fin rays 24 to 28 ***Ablennes hians***

4b. Body rounded or squarish in cross-section; no vertical bars present; a weak, darkly pigmented lateral keel on each side of caudal peduncle (Fig. 3); anal-fin rays 19 to 23 → **5**

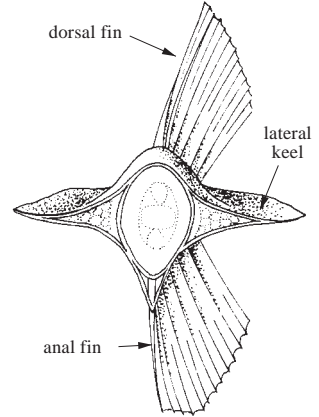


Fig. 1 cross-section of caudal peduncle

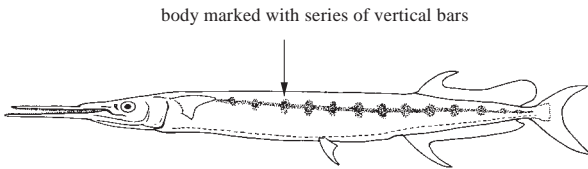


Fig. 2 *Ablennes hians*

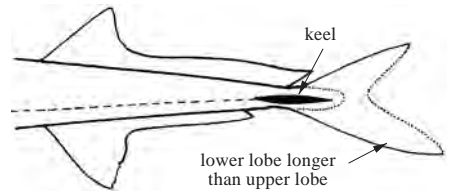









Fig. 3

5a. Dorsal- and anal-fin lobes relatively low compared to body length (10.5 to 13.3 and 9.7 to 11.7 times in body length, respectively); pectoral and pelvic fins relatively short (8.0 to 12.4 and 10.0 to 14.1 times in body length, respectively); upper and lower jaw teeth straight at all sizes; left gonad absent or greatly reduced in length ***Tylosurus acus***

5b. Dorsal- and anal-fin lobes relatively high compared to body length (5.4 to 10.6 and 5.5 to 8.0 times in body length, respectively); pectoral and pelvic fins relatively long (6.6 to 8.3 and 7.3 to 10.6 times in body length, respectively); upper and lower jaw teeth point distinctly anterior in juveniles; left gonad distinct although shorter than right ***Tylosurus crocodilus***

List of species occurring in the area

The symbol  is given when species accounts are included.

-  *Ablennes hians* (Valenciennes, 1846).
-  *Belone acus* Risso, 1827.
-  *Platybelone argalus loyii* (Günther, 1866).
Platybelone argalus annobonensis Collette and Parin, 1970.
Platybelone argalus trachura (Valenciennes, 1846).
-  *Strongylura senegalensis* (Valenciennes, 1846).
-  *Tylosurus acus rafale* Collette and Parin, 1970.
Tylosurus acus imperialis (Rafinesque, 1810).
-  *Tylosurus crocodilus crocodilus* (Péron and Lesueur, 1821).

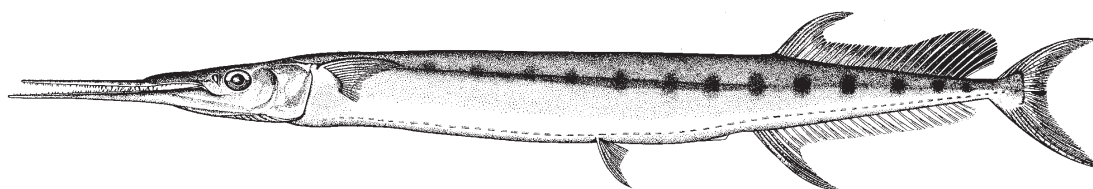
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- Collette, B.B.** 2003. Family Belonidae Bonaparte 1832 - needlefishes. *California Academy of Science Annotated Checklists of Fishes* No. 16, 23 p.
- Collette, B.B.** 2005. Belonidae: needlefishes. In W.J. Richards, ed. *Early stages of Atlantic fishes: an identification guide for the western central North Atlantic*. CRC Press, Chapter 77, pp. 909–931.
- Collette, B.B. & Parin, N.V.** 1970. Needlefishes (Belonidae) of the eastern Atlantic Ocean. *Atlantide Report*, 11: 7–60.

Ablennes hians (Valenciennes, 1846)

Frequent synonyms / misidentifications: None / None.

FAO names: En – Flat needlefish; Fr – Orphie plate; Sp – Agujón sable.



Diagnostic characters: Body elongate and greatly compressed laterally. Gill rakers absent. **Anterior parts of dorsal and anal fins with high falcate lobes**; dorsal-fin rays numerous, 23 to 26, usually 24 or 25; posterior part of dorsal fin with a prominent dark lobe; **anal-fin rays numerous, 24 to 28**, usually 26 or 27; **pectoral fins falcate**, with 13 to 15 fin rays; caudal peduncle without lateral keels, caudal fin deeply forked, lower lobe longer than upper. Females lack the right gonad and males either lack it or have it greatly reduced. Total number of vertebrae 87 to 93. **Colour:** bluish green above, silvery white below. A broad dark blue stripe along sides and **about 12 to 14 prominent dark vertical bars on body**; tip of lower jaw red. **Juveniles and adults have an elevated black lobe in the posterior part of the dorsal fin.**

Size: Maximum to at least 95 cm standard length (without caudal fin) and 77 cm body length (without beak and caudal fin). The IGFA all-tackle gamefish record is 4.8 kg for a fish caught in Mozambique in 1997.

Habitat, biology, and fisheries: A pelagic species inhabiting offshore surface waters. Carnivorous, feeding mainly on small fishes. A 27.8 cm body length female contained 660 eggs averaging 3.16 mm in diameter. Eggs covered with uniformly spaced tufts of filaments, 1 to 6 per tuft; filaments longer than egg diameter. Caught mainly by casting or trolling surface or near-surface lures; also with seines. Marketed mostly fresh, salted and smoked. Separate statistics are not collected for this species.

Distribution: Worldwide in tropical and subtropical seas. In the eastern Atlantic, known from the Cape Verde Islands and Mauritania south through the Gulf of Guinea to the Congo and Moçamedes, southern Angola.



***Belone belone acus* Risso, 1827**

Frequent synonyms / misidentifications: *Belone belone* Risso, 1827; *Belone gracilis* Lowe, 1839 / None.

FAO names: En – Garfish; Fr – Orphie; Sp – Aguja.



Diagnostic characters: Body elongate, somewhat compressed laterally. **Gill rakers present**, 27 to 40 on first gill arch. **Larger individuals usually have teeth on the vomer**. Anterior parts of dorsal and anal fin not forming prominent lobes; dorsal-fin rays 16 to 20; anal-fin rays 19 to 23; pectoral fins not falcate, with 11 to 14 rays. **Caudal peduncle without lateral keels**; caudal fin forked. Left and right gonads of both sexes about equal in length. Total number of vertebrae 75 to 84. **Colour:** brilliant blue-green on back, fins with blue-green tints; lower sides and belly silver-white.

Size: Maximum to at least 62 cm body length. The IGFA all-tackle game fish record is 1.2 kg for a fish caught in France in 2002.

Habitat, biology, and fisheries: Epipelagic, neritic. Food consists mostly of clupeids and anchovies. Spawns from February to May in Algeria. A 51.3-cm body length female contained 2 561 eggs in the left ovary, 3 406 in the right, averaging 2.60 mm in diameter. Exploited in the Black Sea and Mediterranean.

Distribution: Barely enters Fishing Area 34 at Madeira and the Canary Islands. Endemic to the northeastern Atlantic from Trondheim, Norway, and occasionally further north, south through the North Sea and Baltic Sea to the Azores, Madeira and Canary Islands, and also throughout most of the Mediterranean and Black seas. Three subspecies of *Belone belone* (Linnaeus, 1761) are recognized: *B. belone belone* Linnaeus, 1761 from Europe north of the Mediterranean Sea; *B. belone euxini* Günther, 1866 from the Black Sea and Sea of Azov; and *B. belone acus* Risso, 1827 from the Mediterranean Sea and adjacent parts of the Atlantic Ocean, Madeira, Azores and Canary Islands.

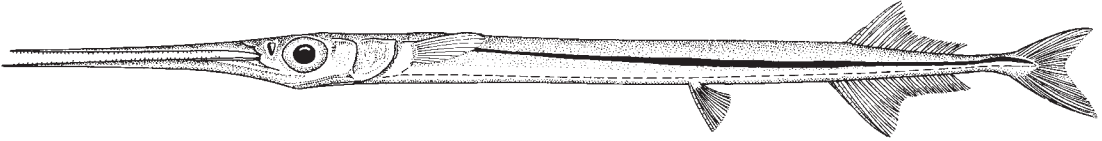


***Platybelone argalus* (Lesueur, 1821)**

Subspecies: *Platybelone argalus annobonensis* Collette and Parin, 1970; *P. a. lovii* (Günther, 1866); *P. a. trachura* (Valenciennes, 1846).

Frequent synonyms / misidentifications: None / None.

FAO names: En – Keeltail needlefish; Fr – Orphie carènée; Sp – Agujón de quilla.

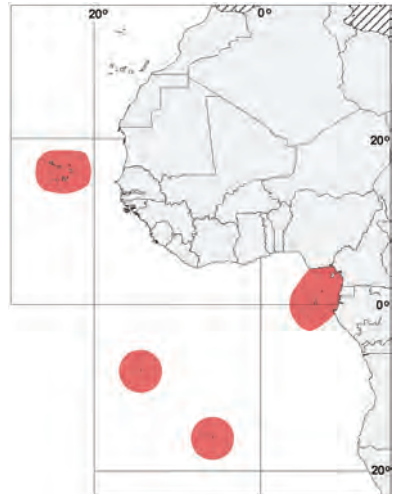


Diagnostic characters: Body elongate, rounded in cross-section. Upper and especially lower jaws greatly elongated and studded with fine teeth. **Gill rakers present.** Anterior parts of dorsal and anal fins not forming prominent lobes; **dorsal-fin rays few, 12 to 16**; anal-fin rays 17 to 19; pectoral fins not falcate, pectoral-fin rays 10 to 12, usually 11; **caudal peduncle greatly depressed**, least caudal peduncle depth about equal to half caudal peduncle width, with very large lateral keels; caudal fin forked, upper and lower lobes of about equal length. Predorsal scales (in front of dorsal fin) comparatively few and large, 107 to 138. Both right and left gonads present, right longer than left. Total vertebrae 66 to 76, number depending on subspecies. **Colour:** bluish green above, silvery below. A dark blue stripe along sides. Fins clear, without pigment.

Size: Maximum to at least 38.2 cm standard length (without caudal fin) and 25.6 cm body length (without beak and caudal fin) in the eastern central Atlantic; common to 30 cm standard length.

Habitat, biology, and fisheries: Pelagic, abundant around islands. Carnivorous, feeding mainly on small fishes. A 26.6-cm body length female from the eastern Pacific contained 944 eggs in the left ovary, 1 136 in the right, averaging 1.61 mm in diameter. Taken incidentally in surface waters, but no special fishery. Caught mainly by casting or trolling surface or near-surface lures; also with seines and trammel nets. Apparently not regularly consumed. Separate statistics are not reported for this species.

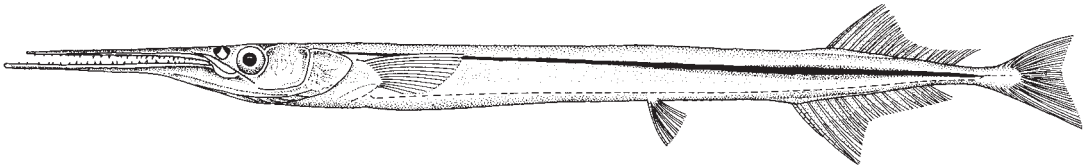
Distribution: A pelagic polytypic species (with 7 subspecies) inhabiting tropical offshore surface waters but particularly abundant about islands. In the eastern Atlantic, known only from near islands: Azores; Cape Verde (*P. argalus lovii* with 69 to 73 vertebrae, usually 71 or 72); Fernando Póo, São Tomé and Annobón in the Gulf of Guinea (*P. argalus annobonensis* with only 66 to 70 vertebrae, usually 67 or 68), and Ascension and St Helena (*P. argalus trachura* with 72 to 76 vertebrae, usually 73 or more). Other subspecies are found in other tropical and warm-temperate seas.



Strongylura senegalensis (Valenciennes, 1846)

Frequent synonyms / misidentifications: None / *Strongylura marina* (Walbaum, 1792).

FAO names: En – Senegal needlefish; Fr – Aiguillette sénégalaise; Sp – Agujón senegalés.



Diagnostic characters: Body elongate, rounded in cross-section. Gill rakers absent. Anterior parts of dorsal and anal fins not forming prominent lobes; dorsal-fin rays 13 to 16; anal-fin rays 14 to 18; pectoral fins not falcate, with 10 to 12 fin rays, usually 11. **Caudal peduncle without lateral keels, caudal fin emarginate, not deeply forked. Predorsal scales** (in front of dorsal fin) 113 to 137, average 125. Both gonads developed in both sexes, right gonad a little bit longer than left. Total number of vertebrae 62 to 67. **Colour:** bluish green above, silvery below. A conspicuous dark blue stripe along sides.

Size: Maximum to at least 64 cm standard length (without caudal fin) and 42 cm body length (without beak and caudal fin).

Habitat, biology, and fisheries: Inhabits coastal areas and brackish lagoons. Carnivorous, feeding mainly on small fishes. A 20.3 cm body length female contained 154 eggs in the left ovary, 165 eggs in the right ovary, averaging 1.70 mm in diameter. Inshore waters, but no special fishery. Caught by casting or trolling surface or near surface lures; also with purse seines. Marketed fresh. Separate statistics are not reported for this species.

Distribution: Restricted to the west African coast from Mauritania and Guinea southward through the Gulf of Guinea to Angola.



Tylosurus acus (Lacépède, 1803)

Subspecies: *Tylosurus acus imperialis* (Rafinesque, 1810); *T. a. rafale* Collette and Parin, 1970.

Frequent synonyms / misidentifications: None / *Tylosurus crocodilus* (Péron and Lesueur, 1821).

FAO names: **En** – Agujon needlefish (AFS: Atlantic Agujón); **Fr** – Aiguille voyeuse; **Sp** – Marao ojón (= Aguja imperial).



Diagnostic characters: Body elongate, rounded in cross section. Gill rakers absent. **Anterior part of dorsal fin with a low lobe, contained 10.5 to 13.3 times in body length; dorsal-fin rays numerous, 20 to 26;** anal fin lobe low, contained 9.7 to 11.7 times in body length; anal-fin rays numerous, 20 to 24, usually 21 or 22; pectoral and pelvic fins relatively short, 8.0 to 12.4 and 10.0 to 14.1 times in body length, respectively; pectoral-fin rays 13 or 14; **a small black lateral keel on caudal peduncle;** caudal fin deeply forked, lower lobe much longer than upper. Predorsal scales (in front of dorsal fin) very numerous and tiny, 267 to 430. Left gonad absent or greatly reduced in both sexes. Total number of vertebrae 93 to 96 in *T. acus imperialis*, 82 to 88 in *T. acus rafale*. **Colour:** dark bluish above, silvery white below. A dark blue stripe along sides. **Juveniles have an elevated black lobe in the posterior part of the dorsal fin which is lost with growth.**

Size: Maximum to 128.5 cm standard length (without caudal fin) and 95 cm body length (without beak and caudal fin); common to 90 cm standard length.

Habitat, biology, and fisheries: A pelagic species inhabiting more offshore waters than *T. crocodilus*, but also found in coastal waters. Carnivorous, feeding mainly on small fishes. A 48.6-cm female from the Philippine Islands contained only 116 eggs in the left ovary but 1 676 eggs in the right ovary, averaging 2.69 mm in diameter. Data on gear and utilization not available. Separate statistics are not reported for this species.

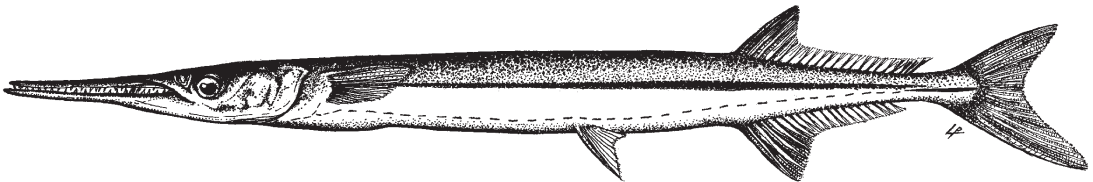
Distribution: *Tylosurus acus rafale* is confined to the Gulf of Guinea from Freetown, Sierra Leone south to Moçâmedes, Angola. May occur north to Dakar, Senegal. It is replaced by *T. acus imperialis* in the Mediterranean Sea and around the Canary and Cape Verde Islands and Morocco. A polytypic species (4 subspecies) found worldwide in tropical and warm-temperate seas except replaced in the eastern Pacific by *Tylosurus pacificus*.



***Tylosurus crocodilus crocodilus* (Péron and Lesueur, 1821)**

Frequent synonyms / misidentifications: *Tylosurus raphidoma* (Ranzani, 1842) / None.

FAO names: En – Hound needlefish (AFS: Houndfish); Fr – Aiguille crocodile; Sp – Marao lisero.



Diagnostic characters: Body elongate, rounded in cross section. Gill rakers absent. Anterior part of dorsal and anal fins with relatively high lobes, contained 5.4 to 10.6 and 5.5 to 8.0 times in body length, respectively; **dorsal-fin rays 21 to 23**, usually 22 or 23; **anal-fin rays 18 to 22**, usually 20 or 21; pectoral and pelvic fins relatively long, contained 6.6 to 8.3 and 7.3 to 10.6 times in body length, respectively; pectoral-fin rays 13 to 15, usually 14 or 15; **a small black lateral keel on caudal peduncle**; caudal fin deeply forked, lower lobe much longer than upper. Predorsal scales (in front of dorsal fin) numerous and tiny, 240 to 290. Both right and left gonads present, right longer than left. Total number of vertebrae 79 to 84. **Colour:** dark bluish green above, silvery below. A dark blue stripe along sides. **Juveniles have an elevated black lobe in the posterior part of the dorsal fin which is lost with growth.**

Size: Maximum to at least 101.3 cm standard length and 71.5 cm body length (without beak and caudal fin) in the eastern Atlantic, but unpublished reports give up to 150 cm total length; common to 90 cm standard length. The IGFA all-tackle game fish record is 4.88 kg for a fish caught in the Bahamas in 2013.

Habitat, biology, and fisheries: A pelagic species inhabiting more coastal waters than *T. acus*. Carnivorous, feeding mainly on small fishes. Large individuals may be dangerous when leaping out of the water. An 86 cm body length female contained about 7 535 eggs in the left ovary, 23 721 in the right, averaging 4.10 mm in diameter. Inshore and offshore waters. Caught by casting or trolling surface or near-surface lures; also with purse seines. Data on utilization not available. Separate statistics are not reported for this species.

Distribution: A worldwide species in tropical and warm-temperate waters. In the eastern Atlantic positively known from only a few specimens taken off Fernando Póo, Cameroon, and Liberia in the Gulf of Guinea, and at Ascension Island. Replaced in the eastern Pacific by *Tylosurus crocodilus fodiator*.

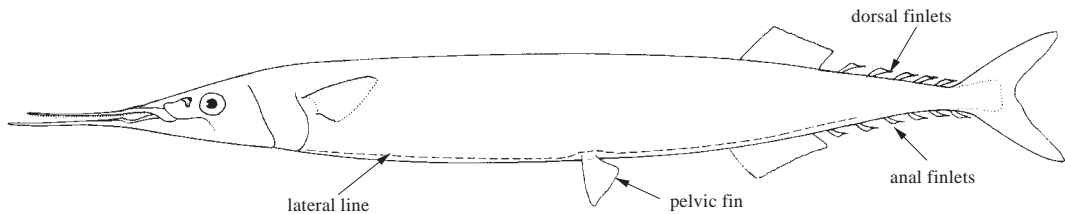


SCOMBERESOCIDAE

Sauries

by B.B. Collette, National Marine Fisheries Service Systematics Laboratory,
National Museum of Natural History, Washington, DC, USA

Diagnostic characters: Elongate, slender fishes, reaching 46 cm standard length. Body moderately compressed, **the greatest body depth about 10% (7–12%) of standard length. Jaws prolonged as slender, fragile beaks in adults, the lower jaw always longest;** all teeth minute; nostrils set in pits close before eyes. No spines in fins; **dorsal and anal fins far back on body, the anal slightly in front of dorsal; both fins followed by 4 to 7 separate finlets** (this feature, typical of the mackerels and tunas - Scombridae, combined with the slender body and posteriorly placed fins typical of the pikes – Esocidae, gave rise to the generic name *Scomberesox*); in adults, the first few finlets are often difficult to distinguish from the last rays of the main fins; pectoral fins high, above lateral midline of body at top of gill cover opening; **pelvic fins originating at about midpoint of body, the distance between pelvic and anal-fin bases being about half the distance between pelvic and pectoral-fin bases;** lower lobe of caudal fin only slightly longer than upper lobe. **No keels on caudal peduncle. Lateral line low, running along ventral profile,** but not reaching to base of caudal fin. Scales small to moderate-sized, cycloid, easily shed; scales on sides vertically oblong, the circuli in straight vertical lines; scales of back and of narrow ventral area (between lateral lines) rounded, the circuli curving with shape of scale. **Colour:** in life, olive green to brownish above, silvery below; usually a silvery band (dusky in preservative) with a narrow dark lower edge, extending along sides just below darker back.



Habitat, biology, and fisheries: Small to medium-sized, epipelagic fishes which readily come to a light at night. *Scomberesox saurus* may occur in large schools and habitually skips over the surface, much like the flyingfishes, particularly when fleeing predators. The food of both species is composed of small zooplankton organisms commonly found at or near the surface. These fishes are not of great commercial importance off the West African coast, since large schools (especially of *S. saurus*) are rather sporadic in occurrence. However, several nations fishing in this area consider at least *S. saurus* as being of potential interest.

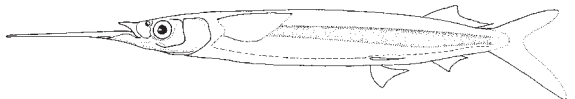
Similar families occurring in the area

Belonidae (needlefishes) and Hemiramphidae (half-beaks): superficially similar in having long, slender bodies, dorsal, pelvic, and anal fins in similar positions, and one or both jaws prolonged into a beak in adults. However, both these families lack separate finlets behind dorsal and anal fins.

Other families having separate finlets: pelvic fins are forward, about below bases of pectoral fins; jaws not beak-like; one or more keels on caudal peduncle.



Belonidae



Hemiramphidae

Key to species of Scomberesocidae occurring in the area

- 1a. Pectoral-fin rays 13 or 14 (seldom 12 or 15); gill rakers on first arch 34 to 51; both jaws of adults prolonged as slender beaks, the lower only slightly longer; all teeth villiform, in narrow bands throughout the length of both jaws; scales along sides of body 128 to 148; lateral line extending to above one of the first few anal finlets (Fig. 1) . ***Scomberesox saurus***
- 1b. Pectoral-fin rays 10 or 11; gill rakers on first arch 22 to 24 (seldom 19 or 26); both jaws of adults prolonged as slender beaks, the lower about twice as long as upper; all teeth minute, conical, in a single row along entire margin of upper jaw and on posterior margins of lower jaw (teeth present, but very sparse anteriorly); scales along sides of body 77 to 91; lateral line not extending much past bases of pelvic fins (Fig. 2) ***Scomberesox simulans***

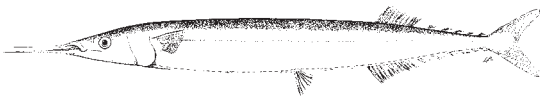


Fig. 1 *Scomberesox saurus*

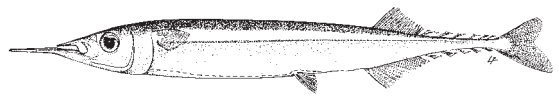



Fig. 2 *Scomberesox simulans*

List of species occurring in the area

The symbol  is given when species accounts are included.

 *Scomberesox saurus* (Walbaum, 1792).

 *Scomberesox simulans* (Hubbs and Wisner, 1980).

References

Collette, B.B. 2004. Family Scomberesocidae Rafinesque 1815 – sauries. *California Academy of Sciences Annotated Checklists of Fishes*, No. 21, 6 p.

Hardy, J.D., Jr. & Collette, B.B. 2005. Scomberesocidae: sauries. In W.J. Richards, ed. *Early states of Atlantic fishes: an identification guide for the western central North Atlantic*. CRC Press, Chapter 76, pp. 905–907.

Hubbs, C.L. & Wisner, R.L. 1980. Revision of the sauries (Pisces, Scomberesocidae) with descriptions of two new genera and one new species. *Fishery Bulletin, U.S.*, 77: 521–566.

Scomberesox saurus (Walbaum, 1792)

Frequent synonyms / misidentifications: None / None.

FAO names: En – Atlantic saury; Fr – Balaou atlantique; Sp – Paparda del Atlántico.

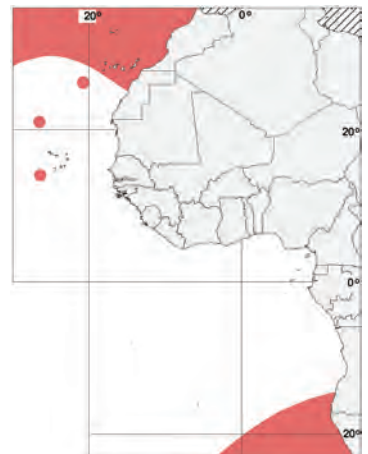


Diagnostic characters: Body elongate, **moderately compressed, the width contained about 2.0 (1.7 to 2.3) times in the depth.** Both jaws of adults prolonged as slender, fragile beaks, **the lower only slightly longer than the upper and bluntly tipped with soft tissue;** in adults of 20 cm or more, the snout length averages about 1.6 (1.5 to 1.7) times in head length but in smaller individuals (7 to 15 cm) this length is contained about 2.0 (1.8 to 2.3) times in head; teeth villiform, **in narrow bands extending to near tips on each jaw; gill rakers on first arch 34 to 51.** Total dorsal-fin rays (including the 5 to 7 finlets) 16 or 17 (seldom 15 or 18); total anal-fin rays (including the 5 to 7 finlets) 18 to 21 (seldom 17); **pectoral fin-rays 13 or 14** (seldom 12 or 15); pelvic-fin rays always 6. **Scales along sides of body 128 to 148. Lateral line extending only to above one of the first few anal finlets. Ovaries paired; swimbladder present.** Vertebrae: 39 to 43 + 24 to 28 = 64 to 70 total. **Colour:** In life, olive to dark green or light brown above in adults (bluish in young); a silvery band (brownish in preservative), often with a narrow dark lower edge, about the width of eye, extends from head to near tail just below the dark area of back; sides and belly silvery, often with a brassy-golden wash; usually a small green spot below bases of pectoral fins (not evident in preserved fish); dorsal fin (including finlets) and caudal fin greenish; other fins lightly flecked with green (the green is brownish in preservative). Coloration appears to vary slightly, possibly with age or geographic area. Young fry have dark blue backs and silvery sides.

Size: Maximum to 46 cm standard length; statements in literature of 50 to 76 cm are not supported by preserved specimens.

Habitat, biology, and fisheries: Oceanic, primarily surface-schooling fishes. Habitually skip over the surface, presumably to escape predators. Frequently enter bays and estuaries. Spawning takes place mainly in the open ocean, in warm-temperate water. One of the most abundant epipelagic planktivores inhabiting the open parts of the Atlantic Ocean, feeding mainly on siphonophores, copepods, euphausiids, and amphipods. Saury perform feeding migrations from spawning areas to cool-temperate, plankton-rich waters. Small catches made by Spain and Morocco in the northern part of the area. Of limited commercial importance but of potential commercial interest. No separate statistics.

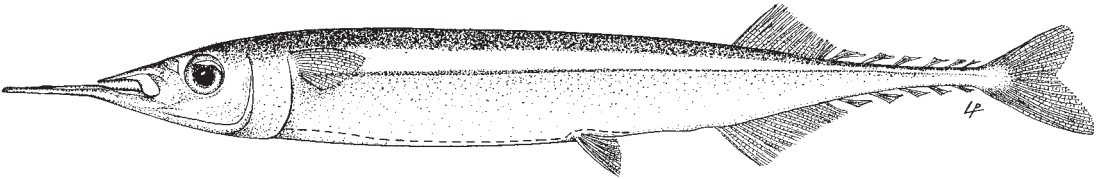
Distribution: Divided into northern and southern subspecies, based mainly on differences in number of gill rakers: *Scomberesox saurus saurus* in the North Atlantic Ocean and Mediterranean Sea; gill rakers range from 36 (seldom 34 or 35) to 41. *Scomberesox saurus scombroides* (Richardson, 1843) in all southern oceans; gill rakers range from 40 to 49 (seldom as few as 39 or as many as 50 or 51). *S. s. saurus*, occurs only in the northern portion of the area, above 30°N, with a few young individuals known to about 15°N. Outside the area, this subspecies occurs in the Mediterranean Sea and across the North Atlantic, to about 45°N, but it can range northward to Newfoundland, Iceland, the British Isles, and (rarely) along Norway and into the Barents, White and Kara seas, following the seasonal movements of temperate water masses. Neither subspecies known to penetrate the warm tropical areas.



Scomberesox simulans (Hubbs and Wisner, 1980)

Frequent synonyms / misidentifications: *Scomberesox* sp. Parin, 1968; *Nanichthys simulans* Hubbs and Wisner, 1980 / None.

FAO names: En – Dwarf saury; Fr – Balaou nain; Sp – Paparda enana.

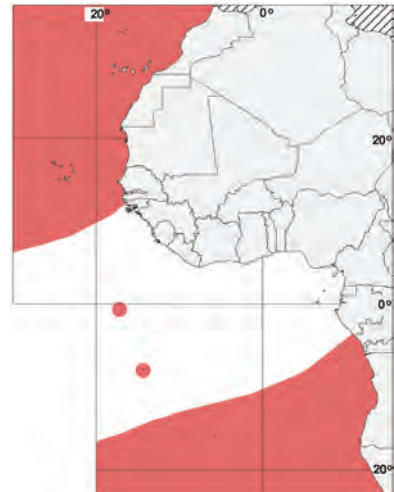


Diagnostic characters: Body strongly compressed (except in gravid females), the width contained about 3 (2.7 to 3.4) times in the depth. Both jaws of adults prolonged as slender, fragile beaks, **but upper jaw only about half as long as the lower** (measured from anterior margin of eye); all teeth minute, conical, **in a single row along entire margin of upper jaw and on posterior margins of lower jaw** (teeth present, but very sparse anteriorly); gill rakers on first arch 22 to 24 (seldom as few as 19 or as many as 25 or 26). Total dorsal-fin rays (including the 5 to 7 finlets) 14 to 16; total anal-fin rays (including 5 to 7 finlets) 19 to 20 (seldom 17 or 18); **pectoral fin-rays 10 or 11. Scales along sides of body 77 to 91. Lateral line not extending much past the base of pelvic fin. Ovary single; swimbladder absent. Colour:** greenish above, silvery below; a narrow silvery band (brownish in preservative), often with a narrow darker lower edge, extends along body just below the dark area of back from gill cover to near caudal fin; fins only lightly, if at all, flecked with green (brownish in preservative).

Size: Maximum to 12.6 cm total length, but very few individuals exceed 10 cm.

Habitat, biology, and fisheries: An oceanic, surface-schooling fish that comes readily to a light at night; little else is known of its habits; apparently gregarious, as many individuals may be taken with dipnets using night lights, and in single tows in pleuston nets. Spawning habits unknown, but presumably similar to those of *S. saurus*. Feeds on small planktonic forms; feeding migrations are unknown. Although common in the area, apparently not fished commercially at present; neither the schooling and migratory habits nor the actual abundance of this species are sufficiently well known to determine whether it may be considered a potential resource.

Distribution: Common throughout the area, except near the equator; apparently antitropical in distribution, since few specimens have been recorded between about 8°N and 8°S. Outside the area, it ranges northward to about 40°N, westward to about 45°W, (across to southern Brazil and northern Argentina) and southward to about 35°S. It also occurs, but is seldom captured, in the tropical Indian Ocean. Not known from the Mediterranean Sea or the Pacific Ocean.

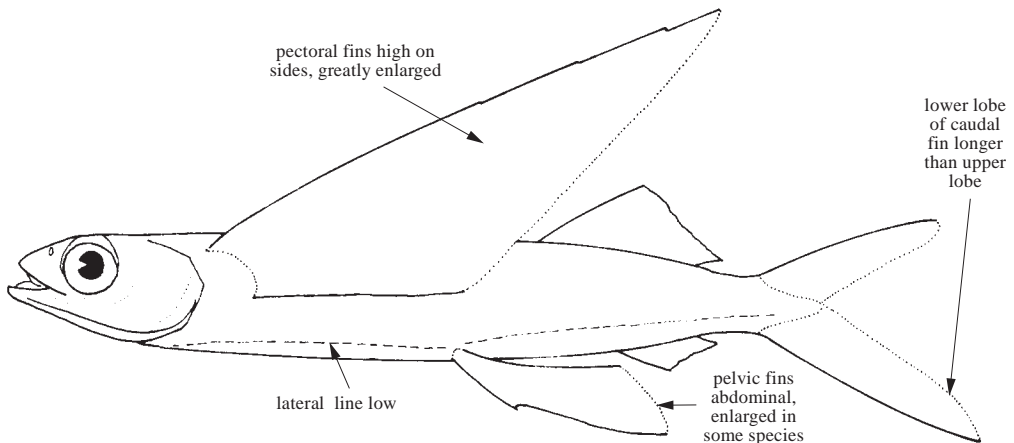


EXOCOETIDAE

Flyingfishes

by N.V. Parin (†) and I.B. Shakhovskoy, Shirshov Institute of Oceanology, Russian Academy of Sciences, Moscow, Russia

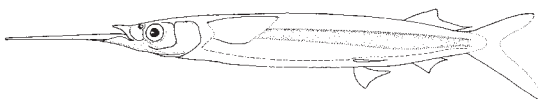
Diagnostic characters: Small to medium-sized (to 45 cm total length) with elongate, broadly cylindrical (round or elliptical in cross-section) bodies, flattened ventrally in some species. Head short; snout usually blunt (produced in *Fodiator* only), shorter than eye in all eastern Atlantic species (except *Fodiator*). Mouth small. Jaw teeth absent or very small. Gill rakers well developed. Upper pharyngeal bones of third gill arches close together, but not fused into a single plate. **No spines in fins.** 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. **Lateral line low on body.** Scales large, cycloid (smooth to touch), easily shed. Swimbladder large, extending posteriorly beyond body cavity. Young stages (to about 10 cm) quite different in appearance from adults, with pectoral fins shorter; dorsal fin often higher than in adults. Colour patterns variable, and spots and bars often developed; single or paired chin barbels conspicuous in many species. **Colour:** dark above, pale below. Dark colours usually iridescent blue or green in life, pectoral fins in some species with pale cross-band and outer margin; dorsal fin in some species with black pigment.



Habitat, biology, and fisheries: Inhabit surface waters of open ocean as well as neritic and inshore areas. Well known for their habit of leaping out of the water and gliding over long distances. Schooling, do not undertake extensive migrations. Feed on zooplankton, larger species also on small fishes. Attracted by light at night. Very abundant in most tropical seas. Usually appreciated as food and some species are highly prized; however, few commercial fisheries have developed. The only target fishery in the area is for *Hirundichthys affinis* in the Antilles, particularly in Barbados but also off northeastern Brazil.

Similar families occurring in the area

Hemiramphidae: body more elongated, except *Oxyporhamphus*; pectoral fins short to medium length, never reaching dorsal-fin origin; lower jaw much longer than upper jaw, except in adult *Oxyporhamphus*; upper pharyngeals of third gill arch usually fused, forming a single plate; swimbladder not extending posteriorly beyond body cavity.



Hemiramphus
(a typical representative)



Oxyporhamphus
(a representative without prolonged lower jaw)

Hemiramphidae

Key to the species of Exocoetidae in the area

- 1a. Pectoral fins moderately long, not reaching beyond posterior part of anal-fin base; pectoral branch of lateral line present (Fig. 1). → 2
- 1b. Pectoral fins very long, reaching beyond anal-fin base to, or almost to, caudal-fin base; pectoral branch of lateral line absent → 3

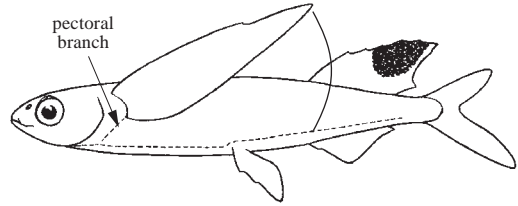


Fig. 1 Parexocoetus

- 2a. Snout long and pointed, longer than eye diameter (Fig.2); upper jaw not protrusible; juveniles not barbelled, with lower jaw greatly elongate **Fodiator acutus**
- 2b. Snout short and blunt, shorter than eye diameter; upper jaw protrusible (Fig. 3); juveniles with paired chin barbels (easily lost) and lower jaw not elongate **Parexocoetus hillianus**

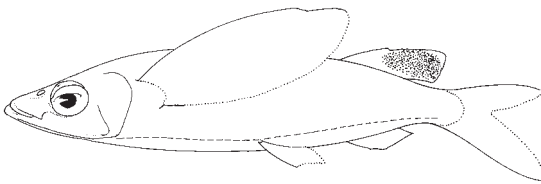


Fig. 2 Fodiator

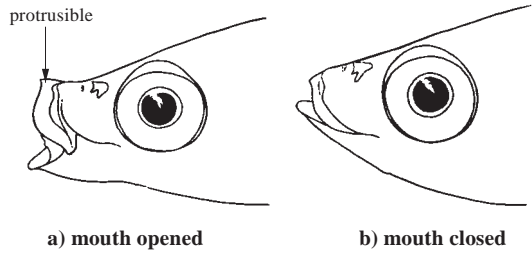


Fig. 3 Parexocoetus

- 3a. Pelvic fins short, not reaching anal-fin origin (barely reaching in juveniles), inserted nearer to pectoral-fin insertion than anal-fin origin (Fig. 4); juveniles not barbelled → 4
- 3b. Pelvic fins long, reaching well beyond anal-fin origin, inserted nearer to anal-fin origin than pectoral-fin insertion (Fig. 5); juveniles barbelled or not barbelled → 5

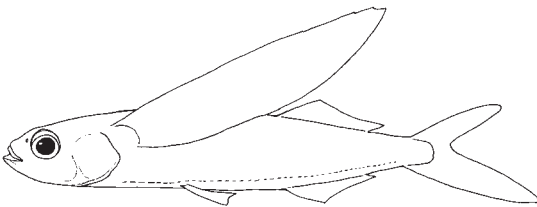


Fig. 4 Exocoetus

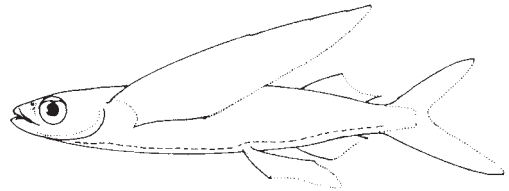


Fig. 5 Hirundichthys

- 4a. Gill rakers on first gill arch 22 to 29 (usually 25 to 27); 7 or 8 (usually 7.5) scales in transverse row between dorsal-fin origin and lateral line; juveniles hump-backed **Exocoetus obtusirostris**
- 4b. Gill rakers on the first gill arch 29 to 37 (usually 32 to 34); 6 or 6.5 (usually 6.5) scales in transverse row between dorsal-fin origin and lateral line; juveniles elongate . **Exocoetus volitans**

- 5a. Origin of anal fin 3 rays or more behind origin of dorsal fin (Fig. 6); dorsal fin 2 to 5 rays more than anal fin; juveniles barbelled or not barbelled → 6
- 5b. Origin of anal fin slightly before, under, or rarely not more than 2 rays behind origin of dorsal fin (Fig. 7); dorsal fin usually with less or equal number of rays than anal fin; juveniles not barbelled → 15

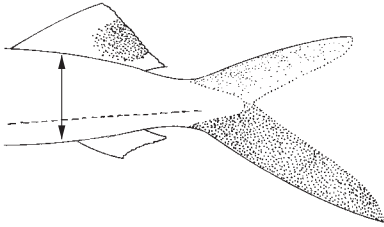


Fig. 6 *Prognichthys, Cheilopogon*

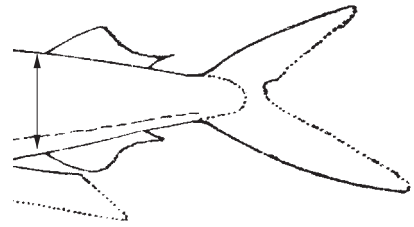


Fig. 7 *Hirundichthys*

- 6a. First 2 pectoral-fin rays unbranched (Fig. 8); juveniles not barbelled → 7
- 6b. Only the first pectoral-fin ray unbranched (Fig. 9); juveniles barbelled → 8

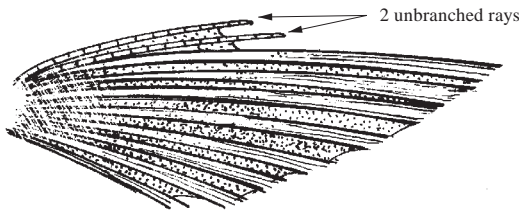


Fig. 8 *Prognichthys*

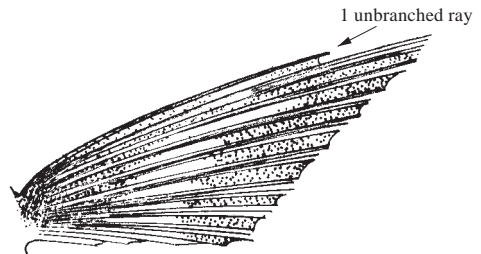
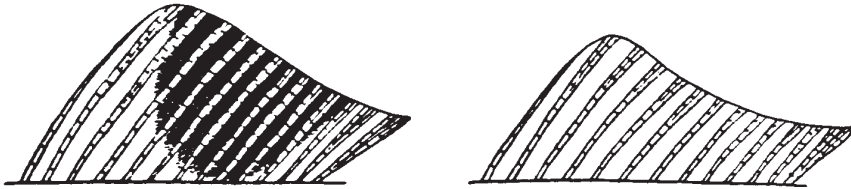


Fig. 9 *Cheilopogon*

- 7a. Pectoral fins chiefly pale with central part greyish; eye diameter 1.2 to 1.5 times in postorbital part of head; anal-fin rays 9 to 11 (usually 10); juveniles with pectoral fins pale with 2 large black blotches, 1 at base and the other in outer portion ***Prognichthys glaphyrae***
- 7b. Pectoral fins chiefly brownish with pale distal tip and lowermost portion; eye diameter 1.4 to 1.8 times in postorbital part of head; anal-fin rays 8 to 10 (usually 9); juveniles with pectoral fins almost uniformly pigmented ***Prognichthys gibbifrons***
- 8a. Vertebrae 49 to 52; least caudal peduncle depth 17.5 to 18.5 times in standard length; predorsal scales 39 to 47; head length 4.5 to 5.0 times in standard length; juveniles up to 120 to 140 mm standard length with semicircular fringed chin barbel ***Cheilopogon pinnatibarbatus***
- 8b. Vertebrae 42 to 47 (46 to 50 in *C. heterurus*); least caudal peduncle depth 12.5 to 16.5 times in standard length (15 to 18 *C. heterurus*); predorsal scales 24 to 38 (except for *C. milleri* with 36 to 45 and *C. cyanopterus* with 33 to 41); head length 3.8 to 4.4 times in standard length (except for *C. melanurus* with up to 4.6 times and *C. heterurus* with up to 4.9 times in standard length); juveniles with paired chin barbels → 9

- 9a. Dorsal fin moderately high (longest ray usually less than 10.0 times in standard length), bearing a prominent black spot (Fig. 10a) (absent in *C. milleri*); palatine teeth present; jaw teeth noticeable (conspicuous to the touch) → 10
- 9b. Dorsal fin moderately low (longest ray usually more than 10.0 times in standard length), without black spot (Fig. 10b); palatine teeth absent; jaw teeth minute (not conspicuous to the touch) → 13

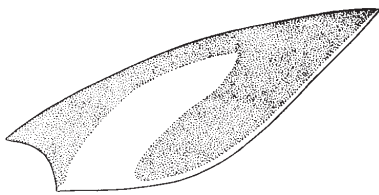


a) *Ch. cyanopterus*; *Ch. exsiliens*; *Ch. nigricans*

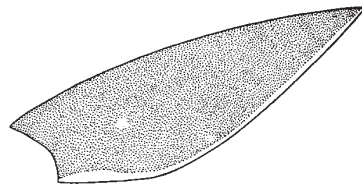
b) *Ch. furcatus*; *Ch. heterurus*; *Ch. melanurus*; *Ch. milleri*

Fig. 10 dorsal fin

- 10a. Predorsal scales 24 to 30; pectoral fins black with more or less definite pale cross-band (Fig. 11a) → 11
- 10b. Predorsal scales 33 to 45; pectoral fins uniformly bluish black except for outer margin and lowermost rays (Fig. 11b) (in adolescent *C. milleri* up to 150 mm standard length with definite pale cross-band) → 12



a) *Ch. exsiliens*; *Ch. nigricans*




b) *Ch. cyanopterus*; *Ch. milleri*

Fig. 11 pectoral fin

- 11a. Upper lobe of caudal fin as heavily pigmented as lower lobe; pelvic-fin length usually more than 3.4 times in standard length; juveniles with shorter (about 10.0 in standard length) chin barbels bearing a minute inner lobe ***Cheilopogon nigricans***
- 11b. Upper lobe of caudal fin much less pigmented than lower lobe; pelvic-fin length usually less than 3.4 times in standard length; juveniles with longer (more than 3.0 times in standard length) chin barbels bearing a prominent inner lobe ***Cheilopogon exsiliens***
- 12a. Dorsal fin in specimens more than 180 mm standard length without black spot; juveniles with short (about 10.0 times in standard length) chin barbels ***Cheilopogon milleri***
- 12b. Dorsal fin with a prominent black spot; juveniles with very long (0.8 to 2.0 times in standard length) chin barbels ***Cheilopogon cyanopterus***
- 13a. Pectoral fin usually blackish, with definite pale crossband and broad outer margin; juveniles with moderately long barbels, their length usually less than 7 times in standard length ***Cheilopogon furcatus***
- 13b. Pectoral fins greyish, with indefinite pale triangular cross-band and narrow outer margin; juveniles with short barbels, their length more than 7 times in standard length → 14

- 14a.** Head length usually less than 4.4 times in standard length; predorsal scales 25 to 33, usually 27 to 30; vertebrae 45 to 47, usually 46 *Cheilopogon melanurus*
- 14b.** Head length usually more than 4.4 times in standard length; predorsal scales 29 to 38, usually 30 to 35; vertebrae 46 to 50, usually 48 *Cheilopogon heterurus*
- 15a.** First 2 pectoral-fin rays unbranched (as in Fig. 8a); pectoral fin uniformly black without pale cross-band; head length 4.5 to 5.0 times in standard length; pectoral-fin length 1.25 to 1.35 in standard length → **16**
- 15b.** Only the first pectoral-fin ray unbranched (as in Fig. 8b); pectoral fins dark grey, with pale triangular cross-band; head length 3.9 to 4.6 times in standard length; pectoral-fin length 1.35 to 1.6 times in standard length → **18**
- 16a.** Pelvic fins with prominent black spot; scales in oblique transverse row 6.5 to 8.5, usually 7 to 7.5; juveniles with banded body and, usually, mottled pectoral and pelvic fins *Hirundichthys volador*
- 16b.** Pelvic fins without black spot; scales in oblique transverse row 6 to 7.5, usually 6.5; juveniles with almost uniformly coloured body and dark pectoral and pelvic fins → **17**
- 17a.** Branched pectoral-fin rays 14 to 17, usually 15 *Hirundichthys rondeletii*
- 17b.** Branched pectoral-fin rays 15 to 18, usually 16 or 17 *Hirundichthys rufipinnis*
- 18a.** Palatine teeth present; pectoral fins with broad pale outer margin. *Hirundichthys speculiger*
- 18b.** No palatine teeth; pectoral fins with narrow pale outer margin *Hirundichthys affinis*

List of species occurring in the area

The symbol  is given when species accounts are included.

-  *Cheilopogon cyanopterus* (Valenciennes, 1847).
-  *Cheilopogon exsiliens* (Linnaeus, 1771).
-  *Cheilopogon furcatus* (Mitchill, 1815).
-  *Cheilopogon heterurus* (Rafinesque, 1810).
-  *Cheilopogon melanurus* (Valenciennes, 1847).
-  *Cheilopogon milleri* (Gibbs and Staiger, 1970).
-  *Cheilopogon nigricans* (Bennett, 1840).
-  *Cheilopogon pinnatibarbatus* (Bennett, 1831).
-  *Exocoetus obtusirostris* Günther, 1866.
-  *Exocoetus volitans* Linnaeus, 1758.
-  *Fodiator acutus* (Valenciennes, 1847).
-  *Hirundichthys affinis* (Günther, 1866).
-  *Hirundichthys rondeletii* (Valenciennes, 1847).
-  *Hirundichthys rufipinnis* Valenciennes, 1847).
-  *Hirundichthys speculiger* (Valenciennes, 1847).
-  *Hirundichthys volador* (Jordan, 1884).
-  *Parexocoetus hillianus* (Gosse, 1851).
-  *Prognichthys gibbifrons* (Valenciennes, 1847).
-  *Prognichthys glaphyrae* Parin, 1999.

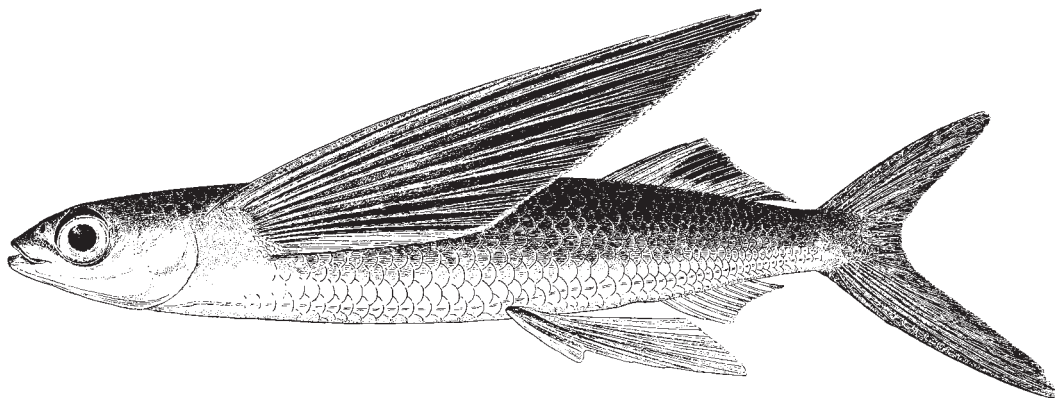
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- Staiger, J.C.** 1965. Atlantic flyingfishes of the genus *Cypselurus*, with descriptions of the juveniles. *Bulletin of Marine Science*, 15(3): 672–725.

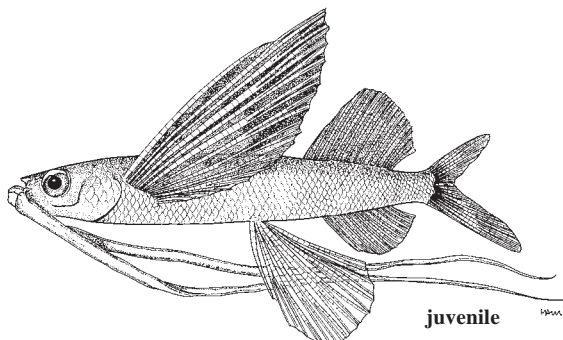
***Cheilopogon cyanopterus* (Valenciennes, 1847)**

Frequent synonyms / misidentifications: *Cypselurus cyanopterus* (Valenciennes, 1847) / None.

FAO names: En – Margined flyingfish; Fr – Exocet codène; Sp – Volador bordiblanco.



Diagnostic characters: Body elongate, **nearly rectangular in cross-section**, almost flat ventrally. Depth 5.3 to 6.0 times in standard length. Vertebrae 43 to 46. **Predorsal scales 33 to 41. Scales in transverse row 7.5 to 9.** Head 4.2 to 4.4 times in standard length. Eye 3.3 to 3.6 times in head length. Jaws subequal; jaw teeth conspicuous, mostly conical and slightly curved. **Palatine teeth present.** Gill rakers on first arch 21 to 28. **Dorsal fin** rather high, **with 12 to 14 rays. Anal fin with 9 to 11 rays, originating under fifth to seventh dorsal-fin ray. Pectoral fins** 1.4 to 1.5 times in standard length, with 13 to 15 rays, **first ray unbranched. Pelvic fins 3.3 to 3.8 times in standard length**, inserted a little nearer to posterior margin of opercle than origin of caudal-fin base. **Juveniles with enlarged dorsal fin** (its height 3.9 to 5.1 times in standard length at 30 to 150 mm standard length) and **very long paired chin barbels** exceeding standard length at 20 to 80 mm standard length (barbels lost at 190 to 200 mm standard length). **Colour:** body dark above, pale below. Dorsal fin greyish with a large black blotch in central part; anal fin transparent; caudal fin dark-grey to almost black; pectoral fins bluish black except outer-margin and lowermost rays; pelvic fins unpigmented. Juveniles with black dorsal fin and other fins strongly but partially pigmented; stems of barbels light, their lateral folds black.



Size: Maximum 33 cm standard length (about 41 cm total length).

Habitat, biology, and fisheries: Predominantly neritic species. Feeds on zooplankton and small fishes. Mature at about 27 cm standard length. Eggs demersal. Not important to fisheries.

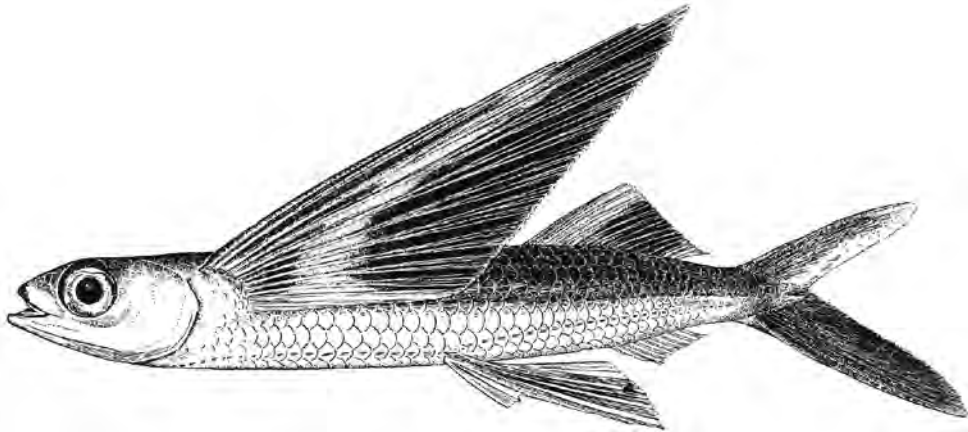
Distribution: Tropical Atlantic and Indo-West Pacific. In the eastern Atlantic known from off Western Sahara to Gabon, as well as in the equatorial area.



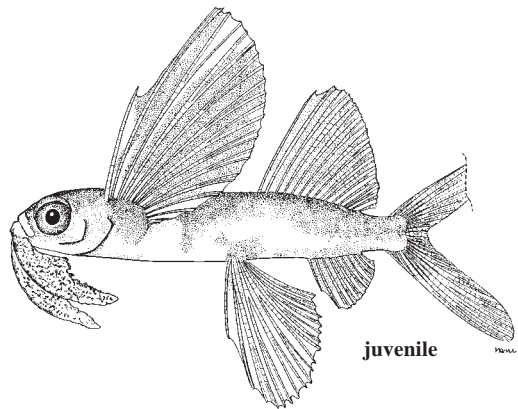
***Cheilopogon exsiliens* (Linnaeus, 1771)**

Frequent synonyms / misidentifications: *Cypselurus exsiliens* (Linnaeus, 1771) / None.

FAO names: En – Bandwing flyingfish; Fr – Exocet raye; Sp – Volador bandiblanco.



Diagnostic characters: Body elongate, nearly rectangular in cross-section, almost flat ventrally. Depth 5.6 to 6.6 times in standard length. Vertebrae 43 to 45. **Predorsal scales 24 to 29. Scales in transverse row 6 to 7.5.** Head 3.8 to 4.2 times in standard length. Eye 3.1 to 3.5 times in head length. Jaws subequal. Jaw teeth conspicuous, unicuspid. **Palatine teeth present.** Gill rakers on first arch 23 to 28. **Dorsal fin rather high with 13 to 15 rays. Anal fin with 9 to 11 rays, originating under sixth to ninth dorsal-fin ray. Pectoral fin 1.3 to 1.5 in standard length, with 14 or 15 rays, first ray unbranched. Pelvic fins 2.8 to 3.6 times in standard length, inserted nearer to posterior margin of opercle than origin of caudal-fin base. Juveniles with enlarged dorsal fin (its height 2.9 to 4.5 times in standard length at 30 to 100 mm standard length), and with paired flap-like chin barbels, their length 2.9 to 4.5 times in standard length at 30 to 100 mm standard length (barbels lost at 105 to 115 mm standard length).** **Colour:** body dark above, pale below. Dorsal fin greyish, with a large black blotch in central part; anal fin transparent; caudal fin with lower lobe almost entirely black and upper lobe almost entirely unpigmented, pectoral fins bluish black with pale oblique band crossing the fin; pelvic fins greyish, often with remains of black pigment in distal half. Juveniles with faint transverse bars on body; dorsal and paired fins partially pigmented; caudal fin clean, barbels grey with dark margins.



Size: Maximum 24 cm standard length (about 30 cm total length).

Habitat, biology, and fisheries: Oceanic species. Feeds on zooplankton. Eggs pelagic. No importance to fisheries.

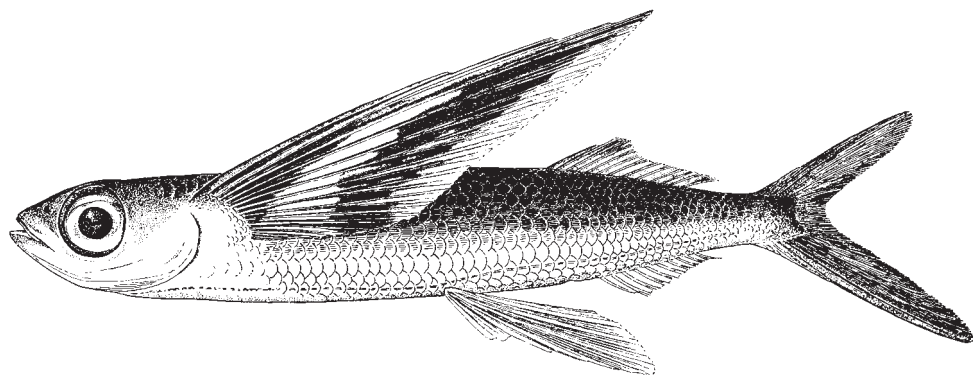
Distribution: Predominantly western Atlantic species, rare in the area. Eastern boundary of the known range goes from 20°N, 18°W to the equator at 36°W and 20°S on the prime meridian.



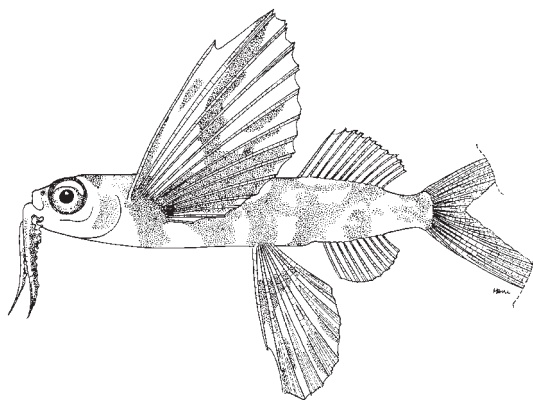
***Cheilopogon furcatus* (Mitchill, 1815)**

Frequent synonyms / misidentifications: *Cypselurus furcatus* (Mitchill, 1815) / None.

FAO names: En – Spotfin flyingfish; Fr – Exocet tacheté; Sp – Volador manchado.



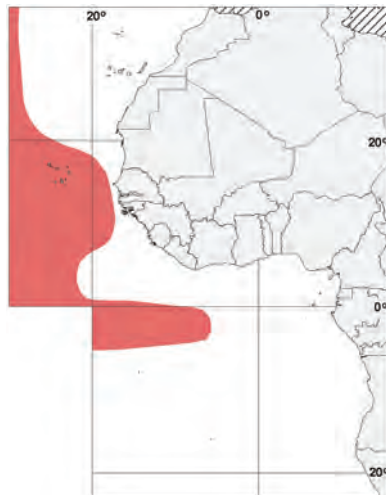
Diagnostic characters: Body elongate, nearly rectangular in cross-section, almost flat ventrally. Depth 5.2 to 6.5 in standard length. Vertebrae 43 to 46. **Predorsal scales** 26 to 33, usually 27 to 30. **Scales in transverse row 7 to 9.** Head 4.0 to 4.7 times in standard length. Eye 2.9 to 3.4 times in head length. Lower jaw slightly projecting beyond the upper with mouth closed. Jaw teeth diminutive, mostly conical. **Palatine teeth absent.** Gill rakers on first arch 18 to 25. **Dorsal fin low, with 12 to 14 rays. Anal fin with 8 to 11 rays, originating under fifth to seventh dorsal-fin ray. Pectoral fins 1.3 to 1.5 in standard length, with 14 to 17 rays, first ray unbranched. Pelvic fins 2.7 to 3.3 times in standard length,** inserted nearer to posterior margin of opercle than origin of caudal-fin base. **Juveniles with paired chin barbels** consisting of firm pointed stem and skin fold along the outer margin, barbel length 2.7 to 10.0 times in standard length at 50 to 150 mm standard length, barbels disappear at 112 to 175 mm standard length). **Colour:** body dark above, pale below. Dorsal and caudal fins greyish; anal fin transparent; pectoral fins almost black to grey (deep blue in life) with unpigmented oblique cross-band reaching or nearly reaching upper margin of the fin and very broad unpigmented margin along rear edge of the fin. Juveniles 50 to 100 mm standard length with 6 transverse vertical bars on body; dorsal and anal fins with black spots; pectoral fins with dark lower part and 2 oblique dark bands; pelvic fins also with dark spots and bands.



Size: Maximum to 27 cm standard length (about 33 cm total length).

Habitat, biology, and fisheries: True oceanic species not connected with inshore waters during any period of life. Feeds on zooplankton. Matures at 19 cm standard length. Eggs demersal, laid on drifting algae or other floating objects. Of no importance to fisheries. Parin & Belyanina (1998) recognized 3 subspecies with the nominal subspecies occurring in the Atlantic.

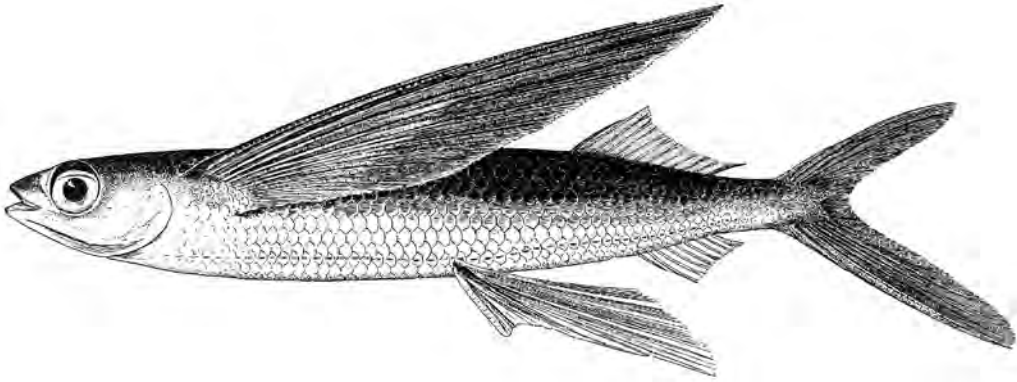
Distribution: Distributed in the tropical Atlantic but rare in the eastern Atlantic (recorded mostly westwards of 20°W and along the equator).



***Cheilopogon heterurus* (Rafinesque, 1810)**

Frequent synonyms / misidentifications: *Cypselurus heterurus* (Rafinesque, 1810) / None.

FAO names: **En** – Mediterranean flyingfish (AFS: Blotchwing flyingfish); **Fr** – Exocet méditerranéen; **Sp** – Volador mediterráneo.



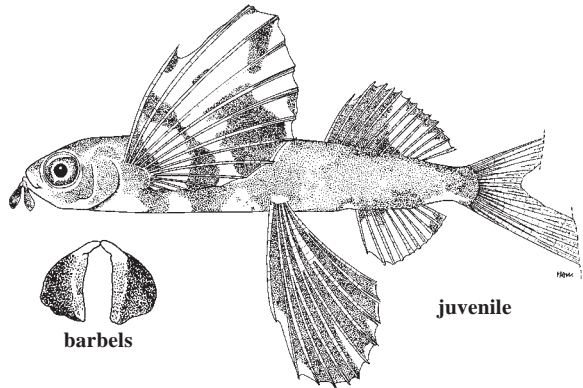
Diagnostic characters: **Body** elongate, nearly rectangular in cross-section, almost flat ventrally. Depth 5.3 to 6.6 times in standard length. Vertebrae 46 to 50, usually 48. **Predorsal scales 29 to 38**, usually 30 to 35. **Scales in transverse row 7 to 9**. Head 4.3 to 4.9 times in standard length. Eye 3.1 to 3.8 times in head length. Lower jaw slightly projecting beyond the upper with mouth closed. Jaw teeth diminutive, mostly conical. **Palatine teeth absent**. Gill rakers on first arch 19 to 26. **Dorsal fin low, with 12 to 15 rays. Anal fin with 8 to 10 rays, originating under fifth to seventh dorsal-fin ray. Pectoral fins 1.3 to 1.5 times in standard length, with 16 to 18 rays, first ray unbranched.**

Pelvic fins 2.7 to 3.3 times in standard length, inserted nearer to posterior margin of opercle than origin of caudal-fin base. **Juveniles with paired chin barbels** consisting of firm pointed stem and skin fold along the outer margin, barbel length more than 8, usually 10 to 25 times in standard length (barbels lost at about 80 to 90 mm standard length). **Colour:** body dark above, pale below. Dorsal and caudal fins greyish; anal fin transparent; pectoral fins light to dark greyish, with indefinite pale triangular cross-band and narrow outer margin, pelvic fins unpigmented. Juveniles less than 100 to 150 mm standard length with three transverse vertical bands on anterior part of body; dorsal and anal fins with dark markings; pectoral fins pale with dark blotches and curved bands; pelvic fins also with dark blotches and bands.

Size: Maximum to 35 cm standard length (about 45 cm total length).

Habitat, biology, and fisheries: Neritic species, rarely found offshore. Feeds on zooplankton. Mature at 280 to 300 mm standard length. Spawns nearshore. Eggs demersal. Not known to be a commercial fish.

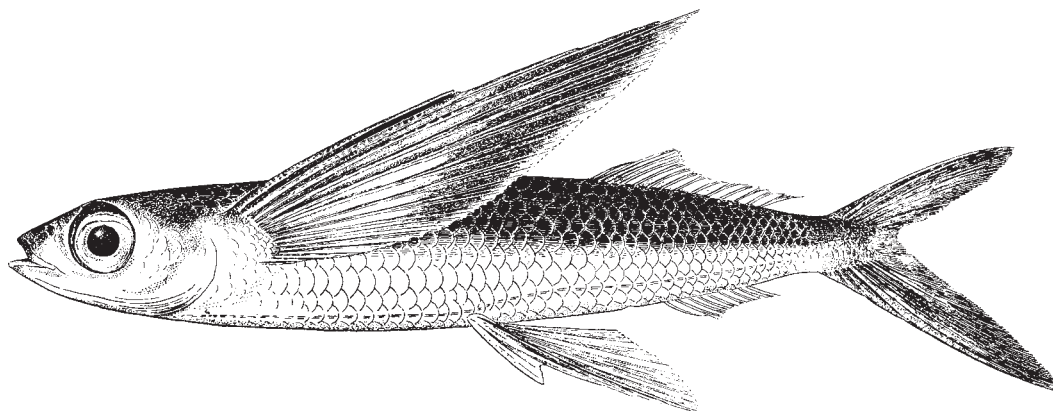
Distribution: Subtropical northern Atlantic. In the area known from off northwestern Africa southwards to Mauritania.



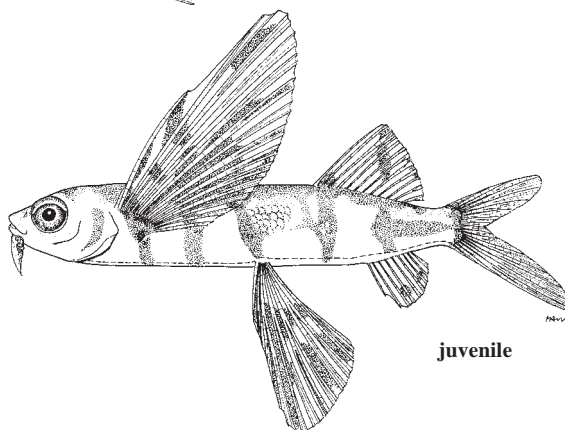
***Cheilopogon melanurus* (Valenciennes, 1847)**

Frequent synonyms / misidentifications: *Cypselurus melanurus* (Valenciennes, 1847); *C. lutkeni* (Jordan and Evermann, 1896) / *Cheilopogon heterurus* (Rafinesque, 1810).

FAO names: En – Atlantic flyingfish; Fr – Exocet atlantique; Sp – Volador atlantico.



Diagnostic characters: Body elongate, nearly rectangular in cross-section, almost flat ventrally. Depth 4.9 to 6.2 times in standard length. Vertebrae 45 to 47, usually 46. **Predorsal scales 25 to 33**, usually 27 to 30. **Scales in transverse row 6 to 8**. Head 3.9 to 4.6 times in standard length. Eye 2.8 to 3.6 times in head length. Lower jaw slightly projecting beyond the upper with mouth closed. Jaw teeth diminutive, mostly conical. **Palatine teeth absent**. Gill rakers on first arch 17 to 24. **Dorsal fin low, with 11 to 14 rays. Anal fin with 7 to 11 rays, originating under fifth to seventh dorsal-fin ray. Pectoral fins 1.4 to 1.6 times in standard length, with 14 to 18 rays, first rays unbranched. Pelvic fins 2.5 to 3.3 in standard length, inserted nearer to posterior margin of opercle than origin of caudal-fin base. Juveniles with paired chin barbels** consisting of firm pointed stem and skin fold along the outer margin; barbel length more than 7, usually 8 to 20 times in standard length (barbels lost at 80 to 100 mm standard length). **Colour:** body dark above, pale below. Dorsal and caudal fins greyish; anal fin transparent; pectoral fins greyish, with indefinite pale triangular cross-band and narrow outer margin; pelvic fins unpigmented. Juveniles less than 100 to 120 mm standard length with six transverse vertical bands on body; dorsal and anal fins with dark markings; pectoral fins pale, with dark blotches and curved bands; pelvic fins also with dark blotches and bands.



juvenile



Size: Maximum to 26.5 cm standard length (about 33 cm total length).

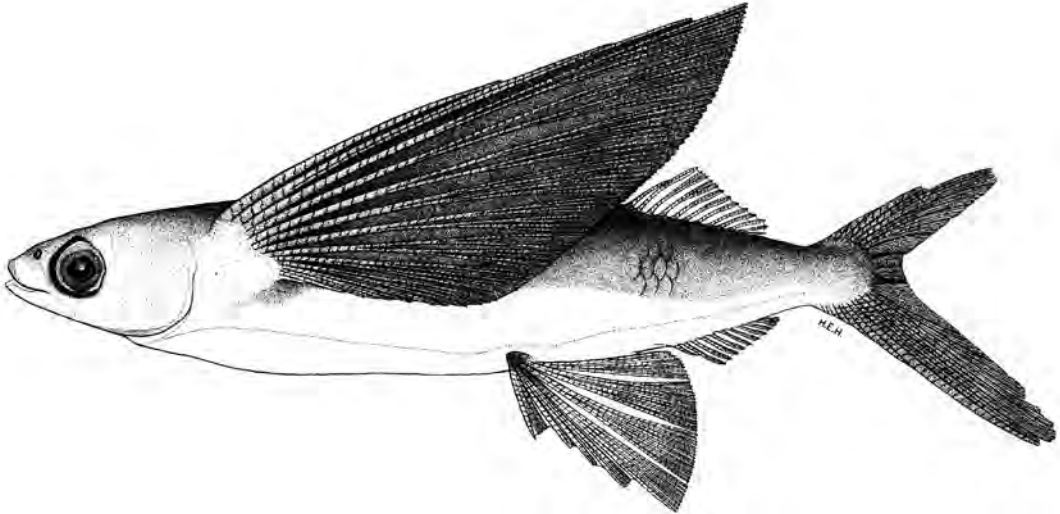
Habitat, biology, and fisheries: Neritic species. Feeds on zooplankton. Eggs demersal. No importance to fisheries.

Distribution: Tropical Atlantic Ocean. In the eastern Atlantic along the African coast from Senegal to Angola.

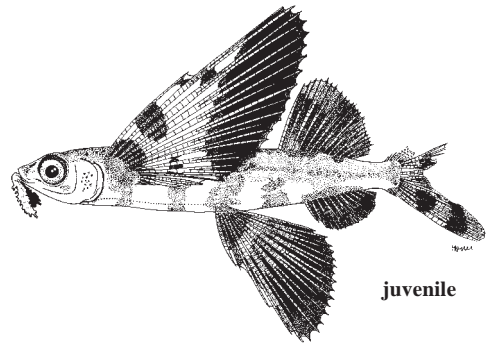
***Cheilopogon milleri* (Gibbs and Staiger, 1970)**

Frequent synonyms / misidentifications: *Cypselurus milleri* (Gibbs and Staiger, 1970) / None.

FAO names: En – Guinean flyingfish; Fr – Exocet de Guinée; Sp – Volador de Guinea.



Diagnostic characters: Body elongate, nearly rectangular in cross-section, almost flat ventrally. Depth 4.7 to 5.7 times in standard length. Vertebrae 45 to 46. **Predorsal scales 36 to 45. Scales in transverse row 7 to 9.** Head 4.1 to 4.4 times in standard length. Eye 3.3 to 3.6 times in head. Jaws subequal. Jaw teeth conspicuous, mostly conical and slightly curved. **Palatine teeth usually present.** Gill rakers on first arch 16 to 24. **Dorsal fin rather high, with 12 or 13 rays. Anal fin with 9 to 11 rays, originating under fourth to seventh dorsal-fin ray. Pectoral fins 1.3 to 1.5 times in standard length, with 14 to 16 rays, first ray unbranched. Pelvic fins 3.2 to 3.8 times in standard length,** inserted a little nearer to posterior margin of opercle than origin of caudal-fin base. **Juveniles with enlarged dorsal fin** (its height 4.5 to 5.0 in standard length at 30 to 170 mm standard length) and **short paired chin barbels**, their length 8.6 to 12.3 times in standard length at 20 to 70 mm standard length (barbels lost at about 100 mm standard length). **Colour:** body dark above, pale below. Dorsal fin greyish without large black blotch in central part; anal fin transparent; caudal fin dark grey; pectoral fins bluish black except lowermost rays; pelvic fins unpigmented. Juveniles with faint transverse bars on body; all fins strongly but partially pigmented (in larger juveniles standard length about 150 mm pectorals with pale oblique band crossing the fin); stems of barbels light, their lateral folds black.



juvenile



Size: Maximum 28 cm standard length (about 35 cm total length).

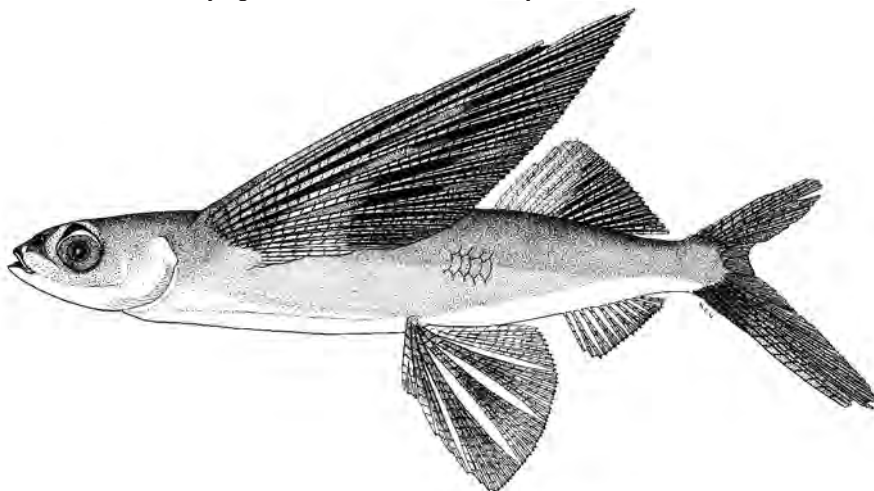
Habitat, biology, and fisheries: Neritic species. Feeds on zooplankton and small fishes. Mature at about 21 cm standard length. Eggs demersal. Not important to fisheries.

Distribution: Eastern tropical Atlantic between 11°N and 17°S.

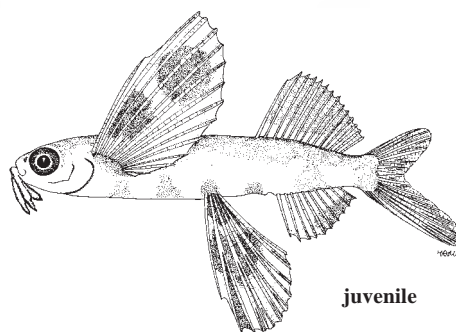
***Cheilopogon nigricans* (Bennett, 1840)**

Frequent synonyms / misidentifications: *Cypselurus nigricans* (Bennett, 1840) / *Cypselurus exsiliens*.

FAO names: En – Blacksail flyingfish; Fr – Exocet africain; Sp – Volador africano.



Diagnostic characters: Body elongate, nearly rectangular in cross-section, almost flat ventrally. Depth 5.2 to 6.8 times in standard length. Vertebrae 42 to 44. **Predorsal scales 24 to 30. Scales in transverse row 5.5 to 7.** Head 3.9 to 4.4 times in standard length. Eye 3.1 to 3.5 times in head. Jaws subequal. Jaw teeth conspicuous, unicuspid. **Palatine teeth present.** Gill rakers on first arch 21 to 27. **Dorsal fin rather high with 13 to 15 rays. Anal fin with 9 to 11 rays, originating under sixth to eighth dorsal-fin ray. Pectoral fin 1.3 to 1.5 times in standard length, with 14 to 15 rays, first ray unbranched. Pelvic fins 3.3 to 4.1 times in standard length,** inserted nearer to posterior margin of opercle than origin of caudal-fin base. **Juveniles** with enlarged dorsal fin (its height 4.1 to 4.9 times in standard length at 20 to 80 mm standard length), and **with paired flap-like chin barbels,** their length 7.5 to 14.9 in standard length at 20 to 80 mm standard length (barbels lost at about 100 mm standard length). **Colour:** body dark above, pale below. Dorsal fin greyish, with a large black blotch in central part; anal fin transparent; both caudal fin lobes uniformly pigmented, pectoral fins bluish black with pale oblique band crossing the fin (the band becomes progressively more pigmented with increasing size); pelvic fins greyish, in smaller adults often with remains of black pigment in distal half. Juveniles with faint transverse bars on body; dorsal and paired fins partially pigmented; caudal fin clean, barbels grey with darker margins.



juvenile



Size: Maximum 24 cm standard length (about 30 cm total length).

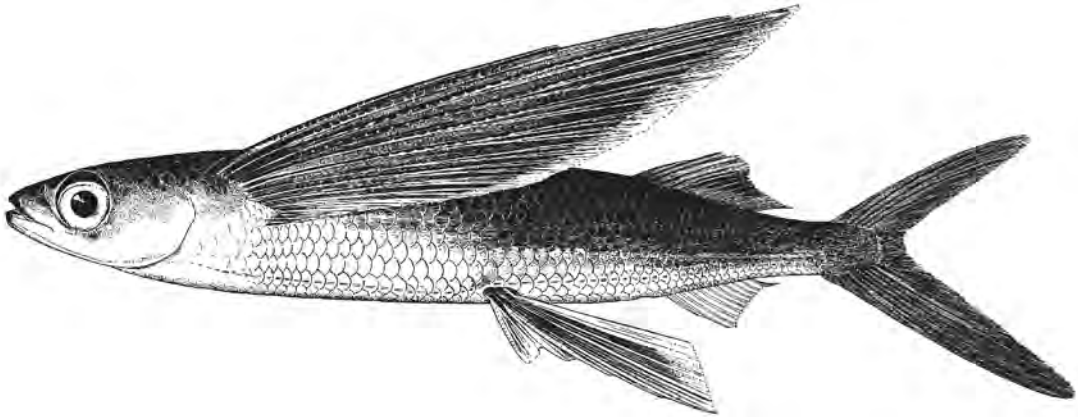
Habitat, biology, and fisheries: Nerito-oceanic species. Feeds on zooplankton. Eggs pelagic. No importance in fisheries.

Distribution: In the eastern tropical Atlantic between 21°N and Baía dos Tigres, Angola; westernmost record at 4°45'N, 29° 30' W.

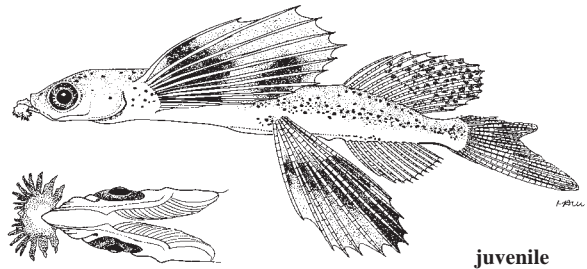
***Cheilopogon pinnatibarbatus* (Bennett, 1831)**

Frequent synonyms / misidentifications: *Cypselurus lineatus* (Valenciennes, 1847); *C. pinnatibarbatus* (Bennett, 1831) / None.

FAO names: En – Bennett's flyingfish; Fr – Exocet de Bennett; Sp – Volador de Bennett.



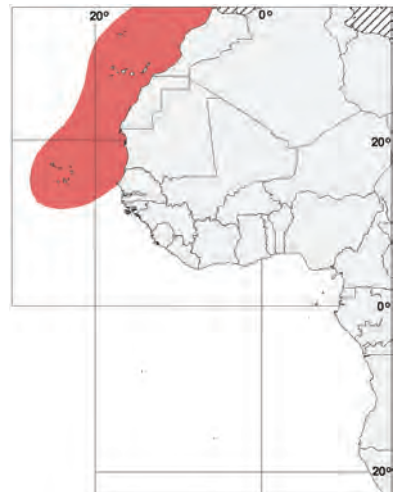
Diagnostic characters: Body elongate, nearly rectangular in cross-section, almost flat ventrally. Depth 5.7 to 7.6 times in standard length. Vertebrae 49 to 52. **Predorsal scales 39 to 47. Scales in transverse row 6 to 8.** Head 4.5 to 5.0 times in standard length. Eye 3.5 to 3.8 times in head. Jaws subequal. Jaw teeth conspicuous, mostly conical. **Palatine teeth usually absent.** Gill rakers on first arch 20 to 26. **Dorsal fin low, with 11 to 14 rays. Anal fin with 9 to 12 rays, originating under third to seventh dorsal-fin ray. Pectoral fins 1.3 to 1.5 times in standard length, with 13 to 15 rays, first ray unbranched. Pelvic fins 2.9 to 3.7 in standard length,** inserted a little nearer to hind margin of opercle than to origin of caudal-fin base. **Juveniles with a singular chin barbel** with fringed margin (barbel disappears at about 140 mm standard length); dorsal fin height up to 4.0 times in standard length. **Colour:** body dark above, pale below. Dorsal and caudal fins greyish; anal fin transparent; pectoral fins uniformly dark grey (with a lighter cross-band in adolescent specimens); pelvic fins greyish basally, transparent elsewhere. Juveniles with dorsal and pelvic fins mottled with greyish spots and bars.



Size: Maximum to about 40 cm standard length (about 48 cm total length).

Habitat, biology, and fisheries: Neritic species. Feeds on zooplankton. Eggs demersal. Of no importance to fisheries.

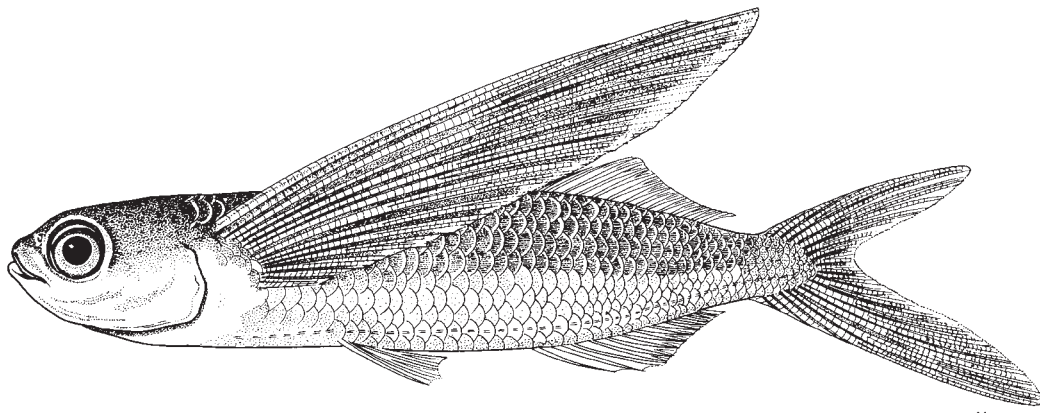
Distribution: In the area known from the Azores, Madeira, Canaries, Cape Verde Islands and off northwest Africa north of about 15°N as well as from St Helena Island and Ascension Island.



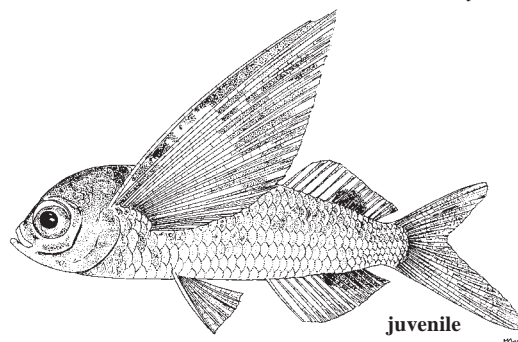
***Exocoetus obtusirostris* Günther, 1866**

Frequent synonyms / misidentifications: None / None.

FAO names: En – Oceanic two-wing flyingfish; Fr – Exocet bouldoque; Sp – Volador nato.



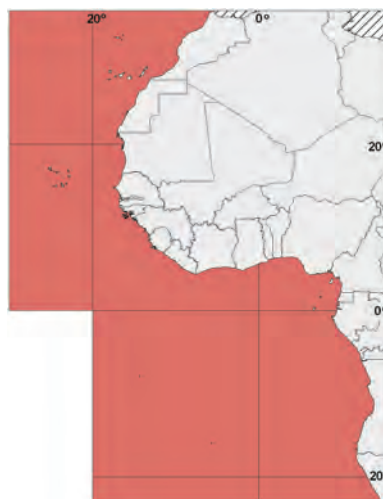
Diagnostic characters: Body elongate, roundish in cross-section, slightly flattened ventrally. Depth 4.6 to 5.4 times in standard length. Vertebrae 42 to 45. Predorsal scales 18 to 23. Scales in transverse row 7 to 8, usually 7.5. Head 3.6 to 4.1 times in standard length. Eye 3.2 to 3.6 times in head. Jaws subequal, without teeth. Gill rakers on first arch 22 to 29, usually 25 to 27. Dorsal fin low, with 12 to 14 rays. Anal fin with 12 to 14 rays, originating just before dorsal-fin origin. Pectoral fins 1.3 to 1.4 times in standard length, with 15 to 17 rays. Pelvic fins 6.5 to 7.5 in standard length, inserted much nearer to posterior margin of opercle than caudal-fin base. Juveniles not barbelled, hump-backed, upper profile of head steeply sloping, body depth 3.4 to 4.3 times in standard length at less than 40 mm standard length. **Colour:** body dark above, pale below. Dorsal and caudal fins greyish; anal and pelvic fins transparent; pectoral fins brownish grey with a broad pale margin. In juveniles body evenly pigmented, dorsal and anal fins blackish posteriorly; pectoral fins usually transparent; pelvic fins mostly blackish.



Size: Maximum to 19.5 cm standard length (about 24.5 cm total length).

Habitat, biology, and fisheries: Oceanic species. Feeds on small zooplankton, predominantly copepods, consumed by predatory fishes (tunas, snake-mackerels, etc.), squids, seabirds and dolphinfishes. Longevity about 1 year. Spawning intermittent, each batch consisting of 420 to 890 eggs. Eggs pelagic. No importance to fisheries.

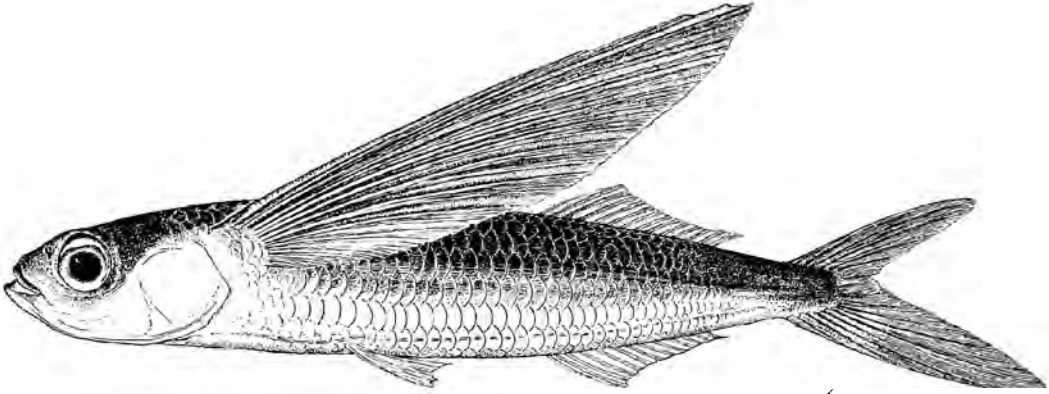
Distribution: Tropical and subtropical Atlantic Ocean. In the eastern Atlantic from Azores – Canary Islands to off Namibia.



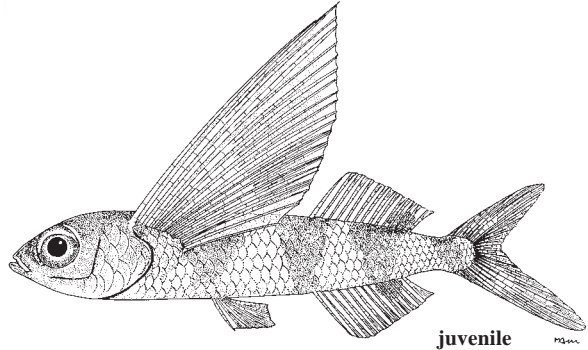
Exocoetus volitans Linnaeus, 1758

Frequent synonyms / misidentifications: None / None.

FAO names: En – Tropical two-wing flyingfish; Fr – Exocet volant; Sp – Volador.



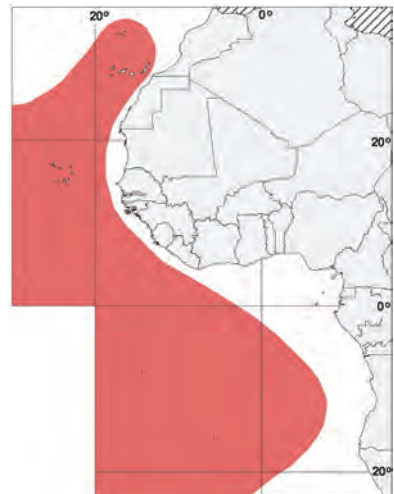
Diagnostic characters: Body elongate, roundish in cross-section, slightly flattened ventrally. Depth 5.6 to 6.0 times in standard length. Vertebrae 43 to 45. **Predorsal scales 16 to 21. Scales in transverse row 6 or 6.5, usually 6.5.** Head 3.6 to 3.9 times in standard length. Eye 3.5 to 3.9 times in head. Jaws subequal, without teeth. **Gill rakers on first arch 29 to 37, usually 32 to 34. Dorsal fin low, with 13 to 15 rays. Anal fin with 12 to 14 rays, originating under first to third dorsal-fin ray. Pectoral fins 1.3 to 1.4 times in standard length, with 14 to 16 rays. Pelvic fins 6.5 to 7.6 times in standard length,** inserted much nearer to posterior margin of opercle than caudal-fin base. **Juveniles not barbelled,** fusiform, upper profile of head gently sloping, body depth 4.8 to 5.3 times in standard length at less than 40 mm standard length. **Colour:** body dark above, pale below. Dorsal and caudal fins greyish; anal and pelvic fins transparent; pectoral fins grey with a narrow colourless margin. In juveniles body pale with two vertical dark bars on tail; dorsal and anal fins blackish posteriorly; pectoral and pelvic fins transparent.



Size: Maximum to 19 cm standard length (about 24 cm total length).

Habitat, biology, and fisheries: Most abundant oceanic flyingfish. Feeds mainly on copepods. All specimens below 140 mm standard length are immature and all above 170 mm standard length are ripe. Maximum age 1+ year. Spawning intermittent, each batch numbering 330 to 420 eggs. Eggs pelagic. No importance to fisheries.

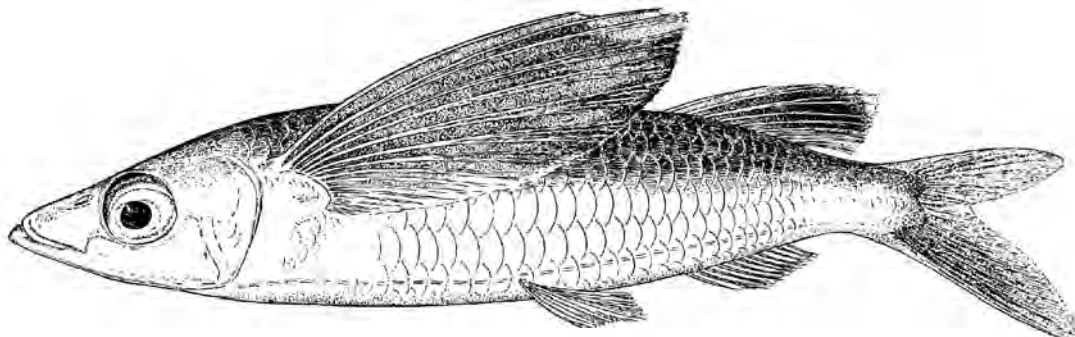
Distribution: Worldwide in offshore tropical waters. In the eastern Atlantic from north of Canary Islands to off Angola, not known in the Gulf of Guinea.



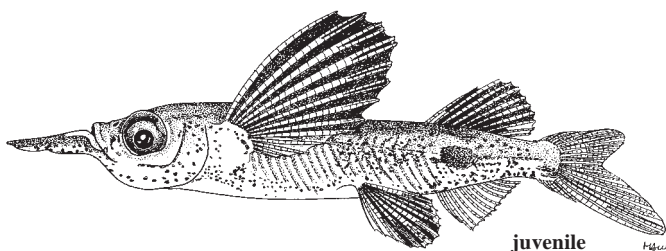
Fodiator acutus (Valenciennes, 1847)

Frequent synonyms / misidentifications: None / None.

FAO names: **En** – Sharpchin flyingfish; **Sp** – Exocet becune; **Fr** – Volador picudo.



Diagnostic characters: **Body** elongate, **elliptical in cross-section**, somewhat compressed. Depth 4.2 to 5.4 times in standard length. Vertebrae 38 to 40. **Predorsal scales 20 to 24. Scales in transverse row 5 to 6.5.** Pectoral branch of lateral line present. Head 3.3 to 3.8 times in standard length. **Snout pointed, longer than eye.** Eye 3.0 to 3.9 times in head. **Lower jaw protruding**, jaw teeth small, conical. **Gill rakers on first arch 27 to 32. Dorsal fin very high (4.0 to 5.8 times in standard length), with 9 to 11 (usually 10) rays. Anal fin with 11 or 12 rays, originating under first to third dorsal-fin ray. Pectoral fins 1.8 to 2.1 times in standard length, extending third to sixth dorsal-fin ray, with 13 to 15 (usually 14) rays, first one unbranched. Pelvic fins 5.0 to 6.6 times in standard length, inserted 1.2 to 1.4 times nearer to posterior margin of opercle than caudal-fin base, barely or not reaching anal-fin origin. Juveniles with strongly prolonged lower jaw (about twice longer than snout at 20 to 40 mm standard length). Colour:** body dark above, pale below. Dorsal fin with a large black blotch distally. Pectoral fins dark, pelvic and anal fins transparent. In juveniles less than 60 mm standard length pelvic fins pigmented.



Size: Maximum to 14 cm standard length (about 17 cm total length).

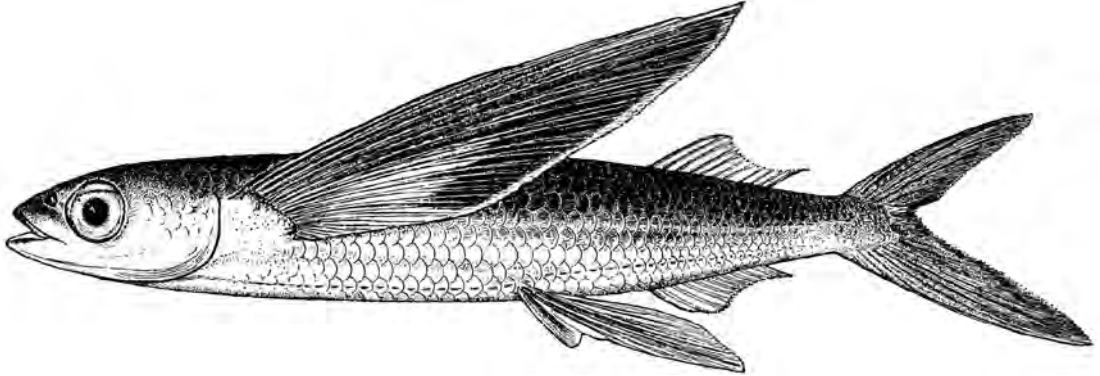
Habitat, biology, and fisheries: Neritic species avoiding open sea. Feeds on zooplankton. No importance to fisheries.

Distribution: Eastern tropical Atlantic along the African coast from Mauritania to Walvis Bay, Namibia.

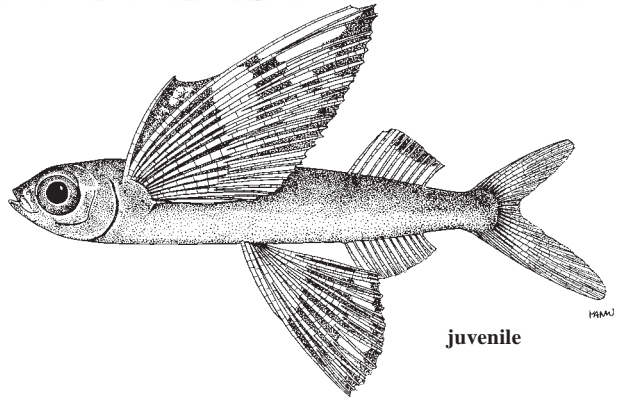
***Hirundichthys affinis* (Günther, 1866)**

Frequent synonyms / misidentifications: None / None.

FAO names: En – Fourwing flyingfish; Fr – Exocet hirondelle; Sp – Volador golondrina.



Diagnostic characters: Body elongate, nearly rectangular in cross-section, almost flat ventrally. Depth 5.5 to 5.7 times in standard length. Vertebrae 45 to 47. **Predorsal scales 26 to 33. Scales in transverse row 5 to 8.** Head 4.0 to 4.6 times in standard length. Eye 3.3 to 3.6 times in head. Jaws subequal. Jaw teeth conspicuous, conical. **Palatine teeth absent.** Gill rakers on first arch 24 to 30. **Dorsal fin very low, with 10 to 12 rays. Anal fin with 11 to 13 rays, originating before or 1 or 2 rays behind dorsal-fin origin. Pectoral fin 1.4 to 1.6 times in standard length, with 16 to 18 rays, first one unbranched. Pelvic fins 3.2 to 3.9 times in standard length,** inserted slightly nearer to posterior margin of opercle than origin of caudal-fin base. Juveniles not barbelled. **Colour:** body dark above, pale below. Dorsal and caudal fins greyish; anal fin transparent; **pectoral fins dark grey with unpigmented triangular cross-band and narrow outer margin;** pelvic fins light. Juveniles with pectoral and pelvic fins mottled with dark spots and bands.



Size: Maximum to 26 cm standard length (about 33 cm total length).

Habitat, biology, and fisheries: Neritic-oceanic species. Feeds on zooplankton. Matures at about 19 cm. Maximum age 1.5 years. Spawning intermittent, total fecundity ranging between 4 100 and 9 200 eggs. Eggs demersal, laid on floating objects. No importance to fisheries in the area, but this species supports the largest single-species fishery in the eastern Caribbean.

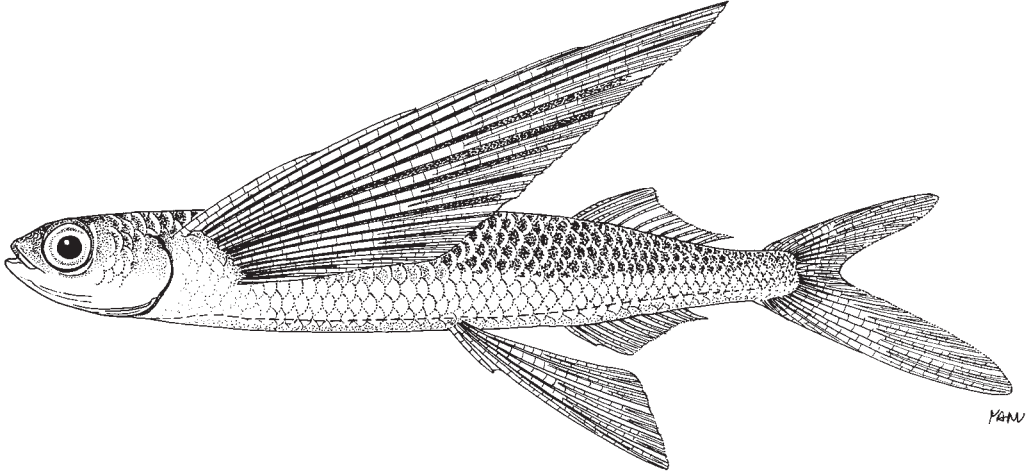
Distribution: Both sides of the Atlantic Ocean. In the area known along the African coast from 20°N to 15°S.



***Hirundichthys rondeletii* (Valenciennes, 1847)**

Frequent synonyms / misidentifications: None / None.

FAO names: En – Blackwing flyingfish; Fr – Exocet aile noire; Sp – Volador aleta negra.



Diagnostic characters: Body elongate, nearly rectangular in cross-section, almost flat ventrally. Depth 6.2 to 7.9 times in standard length. Vertebrae 45 to 47. **Predorsal scales 25 to 30. Scales in transverse row 6 to 7.5, usually 6.5.** Head 4.2 to 5.2 times in standard length. Eye 3.1 to 3.3 times in head. Jaws subequal. Jaw teeth conspicuous, conical. **Palatine teeth absent.** Gill rakers on first arch 25 to 31. **Dorsal fin low, with 10 to 12 rays. Anal fin with 10 to 13 rays, originating slightly before, or 1 to 2 rays behind dorsal-fin origin. Pectoral fins 1.3 to 1.4 times in standard length, with 16 to 18 rays, first 2 rays unbranched. Pelvic fins 2.8 to 3.4 times in standard length, inserted slightly nearer to posterior margin of opercle than origin of caudal fin base. Juveniles not barbelled. Colour:** body dark above, pale below. Dorsal and caudal fins greyish; anal fin transparent; **pectoral fins black without unpigmented cross-band** and with a narrow light outer margin; pelvic fins usually without black spot. Juveniles less than 100 mm standard length without vertical bands on body; dorsal, pectoral and pelvic fins not mottled with dark spots and bands.

Size: Maximum to 20 cm standard length (about 26 cm total length).

Habitat, biology, and fisheries: Oceanic species. Feeds on zooplankton. Eggs demersal. No importance to fisheries.

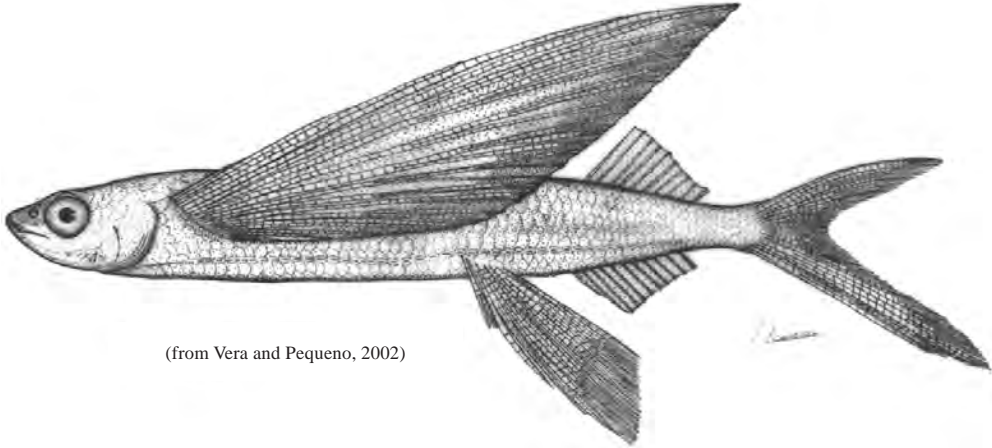
Distribution: Mediterranean Sea and adjacent waters of the Atlantic Ocean (off southern Portugal and Morocco).



***Hirundichthys rufipinnis* (Valenciennes, 1847)**

Frequent synonyms / misidentifications: None / *Hirundichthys rondeletii*.

FAO names: En – Redfin flyingfish.



(from Vera and Pequeno, 2002)

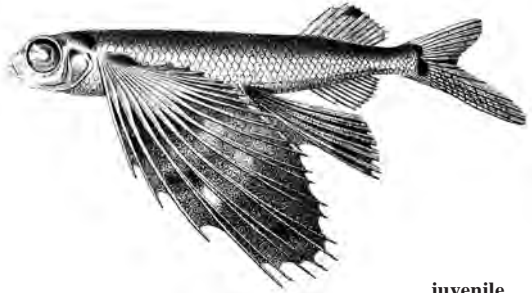
Diagnostic characters: Body elongate, nearly rectangular in cross-section, almost flat ventrally. Depth 5.5 to 7.1 times in standard length. Vertebrae 44 to 47. **Predorsal scales 26 to 32. Scales in transverse row 5.5 to 7.5**, usually 6 or 6.5. Head 4.5 to 5.1 times in standard length. Eye 2.8 to 3.0 times in head. Jaws subequal. Jaw teeth conspicuous, conical. **Palatine teeth absent.** Gill rakers on first arch 25 to 32. **Dorsal fin low, with 10 to 13 rays. Anal fin with 11 to 13 rays, originating slightly before, or 1 to 2 rays behind dorsal-fin origin. Pectoral fins 1.2 to 1.4 times in standard length, with 17 to 20 rays, first 2 rays unbranched. Pelvic fins 2.7 to 3.5 in standard length**, inserted slightly nearer to posterior margin of opercle than origin of caudal-fin base. Juveniles not barbelled.

Colour: body dark above, pale below. Dorsal and caudal fins greyish; anal fin transparent; **pectoral fins black without unpigmented cross-band** and with a moderate light outer margin; pelvic fins without black spot. Juveniles less than 100 mm without vertical bands on body; dorsal, pectoral and pelvic fins not mottled with dark spots and bands.

Size: Maximum to 27 cm standard length (about 37 cm total length).

Habitat, biology, and fisheries: Oceanic species. Feeds on zooplankton. Eggs demersal. No importance to fisheries.

Distribution: Circumglobal in subtropical waters of Southern Hemisphere. Southeastern part of the area (most northern record off Baia dos Tigres, Angola).



juvenile

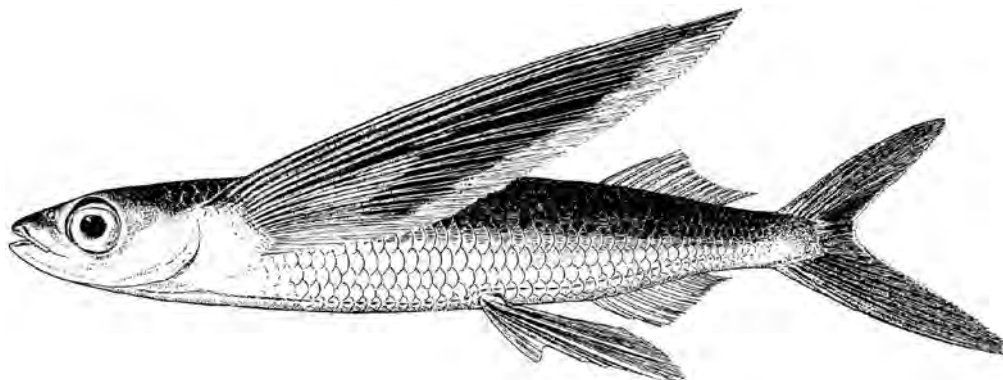
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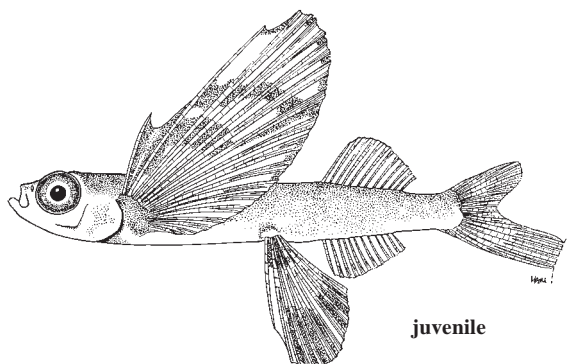
***Hirundichthys speculiger* (Valenciennes, 1847)**

Frequent synonyms / misidentifications: None / None.

FAO names: En – Mirrorwing flyingfish; Fr – Exocet miroir, Sp – Volador espejo.



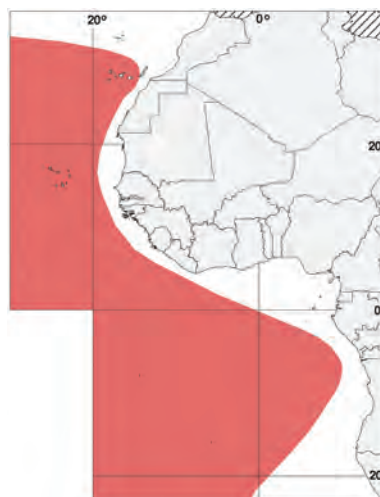
Diagnostic characters: Body elongate, nearly rectangular in cross-section, almost flat ventrally. Depth 5.5 to 6.7 times in standard length. Vertebrae 45 to 47. **Predorsal scales 28 to 33. Scales in transverse row 5 to 7.5.** Head 3.9 to 4.2 times in standard length. Eye 2.9 to 3.3 times in head. Jaws subequal. Jaw teeth conspicuous, conical. **Palatine teeth present.** Gill rakers on first arch 21 to 29. **Dorsal fin low, with 10 to 13 rays. Anal fin with 11 to 13 rays, originating slightly before, or 1 to 2 rays behind dorsal-fin origin. Pectoral fins 1.4 to 1.5 times in standard length, with 17 to 20 rays, first one unbranched. Pelvic fins 3.4 to 4.0 times in standard length, inserted slightly nearer to posterior margin of opercle than origin of caudal-fin base.** Juveniles not barbelled. **Colour:** body dark above, pale below. Dorsal and caudal fins greyish; anal fin transparent; **pectoral fins dark grey with unpigmented triangular cross-band and broad outer margin;** pelvic fins light. Juveniles with pectoral and pelvic fins mottled with dark spots and bands.



Size: Maximum to 25 cm standard length (about 31 cm total length).

Habitat, biology, and fisheries: Oceanic species. Feeds on zooplankton. Eggs demersal, laid on floating objects. Of no importance to fisheries.

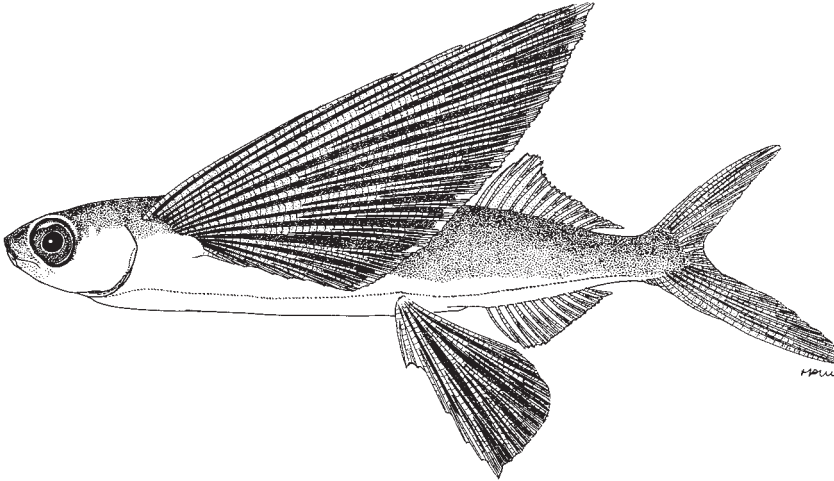
Distribution: Worldwide in offshore tropical waters. In the eastern Atlantic from north of Canaries to off northern Angola.



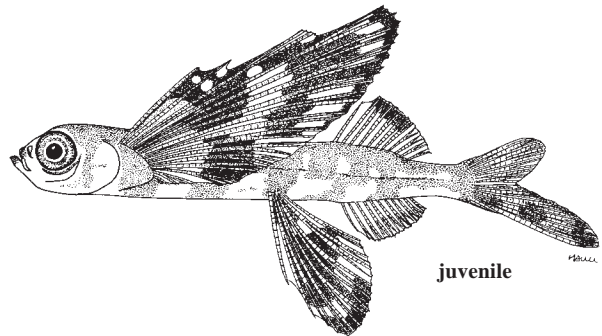
Hirundichthys volador (Jordan, 1884)

Frequent synonyms / misidentifications: None / *Hirundichthys rondeletii*.

FAO names: En – Atlantic blackwing flyingfish.



Diagnostic characters: Body elongate, nearly rectangular in cross-section, almost flat ventrally. Depth 5.2 to 6.4 times in standard length. Vertebrae 44 to 47, **Predorsal scales 25 to 31. Scales in transverse row 6.5 to 8.5**, usually 7.5. Head 4.2 to 5.2 times in standard length. Eye 3.1 to 3.3 times in head. Jaws subequal. Jaw teeth conspicuous, conical. **Palatine teeth absent.** Gill rakers on first arch 24 to 29. **Dorsal fin low, with 10 to 13 rays. Anal fin with 10 to 13 rays, originating slightly before, or 1 to 2 rays behind dorsal-fin origin. Pectoral fins 1.2 to 1.4 times in standard length, with 16 to 19 rays, first two rays unbranched. Pelvic fins 2.5 to 3.4 times in standard length,** inserted slightly nearer to posterior margin of opercle than origin of caudal-fin base. Juveniles not barbelled. **Colour:** body dark above, pale below. Dorsal and caudal fins greyish; anal fin transparent; **pectoral fins black without unpigmented cross-band** and with a narrow light outer margin; pelvic fins usually with black spot. Juveniles less than 50 mm standard length with a few dark transverse vertical bands on body; dorsal, pectoral and pelvic fins mottled with dark spots and bands.



juvenile



Size: Maximum to 24 cm standard length (about 30 cm total length).

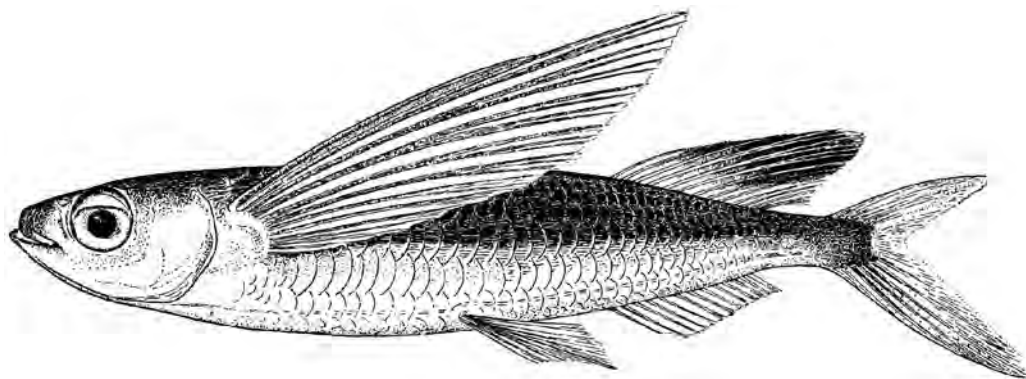
Habitat, biology, and fisheries: Oceanic species. Feeds on zooplankton. Eggs demersal. No importance to fisheries.

Distribution: Northwestern subtropical Atlantic. In the eastern Atlantic known by individual strays reaching Azores, Canary Islands and off Mauritania.

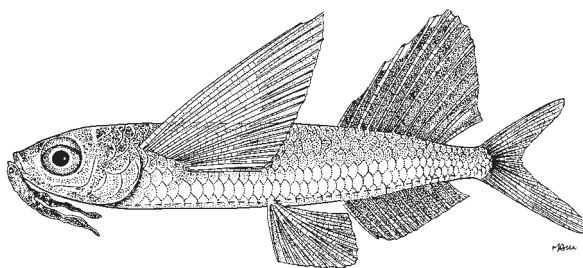
***Parexocoetus hillianus* (Gosse, 1851)**

Frequent synonyms / misidentifications: *Parexocoetus brachypterus hillianus* (Gosse, 1851) / *Parexocoetus brachypterus* (Richardson, 1846).

FAO names: En – Atlantic sailfin flyingfish; Fr – Exocet voilier, Sp – Volador aletón.



Diagnostic characters: Body elongate, elliptical in cross-section, somewhat compressed. Depth 4.3 to 6.0 times in standard length. Vertebrae 36 to 40. **Predorsal scales 19 to 23. Scales in transverse row 4.5 to 5.5.** Pectoral branch of lateral line present. Head 3.9 to 4.9 times in standard length. **Snout blunt, shorter than eye.** Eye 3.0 to 3.5 times in head. Jaws subequal, with small conical teeth. **Gill rakers on first arch 26 to 33, usually 28 to 30. Dorsal fin very high (2.4 to 3.1 times in standard length), with 11 to 13 rays. Anal fin with 10 to 14 rays, originating before second ray of dorsal fin. Pectoral fins 1.7 to 2.1 times in standard length, extending to or beyond middle of dorsal-fin base, with 11 to 13 rays, first one unbranched. Pelvic fins 4.5 to 5.5 times in standard length, inserted nearer to posterior margin of opercle than caudal-fin base, barely or not reaching anal-fin origin. Juveniles similar to adults in general appearance, with paired short chin barbels at less than 105 mm standard length (easily lost). **Colour:** body dark (iridescent bluish green in life) above, pale below. Dorsal fin with a large black blotch distally. All other fins transparent. In juveniles pelvic and anal fins bearing black pigment.**



juvenile

Size: Maximum to 12.5 cm standard length (about 15.5 cm total length).

Habitat, biology, and fisheries: Neritic species. Inhabits inshore and neritic waters. Feeds on crustacean plankton. Eaten by many predatory fishes and sea birds. Eggs demersal. Reach full size in 1 year. Abundant but not known to be commercial species.

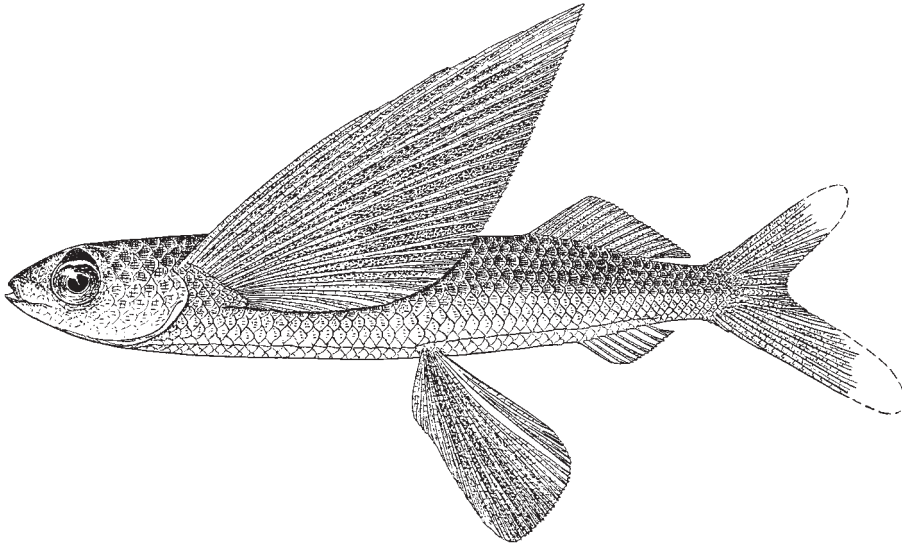
Distribution: Both sides of the Atlantic Ocean. In the tropical eastern Atlantic along west coast of Africa between 12°N and 11°S.



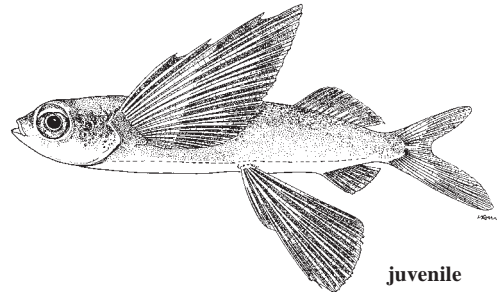
***Prognichthys gibbifrons* (Valenciennes, 1847)**

Frequent synonyms / misidentifications: None / None.

FAO names: En – Eastern bluntnose flyingfish; Fr – Exocet jibeux; Sp – Volador jorobado.



Diagnostic characters: **Body** elongate, **nearly rectangular in cross-section**, almost flat ventrally. Depth 5.3 to 6.6 times in standard length. Vertebrae 42 to 44. **Predorsal scales (22) 23 to 28. Scales in transverse row 6.5 to 8.5.** Head 4.0 to 4.3 times in standard length. Eye 3.0 to 3.6 times in head and 1.4 to 1.8 times in postorbital part of head. Lower jaw a little shorter than the upper and included beneath upper jaw with mouth closed. Jaw teeth small, mostly conical. **No palatine teeth.** Gill rakers on first arch 20 to 26. **Dorsal fin low, with 10 to 13 rays. Anal fin with 8 to 10**, usually 9 rays, **originating under fourth to fifth dorsal-fin ray. Pectoral fins** 1.45 to 1.55 times in standard length, **with 15 to 18 rays, 2 upper rays unbranched. Pelvic fins 2.8 to 3.1 times in standard length**, inserted nearer to posterior margin of opercle than caudal-fin base. **Juveniles not barbelled**, characteristically robust and blunt-snouted, at less than 60 mm with pectoral and pelvic fins of comparable length. **Colour:** body dark above, pale below. Dorsal and caudal fins greyish; anal fin transparent; **pectoral fin brownish with pale distal tip** and lowermost portion. Juveniles less than 30 mm standard length with body and paired fins heavily pigmented; in larger juveniles pectoral fins blackish, sometimes with lighter cross-band in central part.



Size: Maximum to 20 cm standard length (about 25 cm total length).

Habitat, biology, and fisheries: Neritic species rare in open sea. Feeds on zooplankton. No importance to fisheries.

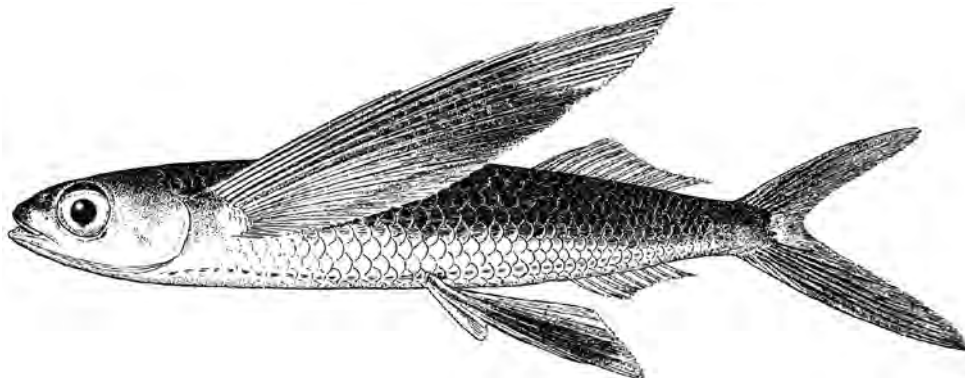
Distribution: Distributed along the African coasts from Western Sahara to Luanda, Angola, rather abundant in the Gulf of Guinea, rare west of 20° W and south of the equator in the open sea.



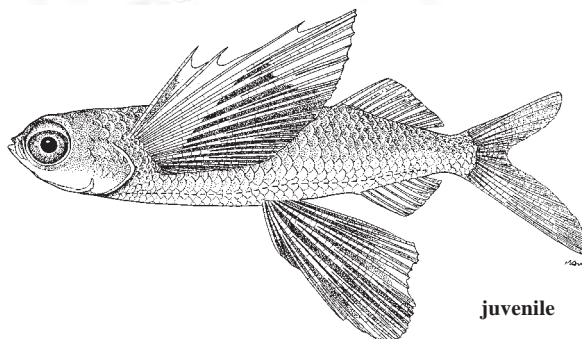
***Prognichthys glaphyrae* Parin, 1999**

Frequent synonyms / misidentifications: None / *Prognichthys gibbifrons*.

FAO names: En – Oceanic bluntnose flyingfish.



Diagnostic characters: Body elongate, nearly rectangular in cross-section, almost flat ventrally. Depth 5.1 to 6.2 times in standard length. Vertebrae 42 to 44. **Predorsal scales 20 to 25. Scales in transverse row 7 or 8.** Head 3.6 to 4.0 times in standard length. Eye 2.8 to 3.2 times in head and 1.2 to 1.5 times in postorbital part of head. Lower jaw a little shorter than the upper and included beneath upper jaw with closed mouth. Jaw teeth small, mostly conical. **No palatine teeth.** Gill rakers on first arch 21 to 28. **Dorsal fin low, with 11 to 13 rays. Anal fin with 9 to 11, usually 10 rays, originating under third to fifth dorsal-fin ray. Pectoral fins 1.4 to 1.5 times in standard length, with 16 to 19 rays, first 2 rays unbranched. Pelvic fins 2.8 to 3.3 times in standard length** inserted nearer to posterior margin of opercle than caudal-fin base. **Juveniles not barbelled**, characteristically robust and blunt-snouted at less than 60 mm standard length, with pectoral and pelvic fins of comparable length. **Colour:** body dark above, pale below (the dark colour iridescent blue, pale colour silvery in life). Dorsal and caudal fins greyish; anal fin transparent; **pectoral fins greyish except for their pointed tips** (for about one-fourth of fin length), **and posterior margin and lower portion** which are transparent; pelvic fins mostly greyish, especially in the middle (probably both pectoral and pelvic fins greenish in life). Juveniles less than 30 mm standard length with body and paired fins heavily pigmented, in juveniles 30 to 130 mm standard length pectoral fins very contrastingly pigmented: mostly pale with black areas at the base and posteroventrally.



Size: Maximum to 20 cm standard length (about 25 cm total length).

Habitat, biology, and fisheries: Oceanic species. Feeds on zooplankton. Eggs pelagic. No importance in fisheries.

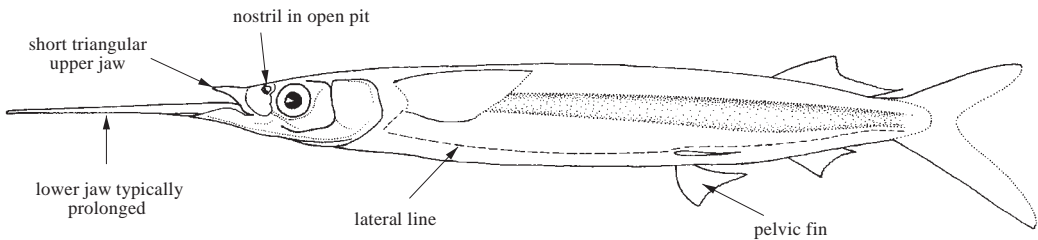
Distribution: Distributional range limited to the Atlantic Ocean. Rare in the area and recorded there only far off-shore, in the central part of the ocean.

HEMIRAMPHIDAE

Halfbeaks

by B.B. Collette, National Marine Fisheries Service Systematics Laboratory,
National Museum of Natural History, Washington, DC, USA

Diagnostic characters: Elongate fishes reaching 40 cm total length, 35 cm standard length with a **prolonged lower jaw and a short triangular upper jaw** (except in *Oxyporhamphus similis*). Nostrils in a pit anterior to the eyes. No spines in fins; dorsal and anal fins posterior in position; pectoral fins usually short; pelvic fins in abdominal position, with 6 soft rays. Lateral line running down from pectoral-fin origin and then posteriorly along ventral margin of body. Scales moderately large, cycloid (smooth), easily detached. **Colour:** these fishes live at the surface and are protectively coloured for this mode of life by being green or blue on the back and silvery white on the sides and ventrally. Tip of the lower jaw bright red or orange in most species.

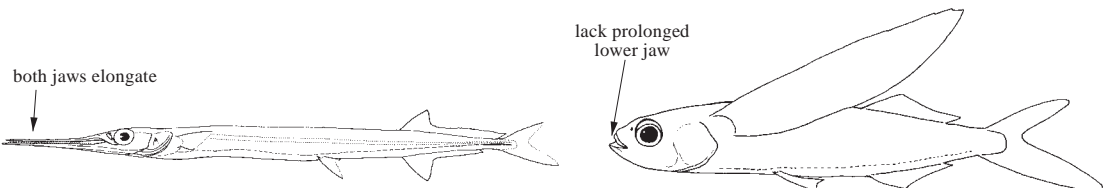


Habitat, biology, and fisheries: Most species are marine, but some inhabit freshwaters. Omnivorous, feeding on floating sea grass, crustaceans and small fishes. Eastern central Atlantic species are all oviparous. Eggs with filaments that attach to sea grasses or algae. Halfbeaks are prone to leap and skitter at the surface and one offshore species, *Euleptorhamphus velox* leaps out of the water and glides like a flyingfish. Although at present these fishes are not of great commercial importance, most species are regularly found in local markets. The flesh is excellent and halfbeaks are utilized as food in many parts of the world. They are mainly caught with seines and pelagic trawls and utilized fresh, dried-salted, smoked and for fishmeal and oil. They are also important as bait for gamefishes like marlins.

Similar families occurring in the area

Belonidae (needlefishes): both upper and lower jaws elongate and armed with needle-sharp teeth.

Exocoetidae (flyingfishes): lack the prolonged lower jaw characteristic of most halfbeaks; pectoral fins or both pectoral and pelvic fins enlarged and used for aerial gliding.



Belonidae

Exocoetidae

Key to species of Hemiramphidae occurring in the area

- 1a. Lower jaw not noticeably elongate (Fig. 1); total gill rakers on first arch 30 to 35; pectoral-fin rays 11 to 13 ***Oxyporhamphus similis***
- 1b. Lower jaw distinctly elongate (Fig. 2); total gill rakers on first arch 25 to 46; pectoral-fin rays usually 7 to 12 → 2

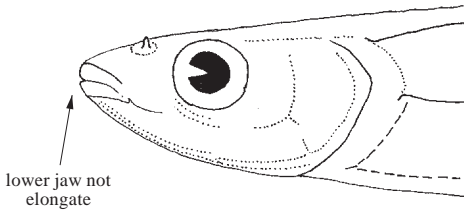


Fig. 1 lateral view of head

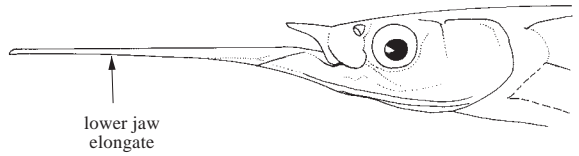


Fig. 2 lateral view of head

- 2a. Dorsal-fin rays 21 to 25; anal-fin rays 19 to 24; pectoral fins very long; pectoral-fin rays usually 7 to 9 ***Euleptorhamphus velox***
- 2b. Dorsal-fin rays 12 to 17; anal-fin rays 10 to 18; pectoral fins short to moderate; pectoral-fin rays 9 to 12 → 3

- 3a. Caudal fin emarginate or slightly forked (Fig. 3a); scales present on snout; preorbital ridge well developed, preorbital canal simple, without posterior branch (Fig. 4a); anal-fin rays 13 to 17, usually 15 or 16 ***Hyporhamphus picarti***
- 3b. Caudal fin deeply forked (Fig. 3b); scales absent on snout; preorbital ridge absent, preorbital canal with posterior branch (Fig. 4b); anal-fin rays usually 10 to 13 . . . ***Hemiramphus*** → 4

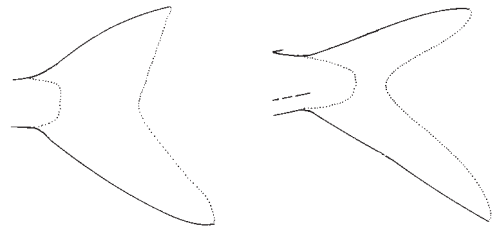


Fig. 3 caudal fin

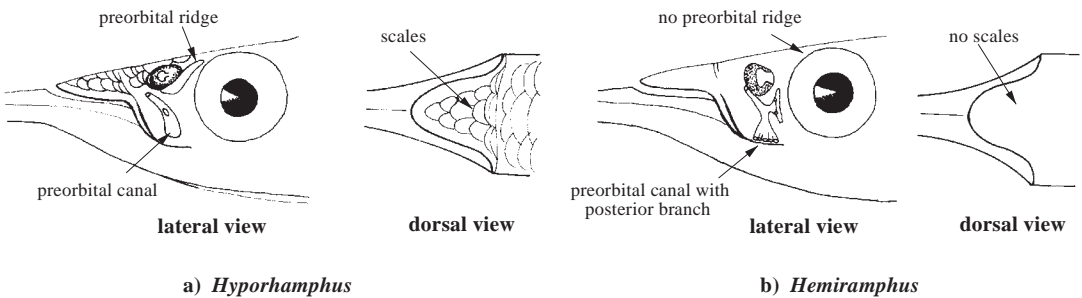








Fig. 4 detail of head

- 4a. Pectoral fins moderate, reaching beyond anterior margin of nasal pit when folded forward; anal-fin rays 10 to 13, usually 11 or 12; upper caudal lobe blue in life ***Hemiramphus balao***
- 4b. Pectoral fins short, not reaching nasal pit when folded forward; anal-fin rays 12 to 14, usually 13; upper caudal lobe reddish orange in life ***Hemiramphus brasiliensis***

List of species occurring in the area

The symbol  is given when species accounts are included

-  *Euleptorhamphus velox* Poey, 1868.
-  *Hemiramphus balao* Lesueur, 1821.
-  *Hemiramphus brasiliensis* (Linnaeus, 1758).
-  *Hyporhamphus picarti* (Valenciennes, 1847).
-  *Oxyporhamphus micropterus similis* Bruun, 1935.

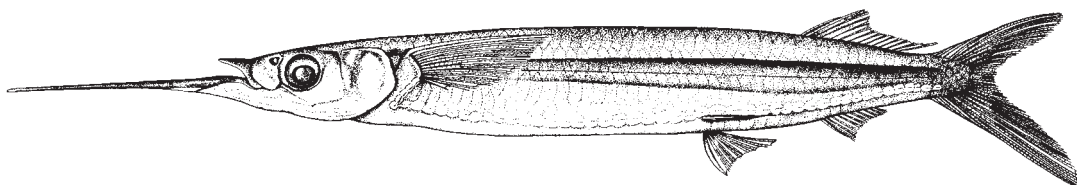
References

- Berkeley, S.A. & Houde, E.D.** 1978. Biology of two exploited species of halfbeaks, *Hemiramphus brasiliensis* and *H. balao* from southeast Florida. *Bulletin of Marine Science of the Gulf and Caribbean*, 28: 624–644.
- Collette, B.B.** 1965. Hemiramphidae (Pisces, Synentognathi) from tropical West Africa. *Atlantide Report*, 8: 217–235.
- Collette, B.B.** 2004. Family Hemiramphidae Gill 1859 – halfbeaks. *California Academy of Sciences Annotated Checklists of Fishes*, No. 22, 35 p.
- Colette, B.B.** 2005. Hemiramphidae: halfbeaks. In W.J. Richards, ed. *Early stages of Atlantic fishes: an identification guide for the western central North Atlantic*. CRC Press, Chapter 78, pp. 933–953.

Hemiramphus balao Lesueur, 1821

Frequent synonyms / misidentifications: None / *Hemiramphus brasiliensis* (Linnaeus, 1758).

FAO names: En – Balao halfbeak; Fr – Demi-bec balaou; Sp – Agujeta balajú.



Diagnostic characters: An elongate fish with a greatly prolonged beak-like lower jaw. **Upper jaw short, triangular and scaleless; preorbital ridge (bony ridge under nostril) absent.** Total number of gill rakers on first gill arch 31 to 39 (average 37.2), 7 to 10 on upper and 22 to 29 on lower limb of arch. No spines in fins; dorsal-fin rays 11 to 15, usually 13 or 14; **anal-fin rays 10 to 13, usually 11 or 12; pectoral fins long, reaching beyond anterior margin of nasal pit when folded forward,** and with 10 to 12, usually 11, rays; **caudal fin deeply forked,** lower lobe much longer than upper. Predorsal scales 37 to 41. Total vertebrae 54 to 56. **Colour:** dark bluish above, silvery white below. Beak black with fleshy red tip; **upper lobe of caudal fin bluish violet, lower lobe bluish.** Juveniles with broad vertical bars on body past 175 mm standard length. Pigment on the pelvic fins of juveniles concentrated proximally, distally in *H. brasiliensis*; tip of lower caudal lobe unpigmented.

Size: Maximum to at least 40 cm total length; about 28 cm standard length (from tip of upper jaw to base of caudal fin); common to 35 cm total length.

Habitat, biology, and fisheries: An inshore, surface-dwelling fish forming sizeable schools. Food is composed largely of zooplankton, particularly copepods, decapods, siphonophores, and polychaetes. Oviparous. Batch fecundity about 3 700 hydrated eggs. Eggs bear long filaments that attach the eggs to seagrasses or algae. Usually taken along with *Hemiramphus brasiliensis*. Caught with beach and purse seines and pelagic trawls. Utilized fresh, dried salted, and for fishmeal and oil and as bait for the billfish sports fishery. Separate statistics are not reported for this species.

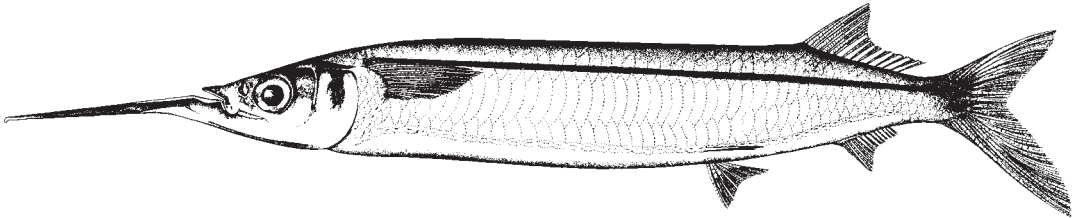
Distribution: In the eastern Atlantic, from the Canary Islands and from Côte d'Ivoire southward to Luanda, Angola. Also found in the western Atlantic from off New York southward through the Gulf of Mexico and Caribbean Sea to Santos, Brazil.



Hemiramphus brasiliensis (Linnaeus, 1758)

Frequent synonyms / misidentifications: None / *Hemiramphus balao* Lesueur, 1821.

FAO names: En – Ballyhoo halfbeak; Fr – Demi-bec brésilien; Sp – Agujeta brasileña.



Diagnostic characters: An elongate fish with a greatly prolonged beak-like lower jaw. **Upper jaw short, triangular and scaleless; preorbital ridge (bony ridge under nostril) absent. Total number of gill rakers on first gill arch 28 to 36 (average 32.8),** 7 to 10 on upper and 20 to 26 on lower limb of arch. No spines in fins; dorsal-fin rays 12 to 15, usually 13 or 14; **anal-fin rays 12 to 14, usually 13; pectoral fins short, not reaching to nasal pit when folded forward** and with 10 to 12, usually 11, rays; **caudal fin deeply forked, lower lobe much longer than upper.** Predorsal scales 35 to 38. Total vertebrae 52 to 55. **Colour:** dark bluish green above, silvery white below. Beak black with fleshy red tip; **entire upper lobe of caudal fin yellowish orange,** lower lobe dusky. Broad vertical bars on body of juveniles present until about 120 mm standard length. Pigment on the pelvic fins of juveniles concentrated distally on the fin, proximally in *H. balao*; tip of lower caudal lobe pigmented.

Size: Maximum to at least 40.5 cm total length; 35 cm standard length (from tip of upper jaw to base of caudal fin); common to 35 cm total length.

Habitat, biology, and fisheries: An inshore, surface-dwelling fish forming sizeable schools. Adults feed mostly on seagrasses, smaller fish on planktonic decapods, copepods and siphonophores. Oviparous. Batch fecundity about 1 200 hydrated eggs about 2.4 mm in diameter. Eggs with thread-like filaments that attach the eggs to seagrasses or algae. Usually taken along with *Hemiramphus balao*. Caught with setnets, beach seines, pelagic trawls and on line gear. Utilized fresh, smoked, dried-salted and for fishmeal and oil and as bait for the billfish sports fishery. Separate statistics are not reported for this species.

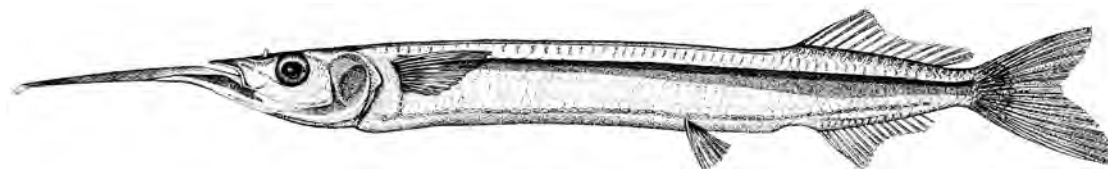
Distribution: In the eastern Atlantic, from the Cape Verde Islands and Dakar southward to Luanda, Angola. Also found in the western Atlantic from Woods Hole, Massachusetts southward through the Gulf of Mexico and Caribbean Sea to Rio de Janeiro.



Hyporhamphus picarti (Valenciennes, 1847)

Frequent synonyms / misidentifications: None / *Hyporhamphus unifasciatus* (Ranzani, 1841).

FAO names: En – African halfbeak; Fr – Demi-bec africain; Sp – Agujeta africana.



Diagnostic characters: An elongate fish with a greatly prolonged beak-like lower jaw. **Upper jaw short, triangular and scaly; preorbital ridge (bony ridge under nostril) present. Total number of gill rakers on first gill arch 28 to 36** (average 32.0), 7 to 11 on upper and 18 to 25 on lower limb of arch. No spines in fins; dorsal and anal fins without scales; dorsal-fin rays 13 to 16, usually 14 or 15; **anal-fin rays 13 to 17, usually 15 or 16**; pectoral fins short, not reaching to nasal pit when folded forward and with 10 to 12, usually 11, rays; **caudal fin emarginate to slightly forked**. Total vertebrae 46 to 49. **Colour:** greenish above, silvery white below; 3 distinct narrow black lines along middle of back from head to dorsal fin; fleshy tip of beak red; caudal fin pale, dark-edged. Juveniles lack the broad vertical bars present in species of *Hemiramphus*.

Size: Maximum to about 18 cm total length; about 14 cm standard length (from tip of upper jaw to base of caudal fin); common to 10 cm standard length.

Habitat, biology, and fisheries: An inshore schooling species, frequently entering estuaries. Omnivorous, feeding on algae as well as on small animal organisms. Caught with beach seines and pelagic trawl. Utilized fresh, dried, salted and for fishmeal and oil. Separate statistics are not reported for this species.

Distribution: An eastern Atlantic species known from Morocco and Dakar southward along the coast of the Gulf of Guinea to Luanda, Angola and also from the southern shores of the Mediterranean Sea from Lebanon and Israel south and west to Gibraltar.



***Euleptorhamphus velox* Poey, 1868**

En – Flying halfbeak; **Fr** – Demi-bec volant; **Sp** – Agujeta voladora.

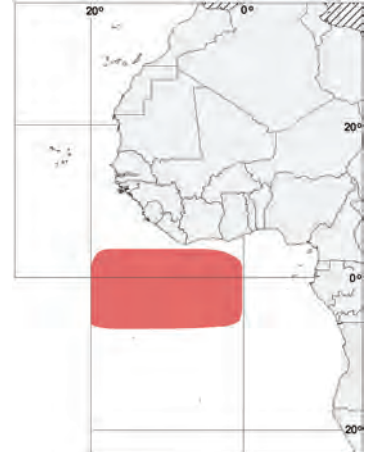
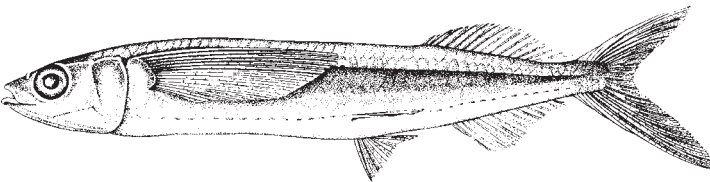
Maximum size 28.1 cm standard length. An offshore epipelagic species. Eaten by oceanic fishes and birds. Of no fisheries interest. Cape Verde Islands and Gulf of Guinea: Sierra Leone to Nigeria. Also found in the western Atlantic from Massachusetts throughout the Gulf of Mexico and Caribbean Sea south to Recife, Brazil.



***Oxyporhamphus micropterus similis* Bruun, 1935**

En – Atlantic smallwing flyingfish.

Maximum size 18.5 cm standard length. A small epipelagic offshore species of no fisheries interest. Widespread in tropical and subtropical waters of the Atlantic, in the eastern Atlantic from 20°N south to 20°S; in the western Atlantic north to 40°N, in the Gulf of Mexico and Caribbean Sea south at least to the equator. Placed in the Exocoetidae by some authors.



New Index

A

<i>Ablennes hians</i>	2121
African halfbeak	2161
Aguja	2122
Aguja imperia	2125
Agujeta africana	2161
Agujeta balajú	2159
Agujeta brasileña	2160
Agujeta voladora	2162
Agujon needlefish	2125
Agujón de quilla	2123
Agujón sable	2121
Agujón senegalés	2124
Aiguille crocodile	2126
Aiguille voyeuse	2125
Aiguillette sénégalais	2124
Atlantic Agujón	2125
Atlantic blackwing flyingfish	2152
Atlantic flyingfish	2141
Atlantic sailfin flyingfish	2153
Atlantic saury	2129
Atlantic smallwing flyingfish	2162

B

BELONIDAE	2118
BELONIFORMES	2118
Balao halfbeak	2159
Balaou atlantique	2129
Balaou nain	2130
Ballyhoo halfbeak	2160
Bandwing flyingfish	2138
Barracudas	2118
<i>Belone belone</i>	2122
<i>Belone belone acus</i>	2122
<i>Belone belone belone</i>	2122
<i>Belone belone euxini</i>	2122
<i>Belone gracilis</i>	2122
BELONIDAE	2127,2156
Bennett's flyingfish	2144
Blacksail flyingfish	2143
Blackwing flyingfish	2149
Blotchwing flyingfish	2140

C

<i>Cheilopogon cyanopterus</i>	2137
--	------

<i>Cheilopogon exsiliens</i>	2138
<i>Cheilopogon furcatus</i>	2139
<i>Cheilopogon heterurus</i>	2140-2141
<i>Cheilopogon melanurus</i>	2141
<i>Cheilopogon milleri</i>	2142
<i>Cheilopogon nigricans</i>	2143
<i>Cheilopogon pinnatibarbatus</i>	2144
<i>Cypselurus cyanopterus</i>	2137
<i>Cypselurus exsiliens</i>	2138,2143
<i>Cypselurus furcatus</i>	2139
<i>Cypselurus heterurus</i>	2140
<i>Cypselurus lineatus</i>	2144
<i>Cypselurus lutkeni</i>	2141
<i>Cypselurus melanurus</i>	2141
<i>Cypselurus milleri</i>	2142
<i>Cypselurus nigricans</i>	2143
<i>Cypselurus pinnatibarbatus</i>	2144

D

Demi-bec africain	2161
Demi-bec balaou	2159
Demi-bec brésilien	2160
Demi-bec volant	2162
Dwarf saury	2130

E

EXOCEOETIDAE	2131
Eastern bluntnose flyingfish	2154
ESOCIDAE	2127
<i>Euleptorhamphus velox</i>	2156,2162
Exocet african	2143
Exocet aile noire	2149
Exocet atlantique	2141
Exocet becune	2147
Exocet bouldoque	2145
Exocet codène	2137
Exocet de Bennett	2144
Exocet de Guinée	2142
Exocet hirondelle	2148
Exocet jibeux	2154
Exocet miroir	2151
Exocet méditerranéen	2140
Exocet raye	2138
Exocet tacheté	2139
Exocet voilier	2153
Exocet volant	2146
EXOCEOETIDAE	2156

- Exocoetus obtusirostris* 2145
Exocoetus volitans 2146
- F**
Flat needlefish 2121
Flying halfbeak 2162
Flyingfishes 2131,2156
Fodiator 2131
Fodiator acutus 2147
Fourwing flyingfish 2148
- G**
Garfish 2122
Guinean flyingfish 2142
- H**
HEMIRAMPHIDAE 2156
Half-beaks 2127
Halfbeaks 2118,2156
HEMIRAMPHIDAE 2118,2127,2131
Hemiramphus 2161
Hemiramphus balao 2159-2160
Hemiramphus brasiliensis 2159-2160
Hirundichthys (Danichthys) rondeletii 2150,2152
Hirundichthys affinis 2131,2148
Hirundichthys rondeletii 2149
Hirundichthys rufipinnis 2150
Hirundichthys speculiger 2151
Hirundichthys volador 2152
Hound needlefish 2126
Houndfish 2126
Hyporhamphus picarti 2161
Hyporhamphus unifasciatus 2161
- K**
Keeltail needlefish 2123
- M**
Mackerels 2127
Marao lisero 2126
Marao ojón 2125
Margined flyingfish 2137
Mediterranean flyingfish 2140
Mirrorwing flyingfish 2151
- N**
Nanichthys simulans 2130
Needlefishes 2118,2127,2156
- O**
Oceanic bluntnose flyingfish 2155
Oceanic two-wing flyingfish 2145
Orphie 2122
Orphie carènée 2123
Orphie plate 2121
Oxyporhamphus 2118,2131
Oxyporhamphus micropterus similis 2162
Oxyporhamphus similis 2156
- P**
Paparda del Atlántico 2129
Paparda enana 2130
Parexocoetus brachypterus 2153
Parexocoetus brachypterus hillianus 2153
Parexocoetus hillianus 2153
Pikes 2127
Platybelone argalus 2123
Platybelone argalus annobonensis 2123
Platybelone argalus lovii 2123
Platybelone argalus trachura 2123
Prognichthys gibbifrons 2154-2155
Prognichthys glaphyrae 2155
- R**
Redfin flyingfish 2150
- S**
SCOMBERESOCIDAE 2127
Sauries 2127
Scomberesox 2127
Scomberesox saurus 2127,2129-2130
Scomberesox saurus scombroides 2129
Scomberesox simulans 2130
Scomberesox sp. 2130
SCOMBRIDAE 2127
Senegal needlefis. 2124
Sharpchin flyingfish 2147
SPHYRAENIDAE 2118
Spotfin flyingfish 2139
Strongylura marina 2124
Strongylura senegalensis 2124
- T**
Tropical two-wing flyingfish 2146
Tunas 2127
Tylosurus acus 2125
Tylosurus acus imperialis 2125
Tylosurus acus rafale 2125
Tylosurus crocodilus 2125
Tylosurus crocodilus crocodilus 2126
Tylosurus crocodilus fodiator 2126

Tylosurus pacificus 2125
Tylosurus raphidoma 2126

V

Volador 2146
 Volador africano 2143
 Volador aleta negra 2149
 Volador aletón 2153
 Volador atlántico 2141
 Volador bandiblanco 2138
 Volador bordiblanco 2137
 Volador de Bennett 2144
 Volador de Guinea 2142
 Volador espejo 2151
 Volador golondrina 2148
 Volador jorobado 2154
 Volador manchado 2139
 Volador mediterráneo 2140
 Volador nato 2145
 Volador picudo 2147

A

acus imperialis, Tylosurus 2125
acus rafale, Tylosurus 2125
acus, Belone belone 2122
acus, Tylosurus 2125
acutus, Fodiator 2147
affinis, Hirundichthys 2131,2148
annobonensis, Platybelone argalus 2123
argalus annobonensis, Platybelone 2123
argalus lovii, Platybelone 2123
argalus, Platybelone 2123
argus trachura, Platybelone 2123

B

balao, Hemiramphus 2159-2160
belone acus, Belone 2122
belone belone, Belone 2122
belone euxini, Belone 2122
belone, Belone 2122
belone, Belone belone 2122
brachypterus hillianus, Parexocoetus 2153
brachypterus, Parexocoetus 2153
brasiliensis, Hemiramphus 2159-2160

C

crocodilus crocodilus, Tylosurus 2126
crocodilus fodiator, Tylosurus 2126
crocodilus, Tylosurus 2125
crocodilus, Tylosurus crocodilus 2126

cyanopterus, Cheilopogon 2137
cyanopterus, Cypselurus 2137

E

euxini, Belone belone 2122
exsiliens, Cheilopogon 2138
exsiliens, Cypselurus 2138,2143

F

fodiator, Tylosurus crocodilus 2126
furcatus, Cheilopogon 2139
furcatus, Cypselurus 2139

G

gibbifrons, Prognichthys 2154-2155
glaphyrae, Prognichthys 2155
gracilis, Belone 2122

H

heterurus, Cheilopogon 2140-2141
heterurus, Cypselurus 2140
hians, Ablennes 2121
hillianus, Parexocoetus 2153
hillianus, Parexocoetus brachypterus 2153

I

imperialis, Tylosurus acus 2125

L

lineatus, Cypselurus 2144
lovii, Platybelone argalus 2123

M

marina, Strongylura 2124
melanurus, Cheilopogon 2141
melanurus, Cypselurus 2141
micropterus similis, Oxyporhamphus 2162
milleri, Cheilopogon 2142
milleri, Cypselurus 2142

N

nigricans, Cheilopogon 2143
nigricans, Cypselurus 2143

O

obtusirostris, Exocoetus 2145

P

pacificus, Tylosurus 2125
picarti, Hyporhamphus 2161
pinnatibarbatu, Cheilopogon 2144
pinnatibarbatu, Cypselurus 2144

R	
<i>rafale</i> , <i>Tylosurus acus</i>	2125
<i>raphidoma</i> , <i>Tylosurus</i>	2126
<i>rondeletii</i> , <i>Danichthys</i>	2152
<i>rondeletii</i>, <i>Hirundichthys</i>	2149
<i>rondeletii</i> , <i>Hirundichthys</i> (<i>Danichthys</i>) . . .	2150
<i>rufipinnis</i>, <i>Hirundichthys</i>	2150
S	
<i>saurus scombroides</i> , <i>Scomberesox</i>	2129
<i>saurus</i> , <i>Scomberesox</i>	2127,2129-2130
<i>senegalensis</i> , <i>Strongylura</i>	2124
<i>similis</i> , <i>Oxyporhamphus</i>	2156
<i>similis</i> , <i>Oxyporhamphus micropterus</i>	2162
<i>simulans</i> , <i>Nanichthys</i>	2130
<i>simulans</i>, <i>Scomberesox</i>	2130
<i>speculiger</i>, <i>Hirundichthys</i>	2151
T	
<i>trachura</i> , <i>Platybelone argalus</i>	2123
U	
<i>unifasciatus</i>, <i>Hyporhamphus</i>	2161
V	
<i>velox</i>, <i>Euleptorhamphus</i>	2156,2162
<i>volador</i>, <i>Hirundichthys</i>	2152
<i>volitans</i>, <i>Exocoetus</i>	2146

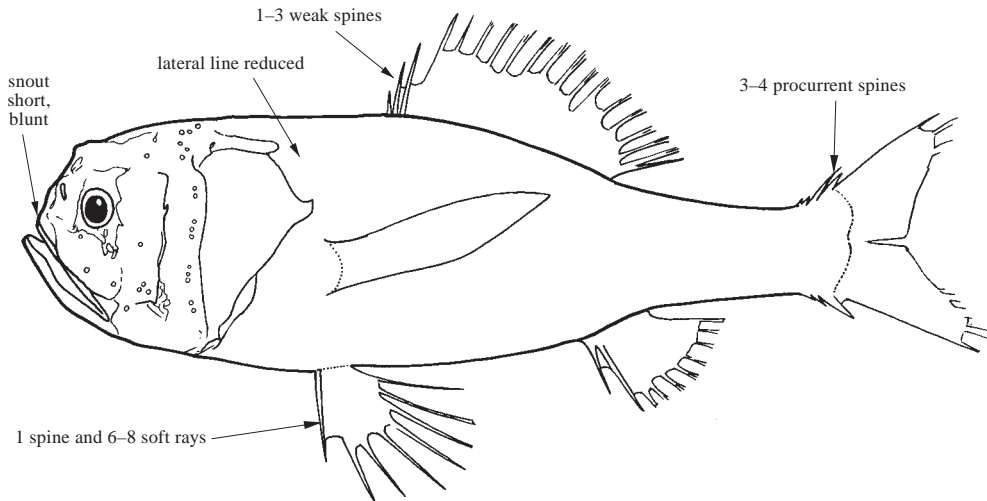
Order STEPHANOBERYCIFORMES

MELAMPHAIDAE

Big scales

by J.A. Moore, Florida Atlantic University, Jupiter, FL, USA

Diagnostic characters: Small (to 187 mm standard length) stephanoberyciform fishes. **Body subcylindrical. Head large; large sensory canals separated by very thin bony ridges and covered with membranous skin.** Eye small in most species. **Snout short and blunt.** Mouth moderately large and oblique, 1 supramaxilla (absent in *Scopelogadus*). Teeth on jaws minute, in bands or uniserial row; vomer and palatine toothless. **One dorsal fin with 1 to 3 weak spines and 9 to 18 soft rays;** anal fin with 1 weak spine and 7 to 10 soft rays; caudal fin emarginate, with **3 or 4 procurent spines in upper and lower lobes** and 19 principal rays; pectoral fins with 13 to 16 rays; pelvic fins with 1 spine and 6 to 8 soft rays. Scales thin and cycloid, usually deciduous, moderate-sized to very large; **lateral line reduced to 1 or 2 pored scales behind upper edge of operculum;** 12 to 40 transverse rows of scales along body. No light organs. **Colour:** body and head dark brown or black.

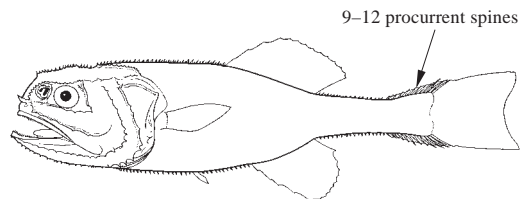


Habitat, biology, and fisheries: Meso- to bathypelagic, at depths from 200 to 2 000 m. Many species widely distributed in Atlantic and Indo-Pacific. Feed primarily on gelatinous organisms and small crustaceans. Frequently taken in deepwater trawls, but of no commercial importance.

Remarks: Family contains with at least 65 species in 5 genera, found in midwaters of all oceans except Arctic Ocean and Mediterranean Sea. Most recent published coverages of eastern Atlantic species are by Maul (1986 and 1990). Since 2002, Kotlyar has published a series of revisions of Melamphaidae worldwide, which resurrected a number of previously synonymized species and described many new species (see Kotlyar, 2011, 2015).

Similar families occurring in the area

Stephanoberycidae: ridges on head extremely spinose; 9 to 12 procurent spines in upper and lower caudal lobes; pelvic fins minute with no spine and 5 soft rays.



Stephanoberycidae

Key to the genera of Melamphaidae occurring in the area

- 1a. Very large scales, fewer than 15 transverse scale rows from nape to caudal base (scales almost always lost, leaving large, shaggy scale pockets); scales on cheek absent (no apparent scale pockets); supramaxilla absent **Scopelogadus**
- 1b. Smaller scales, more than 20 transverse scale rows from nape to caudal base (scales mostly lost, leaving discernable scale pockets); scales on cheek (leaving discernable scale pockets); supramaxilla present → 2
- 2a. Ridges on top of head crest-like with serrate edges; conspicuous dorsally-directed spine present between nostrils; ventral edge, angle, and most of posterior edge of preopercle serrate; scales on cheek 3 or 4 (but often lost) **Poromitra**
- 2b. Ridges on top of head not crest-like with edges smooth; no conspicuous dorsally-directed spine between nostrils; ventral edge, angle, and posterior edge of preopercle smooth; scales on cheek 2 or 3 (but often lost) → 3
- 3a. Total number of dorsal-fin elements (spines plus rays) less than 16 **Scopeloberyx**
- 3b. Total number of dorsal-fin elements (spines plus rays) more than 16. **Melamphaes**

List of species occurring in the area

- Melamphaes ebelingi* Keene, 1973. To 126 mm SL. Subtropical Atlantic.
- Melamphaes eulepis* Ebeling, 1962. To 48 mm SL. Tropical worldwide.
- Melamphaes inconspicuus* Kotlyar, 2015. To 25 mm SL. Tropical Atlantic.
- Melamphaes kobylyanskyi* Kotlyar, 2015. To 19 mm SL. Subtropical/temperate southeastern Atlantic.
- Melamphaes leprus* Ebeling, 1962. To 112 mm SL. Tropical eastern Atlantic
- Melamphaes longivelis* Parr, 1933. To 127 mm SL. Tropical/temperate Atlantic.
- Melamphaes manifestus* Kotlyar, 2011. To 87 mm SL. Tropical eastern Atlantic
- Melamphaes microps* (Günther, 1878). To 96 mm SL. Subtropical southeastern Atlantic and southwestern Indian Ocean.
- Melamphaes polylepis* Ebeling, 1962. To 73 mm SL. Tropical worldwide.
- Melamphaes pumilus* Ebeling, 1962. To 24 mm SL. Tropical/subtropical N Atlantic.
- Melamphaes simus* Ebeling, 1962. To 29 mm SL. Tropical/temperate worldwide.
- Melamphaes suborbitalis* (Gill, 1883). To 114 mm SL. Subtropical/temperate Atlantic.
- Melamphaes typhlops* (Lowe, 1843). To 100 mm SL. Tropical/subtropical Atlantic.
- Poromitra capito* Goode and Bean, 1883. To 102 mm SL. Subtropical/temperate N Atlantic.
- Poromitra crassiceps* (Günther, 1878). To 187 mm SL. Subtropical/temperate Atlantic.
- Poromitra megalops* (Lütken, 1878). To 76 mm SL. Tropical/subtropical worldwide.
- Poromitra* sp. To 138 mm SL. Tropical/subtropical Atlantic.
- Scopeloberyx nigrescens* (Brauer, 1906). To 25 mm SL. Tropical Atlantic and temperate southeastern Atlantic. Considered by some authors as a synonym of *S. robustus*.
- Scopeloberyx opercularis* Zugmayer, 1911. To 96 mm SL. Tropical Atlantic. Considered by some authors as a synonym of *S. robustus*.
- Scopeloberyx opisthopterus* (Parr, 1933). To 40 mm SL. Tropical/subtropical N Atlantic.
- Scopeloberyx robustus* (Günther, 1887). To 50 mm SL. Subtropical/tropical Atlantic.
- Scopeloberyx rubriventer* Koefoed, 1953. To 28 mm SL. Subtropical/tropical Atlantic.
- Scopelogadus beanii* (Günther, 1887). To 122 mm SL. Subtropical/temperate worldwide.
- Scopelogadus mizolepis* (Günther, 1878). To 94 mm SL. Tropical/subtropical worldwide.

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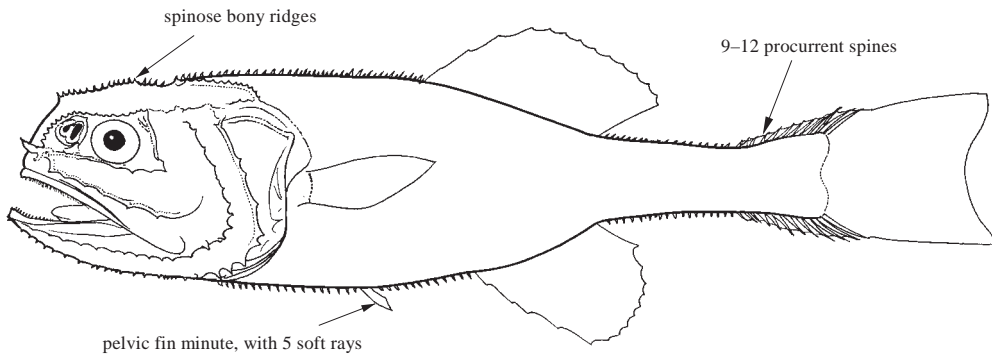
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STEPHANOBERYCIDAE

Pricklefishes

by J.A. Moore, Florida Atlantic University, Jupiter, FL, USA

Diagnostic characters: Small (to 168 mm standard length) stephanoberyciform fishes. **Body and head subcylindrical.** Head moderately large, about 1/3 standard length; **large sensory canals separated by extremely spinose bony ridges and covered with membranous skin.** Eye moderate to small. Snout blunt. Mouth moderate-sized and terminal; 1 supramaxilla. Teeth on jaws minute, in bands; vomer and palatine toothless. **Single dorsal fin set far back and symmetrical with anal fin,** with 0 to 3 weak spines and 9 to 14 rays; anal fin with 0 to 3 weak spines and 9 to 14 rays; **caudal fin emarginate with 9 to 12 procurrent spines in upper and lower lobes** and 19 principal rays; pectoral fins with 11 to 14 rays; **pelvic fins minute, with no spine and 5 or 6 rays.** Scales firmly adherent with 1 to 6 outwardly pointing spines in *Acanthochaenus* and deciduous cycloid in *Abyssoberyx*. Lateral line obscure. **Colour:** brownish overall or dark brown to black head and whitish body with brownish scales and fins.

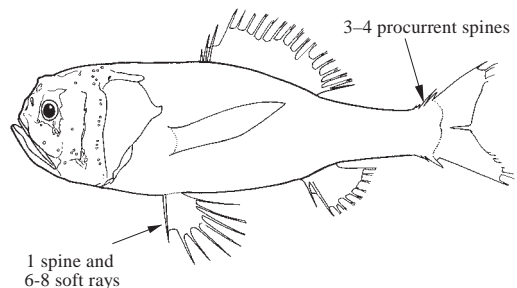


Habitat, biology, and fisheries: Benthopelagic or abyssal benthic, at depths from 945 to 5 308 m. *Acanthochaenus* in the southwestern Indian Ocean feeds on benthic crustaceans and has a maximum age calculated at 12+ years from otoliths. Both *Acanthochaenus* and *Abyssoberyx* are reproductively mature by 80 mm standard length. Occasionally taken in bottom trawls. Rare fishes of no commercial importance.

Remarks: Family contains 4 species in 4 monotypic genera. Most recent reviews are by Ebeling and Weed (1973) and Kotlyar (1996).

Similar families occurring in the area

Melamphaidae: 3 or 4 procurrent spines in upper and lower caudal lobes; pelvic fins with 1 spine and 6 to 8 rays; deciduous cycloid scales on body; lateral line reduced to 1 or 2 pored scales above opercle.



Melamphaidae

Key to the species occurring in the area

- 1a.** Scales deciduous cycloid, empty scale pockets create impression of vertical stripes; gill rakers 5–7 + 1 + 13–14 = 19–21 ***Abyssoberyx levisquamosus***
- 1b.** Scales strongly adherent with 1 to 6 outwardly pointing spines; gill rakers 8–10 + 1 + 17–20 = 26–31 ***Acanthochaenus luetkenii***

List of species occurring in the area

Acanthochaenus luetkenii Gill, 1884. To 141 mm SL. Subtropical/temperate worldwide.

Abyssoberyx levisquamosus Merrett and Moore, 2005. To 168 mm SL. Tropical E Atlantic.

References

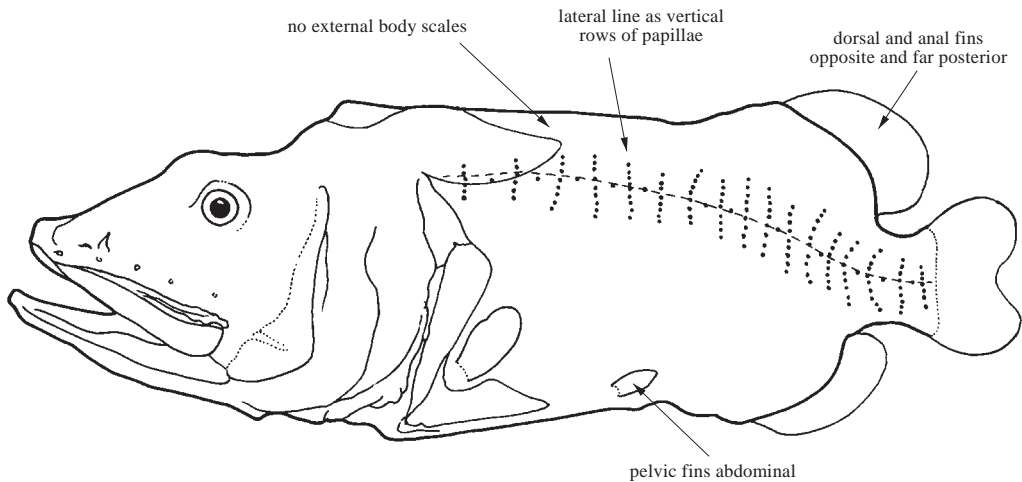
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RONDELETIIDAE

Redmouth whalefishes

by J.R. Paxton, Australian Museum, Sydney, Australia and T. Trnski, Auckland Museum, Auckland, New Zealand

Diagnostic characters: Body flabby, somewhat whale-shaped with median fins opposite and far posterior. Head large; mucous cavities on top of head indistinct, covered by thick skin. Eyes small. Snout very long; nasal organ moderately developed; posterior nostril with large, triangular skin flap. Mouth large, nearly horizontal, **jaws not extending beyond posterior margin of eye**. Teeth small and closely set on jaws, vomer, and pharyngobranchials; palatine, ectopterygoid, and basibranchials (copula/tongue) toothless. Gill rakers well developed, lath-like. Fins without spines; 1 dorsal fin with 13 to 16 soft rays; anal fin with 13 to 16 soft rays; caudal fin with 19 principal rays; pectoral fins with 9 to 11 rays; **pelvic fins abdominal with 5 to 6 soft rays**. Lateral line as vertical rows of papillae without supporting internal scales. **External body scales absent**. Photophores and luminous tissue absent. Cavernous tissue absent. Ribs present. **Total vertebrae 24 to 27**. **Colour:** in life, orange-brown, inside mouth and gill cavities red-orange; in preservative, brown.

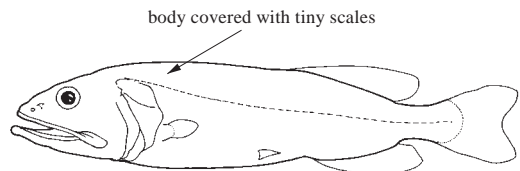


Habitat, biology, and fisheries: Mesopelagic and some bathypelagic. Feeds as predator on amphipods and crustaceans. Uncommon deep-sea fishes of no commercial importance.

Remarks: One genus with 2 species throughout world's oceans in tropical and temperate latitudes; both species in area.

Similar families occurring in the area

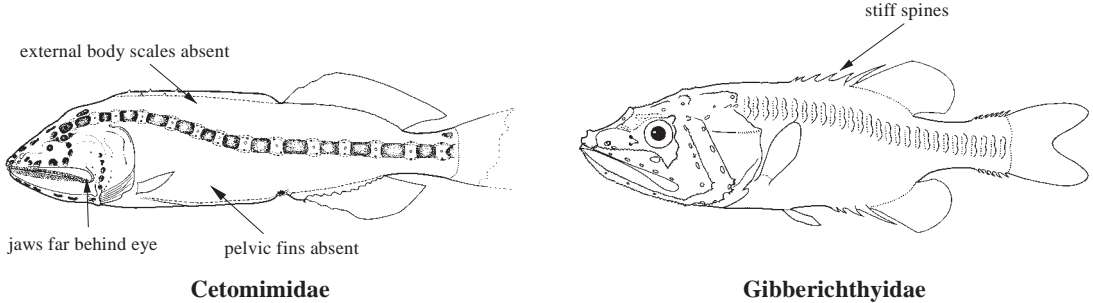
Barbourisiidae: mouth very large with jaws extending far behind eye; head and body covered with tiny scales with central spine giving velvet-like texture; lateral line as tube with moderate pores; live colour bright red-orange.



Barbourisiidae

Cetomimidae: pelvic fins absent; mouth very large to enormous with jaws extending far behind eye; most species with lateral line as broad tube with large pores, only 1 with vertical rows of many papillae; ribs absent.


Gibberichthyidae: anterior stiff spines in dorsal, anal, and caudal fins; body covered with scales; colour black.



Key to the species of Rondeletiidae occurring in the area

- 1a. Vertical rows of lateral-line papillae 24 to 26; bony hook over orbit present; large posterior extensions of spongy bone on supraterporal or cleithrum absent
 ***Rondeletia bicolor***
- 1b. Vertical rows of lateral line papillae 15 to 19; bony hook over orbit absent; large posterior extensions of spongy bone on supraterporal and cleithrum present
 ***Rondeletia loricata***

List of species occurring in the area

The symbol  is given when species accounts are included.

 *Rondeletia bicolor* Goode and Bean, 1895.

 *Rondeletia loricata* Abe and Hotta, 1963.

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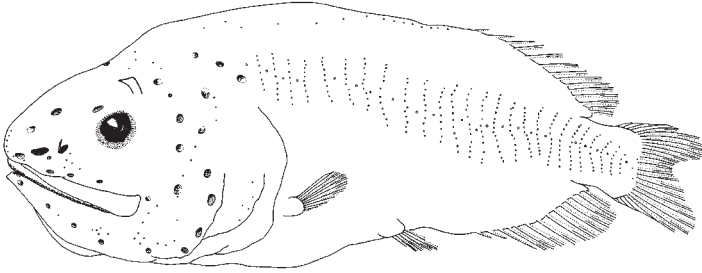
Paxton, J.R., Johnson, G.D. & Trnski, T. 2001. Larvae and juveniles of the deepsea “whalefishes” *Barbourisia* and *Rondeletia* (Stephanoberyciformes: Barbourisiidae, Rondeletiidae), with comments on family relationships. *Records of the Australian Museum*, 53: 407–425.

Paxton, J.R. & Trnski, T. 2003. Rondeletiidae. In K. Carpenter, ed. The living marine resources of the western central Atlantic, Volume 2: Bony fishes part 1 (Acipenseridae to Grammatidae). *FAO species identification guide for fishery purposes and American Society of Ichthyologists and Herpetologists Special Publication No. 5*. Rome, FAO, p. 1168–1169.

***Rondeletia bicolor* Goode and Bean, 1895**

En – Hooked redmouth whalefish.

Maximum size to 100 mm standard length, commonly to 60 mm; 40 specimens known. Mesopelagic, perhaps bathypelagic, nocturnal vertical migration to 300 to 500 m likely. In area only 1 record; mainly in western North Atlantic and Gulf of Mexico, few records from western South Atlantic and eastern and western central Pacific.



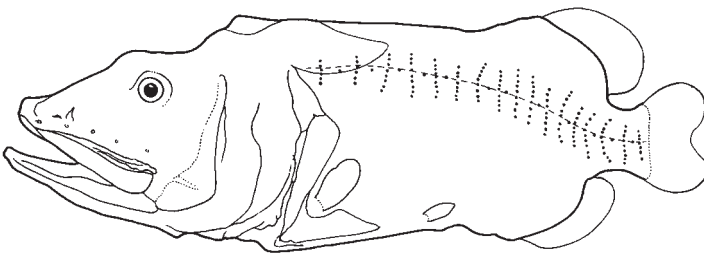
(after Paxton *et al.*, 2001)



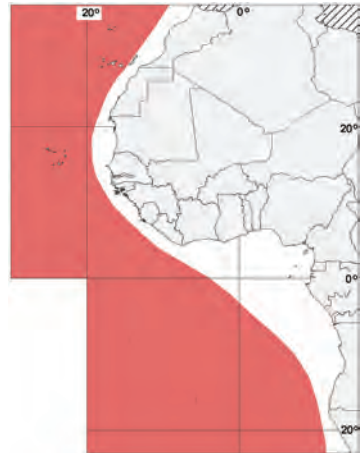
***Rondeletia loricata* Abe and Hotta, 1963**

En – Common redmouth whalefish.

Maximum size to 110 mm standard length, commonly to 90 mm; 150+ specimens known. Mesopelagic, some bathypelagic, 2 from 1 200 to 1 400 m; larvae and small juveniles in upper 200 m, limited evidence of nocturnal vertical migration to 250 to 300 m. In area 11 records mostly far from shore. Also circumglobal 60°N to 50°S, excluding Gulf of Mexico, Caribbean, and far western North Atlantic.

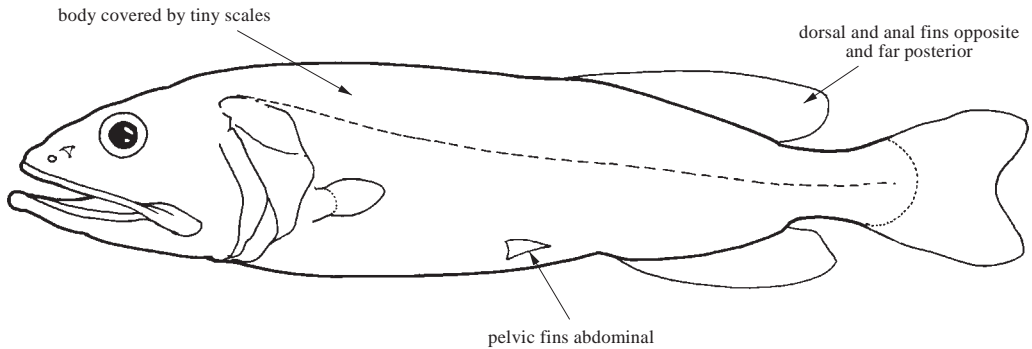


(after Paxton and Bray, 1986)



BARBOURISIIDAE**Redvelvet whalefish**

by J.R. Paxton, Australian Museum, Sydney, Australia

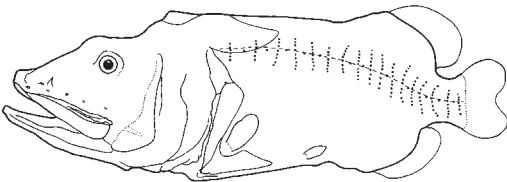
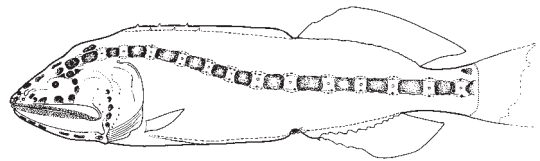
A single species occurring in the area.***Barbourisia rufa* Parr, 1945****Frequent synonyms / misidentifications:** None / None.**FAO names:** En – Redvelvet whalefish.

Diagnostic characters: Body somewhat flabby, moderately robust, whale-shaped with median fins opposite and far posterior. Head large; mucous cavities on top of head separated by thick ridges and covered by skin. Eye small to moderate. Snout very long; nasal organ moderately developed, no skin flap on posterior nostril. **Mouth very large, nearly horizontal, jaws extending far behind eye.** Teeth small and closely set on jaws, vomer, ectopterygoid, and pharyngobranchials; palatine and basibranchials (copula/tongue) toothless. Gill rakers well developed, lath-like, 4 to 6 + 14 to 17. Fins without spines; 1 dorsal fin with 19 to 23 soft rays; anal fin with 16 to 18 soft rays; caudal fin with 19 principal rays; pectoral fins with 13 or 14 rays; **pelvic fins abdominal with 6 soft rays.** **Lateral line well developed as a broad tube pierced by small pores and supported by internal scales.** Body and head covered with small, adherent, non-imbricate scales, each with a single, central spine giving a velvet-like texture. Photophores and luminous tissue absent. Cavernous tissue absent. Ribs present. **Total vertebrae 40 to 43.** **Colour:** in life, bright red-orange; in preservative, white.

Similar families occurring in the area

Rondeletiidae: external body scales absent; lateral line as vertical rows of papillae; mouth large, but jaws not extending beyond posterior margin of eye; colour orange-brown in life, brown in preservative.

Cetomimidae: external body scales absent; pelvic fins absent; ribs absent; colour brown or black.

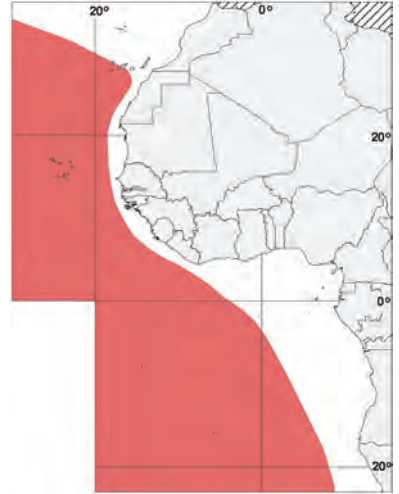
**Rondeletiidae****Cetomimidae**

Size: Maximum to 38 cm standard length; common to 30 cm.

Habitat, biology, and fisheries: Mesopelagic as juveniles, largest adults over 30 cm often benthopelagic to 1 000 m and deeper. Feeding mode unknown, presumably as predator on crustaceans. Uncommon deep-sea fish (more than 100 specimens known) of no commercial importance.

Distribution: In area, 8 records from Canary Islands to 5°S, 5°W; also number of records 25° to 35°S off western South Africa and circumglobal, Atlantic 65°N to 35°S, Indian 5° to 20°S, Pacific 50°N to 50°S.

Remarks: One genus and species in family.



References

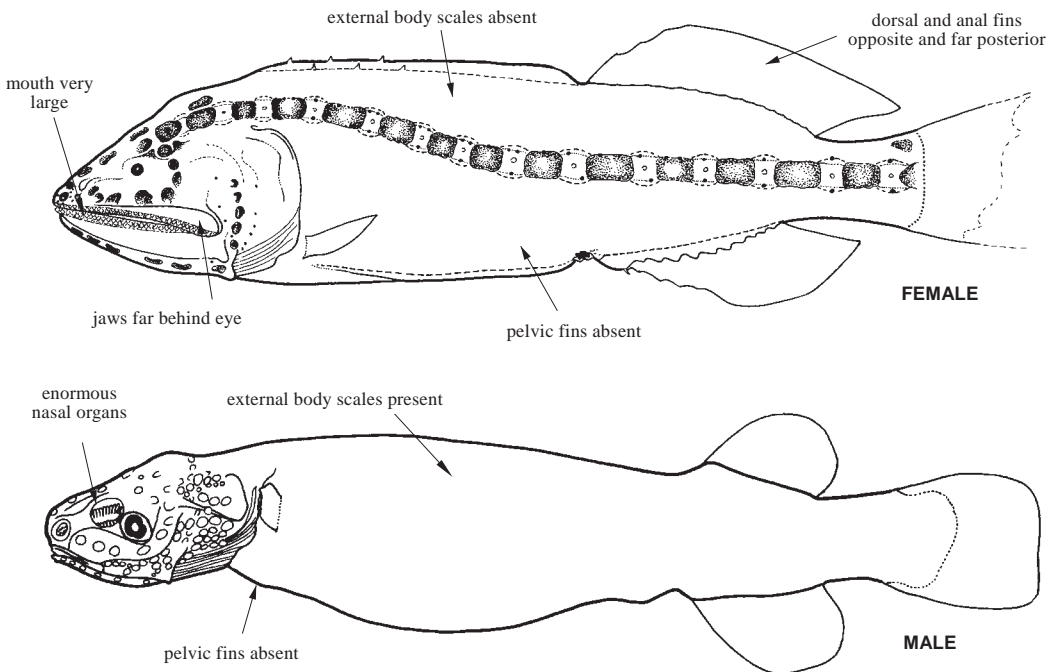
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- Paxton, J.R.** 2003. Barbourisiidae. In K. Carpenter, ed. The living marine resources of the Western Central Atlantic, Volume 2: Bony fishes part 1 (Acipenseridae to Grammatidae). *FAO species identification guide for fishery purposes and American Society of Ichthyologists and Herpetologists Special Publication No. 5*. Rome, FAO, p. 1170.
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CETOMIMIDAE

Flabby whalefishes

by J.R. Paxton, Australian Museum, Sydney, Australia, T. Trnski, Auckland Museum, Auckland, New Zealand and G.D. Johnson, Smithsonian Institution, Washington, DC, USA

D **Diagnostic characters:** **Body soft and flabby**, slender to robust, **whale-shaped in females, elongate in males, with median fins opposite and far posterior. Head large to very large (few moderate) in females, small in males;** no bone-bordered mucous cavities on top of head. Eye degenerate, tiny in females, small in males (small and developed in female *Procetichthys*). Snout very long; nasal organ poorly developed in females (except *Procetichthys*), **enormous, covering most of snout in males**, no skin flap on posterior nostril. **Mouth very large**, horizontal in females, moderate, horizontal in males, **jaws extending far behind eye in females**, not extending behind eye in males. **Jaw teeth** either tiny and closely set, and widely spaced, or elongate in well defined, closely set rows in females, **absent in males;** jaws, pharyngobranchials, and **basihyal/basibranchials (copula/tongue) always toothed;** vomer, palatine, and ectopterygoid usually toothed in females, only pharyngobranchial 4 always toothed, vomer toothed or toothless, jaws and all other oral bones toothless in males. **Gill rakers club-shaped, or as tooth patches, tooth plates or individual teeth, never lath-like in females, absent in males. Branchiostegal membranes unfused in females, fused across isthmus in males.** Fins without spines; 1 dorsal fin with 13 to 37 soft rays in females, 15 to 31 in males; anal fin with 11 to 34 soft rays in females, 13 to 29 in males; pectoral fins with 15 to 24 rays in females (14?), 18 to 23 in males; **pelvic fins absent in adults, present, jugular in larvae with 4 to 10 soft rays, fewer in transforming larvae; caudal fin with 10 to 19 principal rays (usually damaged) in females, 16 or 17 principal rays in males (apparent sexual dimorphism presumably due to small sample size of males), larval tail streamer absent in adults. Lateral line very well developed, supported by internal scales; in most as a broad tube pierced by large pores (*Procetichthys* with long vertical rows of lateral-line papillae; *Rhamphocetichthys* with rows of 1 to 3 papillae) in females, short vertical rows of lateral-line papillae on paired lateral-line scales (usually damaged or lost) in males. External body scales absent in females, small to moderate, non-imbriicate, and cycloid (often lost from net damage) in males. Photophores or apparent luminous tissue absent. Unique cavernous tissue around anus in most species, over base of anal fin and other areas in many species in females, absent in males. Ribs absent. Total vertebrae 38 to 59 in females, 41 to 57 in males. **Colour:** brown or black; in fresh specimens fin rays and inside mouth reddish orange in females, brown, black or unknown in males; live females (2 videos) red-orange.**



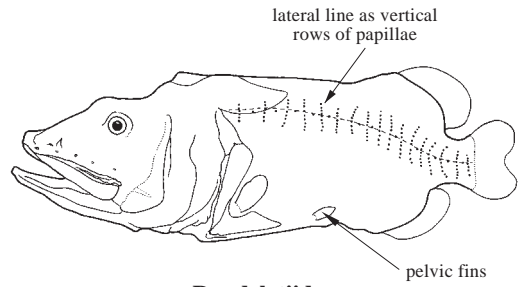
Habitat, biology, and fisheries: Bathypelagic as adults, some females apparently benthopelagic, some juveniles mesopelagic; males previously considered separate family Megalomyceridae; larvae previously considered separate family Mirapinnidae. Females feed on crustaceans; males non-feeding after transformation, larvae feed on copepods. Rare to uncommon deep-sea fishes of no commercial importance.

Remarks: Nine genera with about 15 to 20 species throughout the world's oceans from boreal latitudes to the Antarctic; 6 genera and 9 species of females in the area; 8 possible species of males recognised, only 3 linked with females, 2 in the area. Revision of *Gyrinomimus* (Paxton, in preparation) nearing completion; review of *Cetomimus* in early stages with distributions incomplete.

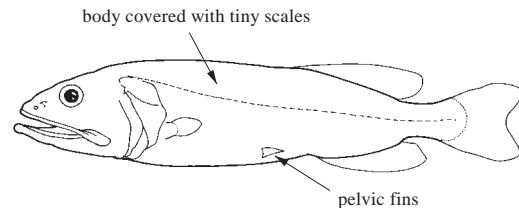
Similar families occurring in the area

Rondeletiidae: pelvic fins present, abdominal; lateral line as vertical rows of papillae; jaws not extending beyond posterior margin of eye; ribs present.

Barbourisiidae: pelvic fins present, abdominal; head and body covered with tiny scales, central spine of scales giving velvet-like texture; ribs present; live colour bright red-orange.



Rondeletiidae



Barbourisiidae

Key to the species of Cetomimidae females occurring in the area

Notes for identification: Cavernous tissue is a white and brown tissue unique to cetomimid females, where it is found in rows, bundles and/or tubules around or above the anus of most genera and species. Its distribution on other areas of the body is an important character for identifying different species within *Gyrinomimus* and *Cetomimus*. Cavernous tissue, of undetermined function but possibly pheromone production, is more fully described and figured in Paxton (1989). The first pore of the lateral line is just above the top of the gill opening. The number of pores is one more than the number of supporting scales at the bottom of the lateral-line canal that can be used for the count when the skin of the canal is damaged.

- 1a. Nasal organ long, filling both nostrils with more than 30 lamellae; lateral line without canal and pores, of vertical rows of papillae with at least 8 per row posteriorly; jaw teeth small, sharply pointed, and widely spaced; pseudobranch present; pectoral fin at midbody level with 15 rays (not recorded from the area but only 3 records from eastern Atlantic at 41°N and 37°S; manuscript in preparation by Paxton justifying *Mirapinna esau* Bertelsen & Marshall, 1956 as a senior synonym) ***Procetichthys krefftii***
- 1b. Nasal organ small and short, mostly in anterior nostril, with 0 to 10 lamellae; lateral line of canal and pores or vertical rows of 1 to 3 papillae; jaw teeth tiny and triangular or elongate in closely spaced rows; pseudobranch absent; pectoral fin below midbody level with 17 to 24 rays → 2

- 2a. Dorsal-fin rays 29 to 37; anal-fin rays 24 to 26; dorsal and anal fins abruptly elevated on bases higher than body; slit of fourth gill arch tiny and tubular, at angle of arch; 3 separate copular tooth plates ***Cetostoma regani***
- 2b. Dorsal- and anal-fin rays 13 to 22; dorsal- and anal-fin bases not abruptly elevated above body; slit behind ventral arm of fourth gill arch elongate or absent; 1 copular tooth plate → 3

- 3a. Snout elongate and beak-like, 5.1 to 6.2 in standard length; no lateral-line canal with pores, but vertical rows of 1 to 3 papillae; no lateralis canals on head, only sensory papillae; gill arches 2 and 3 without tooth knobs or plates ***Rhamphocetichthys savagei***
- 3b. Snout not elongate and beak-like, rounded, 7 to 12.7 in standard length (except *Cetomimus* sp. nov. P with large, deep snout 6 in standard length but not beak-like); lateral line a canal with 11 to 25 pores, no vertical rows of papillae; lateralis canals and pores on head; gill arches 2 and 3 with tooth plates or knobs → 4

- 4a. Free gill arches 4, with elongate slit behind ventral arm of fourth arch present; gill rakers/tooth plates separate and raised, domed to club-shaped; lateral-line scales round to rectangular and flat, without dorsal and ventral projections; vertebrae 38 to 46 → 5
- 4b. Free gill arches 3, with slit behind ventral arm of fourth arch absent; gill tooth plates contiguous, fusing with age, and flat; lateral-line scales elongate and curved with dorsal and ventral projections supporting lateral-line canal; vertebrae 44 to 59 → 6

- 5a. Dorsal-fin rays 19 to 22; vertebrae 38 to 42; lateral-line pores 11 to 14; jaw teeth tiny in irregular diagonal rows; gill rakers club-shaped; ventral pharyngeal tooth plate absent ***Ditropichthys storeri***
- 5b. Dorsal-fin rays 14 to 16; vertebrae 43 to 46; lateral-line pores 17 to 19; jaw teeth elongate in well-defined longitudinal rows; gill tooth plates round to ellipsoidal, slightly raised; ventral pharyngeal tooth plate present on fifth gill arch ***Danaceticthys galathenus***

- 6a. Jaw teeth in distinct longitudinal rows, all but newest teeth elongate with length more than 3 times basal width; vomerine tooth plate flat and rectangular or oval; cavernous tissue behind pectoral-fin base under fin rays, as well as other areas; vertebrae 52 to 56 ***Gyrinomimus myersi***
- 6b. Jaw teeth in indistinct diagonal rows, all teeth short with length less than 2 times basal width; vomerine tooth plate domed and round or rarely oval; cavernous tissue around anus and other areas, but never behind pectoral-fin base; vertebrae 48 to 53. → 7

- 7a. Lateral-line pores 11 to 14 with large, tent-like flaps wider than lateral-line canal posteriorly between pores; small cavernous tissue visible externally between anus and anal-fin origin, but extensive internally around anus in 'pseudo-cloaca', none elsewhere; head very large, 2.4 to 2.5 in standard length ***Cetomimus* sp. nov. P**
- 7b. Lateral-line pores 15 to 28 with small to moderate posterior flaps between pores, narrower than lateral-line canal; cavernous tissue visible externally around anus and often over or on and between anal-fin rays, sometimes predorsally and under or on and between dorsal-fin rays and/or on caudal peduncle; head moderate in length, more than 3 in standard length. → 8


- 8a. Cavernous tissue around anus, predorsally, on isthmus, and on dorsal area of caudal peduncle behind dorsal fin and sometimes on ventral surface behind anal fin; lateral-line pores 23 to 28 ***Cetomimus compunctus***
- 8b. No cavernous tissue on caudal peduncle or isthmus, although present at least around anus, and predorsally in some; lateral-line pores 15 to 23 → 9










- 9a. Cavernous tissue around anus and over anal-fin rays 3 or 4, predorsally and under dorsal-fin rays 4 or 5; lateral-line pores 18 to 23 ***Cetomimus hempelii***
- 9b. Cavernous tissue only around anus and over anal-fin rays 0 to 12, never predorsally or under dorsal-fin rays; lateral-line pores 15 to 20 ***Cetomimus gillii***

Key to the known males of the species of Cetomimidae occurring in the area

- 1a. Dorsal-fin rays 29 to 31; anal-fin rays (20) 25 to 29; anal-fin origin under dorsal-fin ray 4 to 6 ***Cetostoma regani***
- 1b. Dorsal-fin rays 16 to 18; anal-fin rays 16 to 19; anal-fin origin under dorsal-fin ray 0 to 4 ***Cetomimus/Gyrinomimus* spp.**

List of species occurring in the area

The symbol  is given when species accounts are included.

-  *Cetomimus compunctus* Abe, Marumo and Kawaguchi, 1965.
-  *Cetomimus gillii* Goode and Bean, 1895.
-  *Cetomimus hempelii* Maul, 1969.
-  *Cetomimus* sp. nov. P Paxton and Trnski, ms.
-  *Cetostoma regani* Zugmayer, 1914.
-  *Danacetichthys galathenus* Paxton, 1989.
-  *Ditropichthys storeri* (Goode and Bean, 1895).
-  *Gyrinomimus myersi* Parr, 1934.
-  *Rhamphocetichthys savagei* Paxton, 1989.
- Procetichthys krefftii* Paxton, 1989

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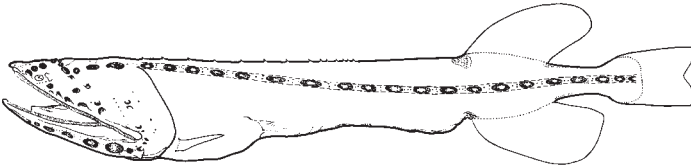
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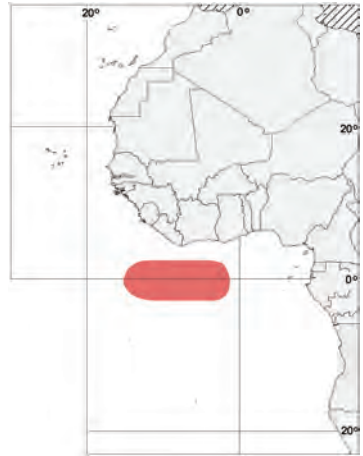
***Cetomimus punctatus* Abe, Marumo, and Kawaguchi, 1965**

En – Cavernous-peduncled flabby whalefish.

Maximum size for females to 160 mm standard length, common to 125 mm; 8 female specimens known, males unknown. Bathypelagic from open nets from 1 000 to 2 000 m. In the area, 2 oceanic records; also from western South Atlantic and tropical eastern, tropical western, and western North Pacific.



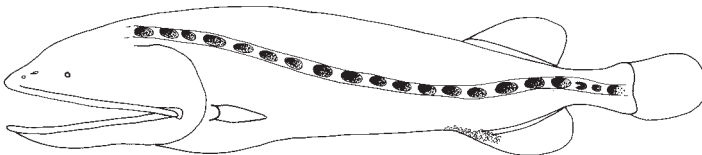
(after Paxton, 1989)



***Cetomimus gillii* Goode and Bean, 1895**

En – Gill's flabby whalefish.

Maximum size for females to 110 mm standard length, possibly to 140 mm, most under 90 mm; probably most common species of genus, with more than 20 female specimens known, males unknown. Bathypelagic to more than 1 000 m, some of smallest specimens less than 50 mm from upper 800 m. In the area, 7 oceanic records in northern half; also from western Atlantic and Gulf of Mexico, possibly circumglobal between 40°N and S.



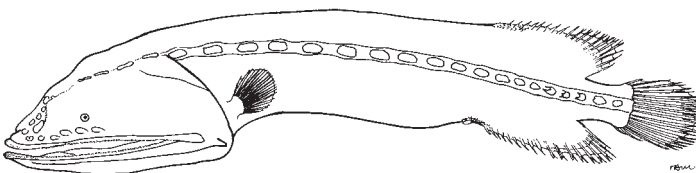
(illustration: T. Trnski)



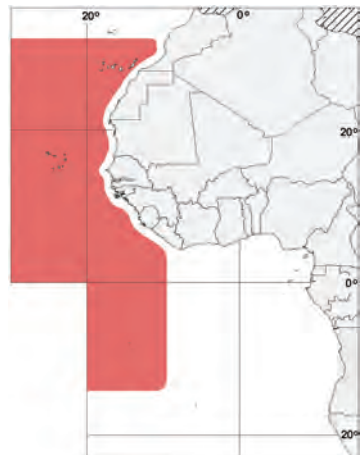
***Cetomimus hempeli* Maul, 1969**

En – Hempel's flabby whalefish.

Maximum size for females to 150 mm standard length, common to 80 mm, smallest 57 mm; 11 female specimens known, males unknown. Meso- and bathypelagic, 4 from closing nets 500 to 610 m to 1 250 to 1 500 m, smallest (68 mm) specimen also shallowest. In the area, 7 oceanic records; also from Gulf of Mexico and possibly eastern North and western North Pacific.



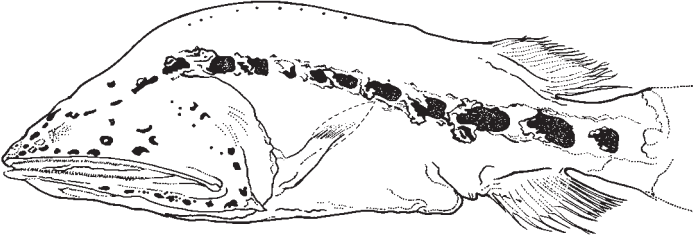
(after Maul, 1969)



***Cetomimus* sp. nov.** P Paxton and Trnski, in preparation

En – Butterfly flabby whalefish.

Maximum size for females to 85 mm standard length, others 44 to 83 mm; only 7 female specimens known, males unknown. Bathypelagic, from 1 000 to probably around 3 300 m. In the area 1 oceanic record; also from western North and western South Pacific.



(illustration: D. Bürkel)

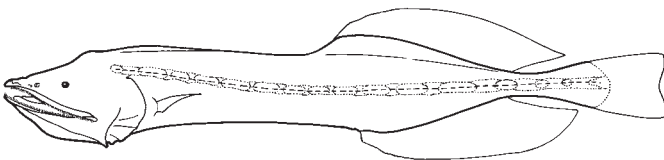


Cetostoma regani Zugmayer, 1914

Frequent synonyms / misidentifications: *Cetomimoides parri* Koefoed, 1955 (male), *Parataeniophorus gulosus* Bertelsen and Marshall, 1956 (larva) / None.

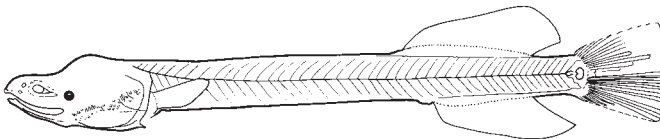
En – Longfin flabby whalefish.

Maximum size for females to 250 mm standard length, common to 190 mm, smallest 40 mm; most common whalefish with more than 150 female specimens recorded; 7 males from 34 to 41 mm standard length. Females meso- and bathypelagic, from 100 to probably around 3700 m, with smaller specimens usually less than 120 mm mesopelagic, often nocturnally; males bathypelagic, 1 closing net capture at 1 500 to 2 000 m. In the area females recorded throughout where bottom more than 1 000 m, plus 1 transforming juvenile female and 1 male; also circumglobal from 50°N to 40°S except the eastern South Pacific.



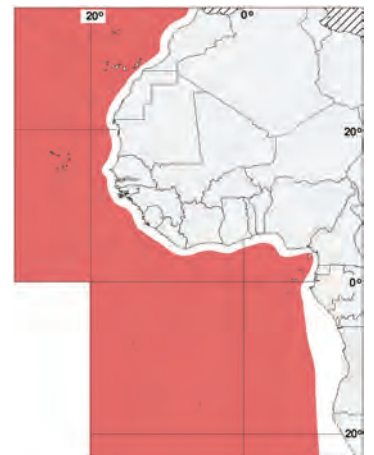
(after Paxton, 1989)

FEMALE



(after Koefoed, 1955)

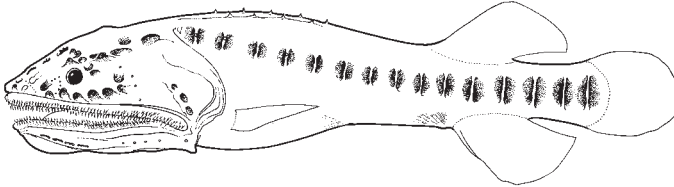
MALE



***Danacetichthys galathenus* Paxton, 1989**

En – Young flabby whalefish.

Maximum size for females to 54 mm standard length, others 34 to 53 mm; only 6 female specimens recorded, males unknown. Bathypelagic 1 300 to 2 000 m. In the area, 1 oceanic record; also from Caribbean Sea, tropical western Indian Ocean, and western Pacific from 30° to 20°N.



(after Paxton, 1989)

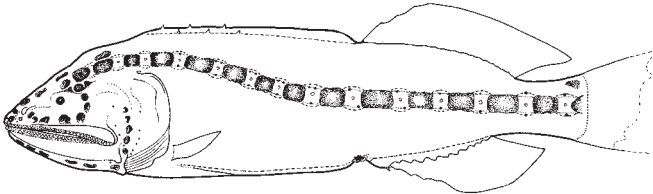


***Ditropichthys storeri* (Goode and Bean, 1895)**

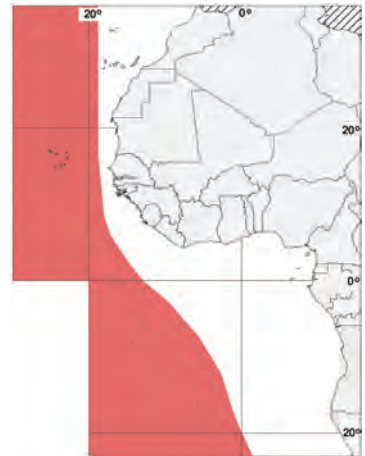
Frequent synonyms / misidentifications: *Parataeniophorus bertelseni* Shiganova, 1989 (larva) / None.

En – Doublekeel flabby whalefish.

Maximum size for females to 130 mm standard length, common to 100 mm, smallest 25 mm; about 100 female specimens recorded, males unknown. Specimens less than 40 mm sometimes mesopelagic 650 to 1 000 m, specimens greater than 60 mm bathypelagic from 1 000 to about 5 000 m. In the area, 7 oceanic records, potentially throughout where bottom greater than 1 000 m; elsewhere circumglobal between 45° N and S.



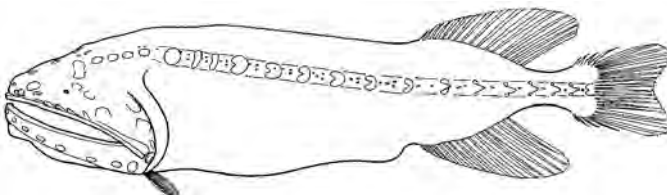
(after Paxton, 1989)



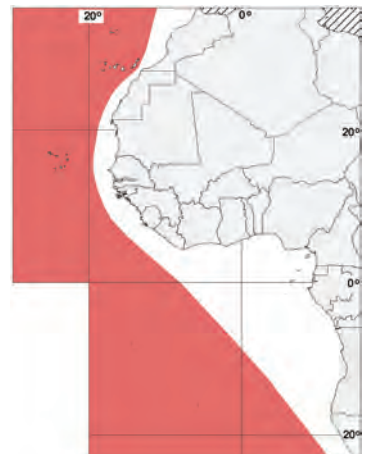
***Gyrinomimus myersi* Parr, 1934**

En – Myers' flabby whalefish.

Maximum size for females to 300 mm standard length, common to 165 mm; 20 female specimens known, males unknown. Bathypelagic, 1 closing net capture at 2 200 to 2 350 m. In area, 4 oceanic records; also circumglobal, 55° N to 20° S in Atlantic, tropical in central Indian Ocean, 40° to 20° N in Pacific.



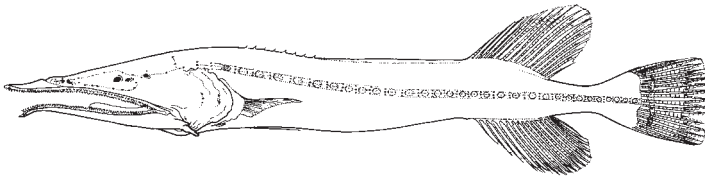
(after Parr, 1934)



***Rhamphocetichthys savagei* Paxton, 1989**

En – Birdsnout flabby whalefish.

Maximum size of females to 125 mm standard length, others 90 mm to 115 mm; only 5 female specimens recorded, males unknown. Bathypelagic from 1 000 to 2 100 m. In area, 1 oceanic record; also from the western North Atlantic, eastern and western tropical Pacific.



(after Paxton, 1989)



- A**
Abyssoberyx 2166
Acanthochaenus 2166
- B**
BARBOURISIIDAE 2171
Barbourisia rufa 2171
BARBOURISIIDAE 2168,2174
 Bigscales 2163
 Birdsnouted flabby whalefish 2181
 Butterfly flabby whalefish 2179
- C**
CETOMIMIDAE 2173
 Cavernous-peduncled flabby whalefish . . . 2178
CETOMIMIDAE 2169,2171
Cetomimoides parri 2179
Cetomimus 2174
Cetomimus compunctus 2178
Cetomimus gillii 2178
Cetomimus hempeli 2178
Cetomimus sp. nov. 2179
Cetostoma regani 2179
 Common redmouth whalefish 2170
- D**
Danacetichthys galathenus 2180
Ditropichthys storeri 2180
 Doublekeel flabby whalefish. 2180
- F**
 Flabby whalefishes. 2173
- G**
GIBBERICHTHYIDAE 2169
 Gill's flabby whalefish 2178
Gyrimomimus 2174
Gyrimomimus myersi 2180
- H**
 Hempel's flabby whalefish 2178
 Hooked redmouth whalefish. 2170
- L**
 Longfin flabby whalefish. 2179
- M**
MELAMPHAIDAE 2163
MELAMPHAIDAE 2166
 Myers' flabby whalefish 2180
- P**
Parataeniophorus bertelseni 2180
Parataeniophorus gulosus 2179
 Pricklefishes 2166
Procetichthys 2173
- R**
RONDELETIIDAE 2168
 Redmouth whalefishes 2168
 Redvelvet whalefish 2171
Rhamphocetichthys 2173
Rhamphocetichthys savagei 2181
Rondeletia bicolor 2170
Rondeletia loricata 2170
RONDELETIIDAE 2171,2174
- S**
STEPHANOBERYCIFORMES 2163
Scopelogadus 2163
STEPHANOBERYCIDAE 2163,2166-2167
- Y**
 Young flabby whalefish 2180
- B**
bertelseni, *Parataeniophorus* 2180
bicolor, *Rondeletia* 2170
- C**
compunctus, *Cetomimus* 2178
- G**

galathenus, Danacetichthys 2180
gillii, Cetomimus 2178
gulosus, Parataeniophorus 2179

H

hempeli, Cetomimus 2178

L

loricata, Rondeletia 2170

M

myersi, Gyrinomimus 2180

P

parri, Cetomimoides 2179

R

regani, Cetostoma 2179

rufa, Babourisia 2171

S

savagei, Rhamphocetichthys 2181

storeri, Ditropichthys 2180

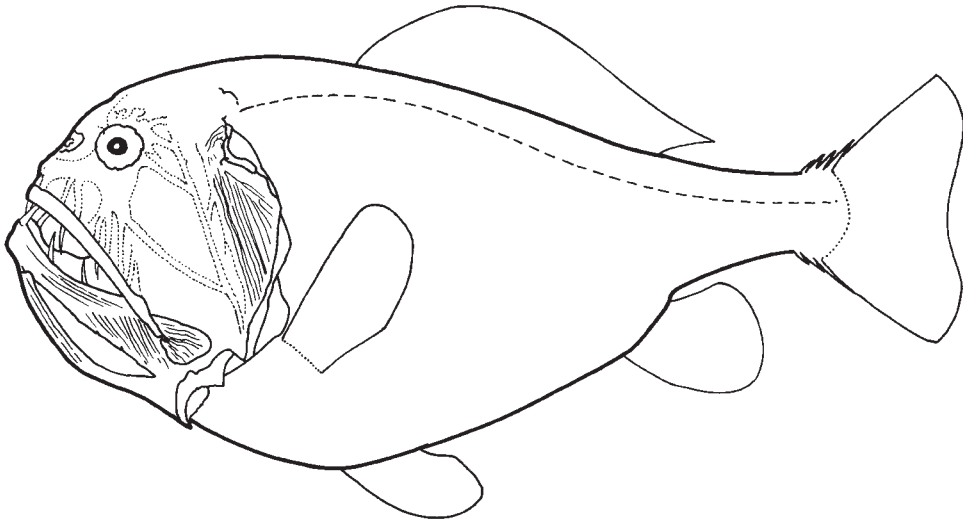
Order BERYCIFORMES

ANOPLOGASTRIDAE

Fangtooths

by J.A. Moore, Florida Atlantic University, Jupiter, FL, USA

DDiagnostic characters: Small (to about 160 mm standard length) beryciform fishes. Body short, deep, and compressed, tapering to narrow peduncle. Head large (1/3 standard length); deep sensory canals separated by serrated ridges; very large parietal and preopercular spines in juveniles of one species, all disappearing with age. **Eye smaller than snout length in adults**, but larger than snout length in juveniles. **Mouth very large and oblique, jaws extend behind eye in adults; 1 supramaxilla.** Bands of villiform teeth in juveniles are replaced with **large fangs on dentary and premaxilla in adults**; vomer and palatines toothless. **Gill rakers as clusters of teeth on gill arch in adults** (lath-like in juveniles). **No true fin spines; single, long-based dorsal fin with 16 to 20 rays; anal fin very short-based with 7 to 9 rays;** caudal fin emarginate; pectoral fins with 13 to 16 rays; pelvic fins with 7 rays. **Scales small, non-overlapping, spinose, goblet-shaped in adults; lateral line an open groove partially bridged by scales;** no enlarged ventral keel scutes. **Colour:** entirely dark brown or black in adults.



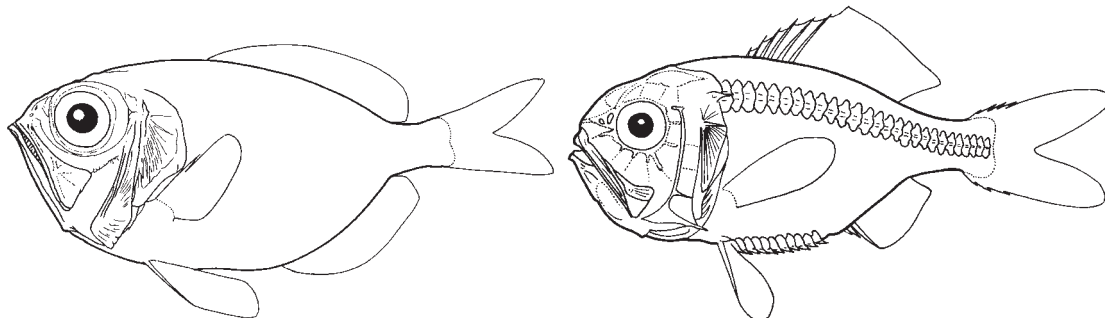
Habitat, biology, and fisheries: Meso- to bathypelagic, at depths of 75 to 5 000 m. Carnivorous, with juveniles feeding on mainly crustaceans and adults mainly on fishes. May sometimes swim in small groups. Uncommon deep-sea fishes of no commercial importance.

Remarks: The family was revised recently by Kotlyar (1986) and contains 1 genus with 2 species throughout the tropical and temperate latitudes.

Similar families occurring in the area

Diretmidae: no fangs; anal fin long-based, with 18 to 24 rays; ventral keel scutes; lateral line absent.

Trachichthyidae: no fangs; spines in dorsal and anal fins; ventral keel scutes.



Diretmidae

Trachichthyidae

List of species occurring in the area

Anoplogaster cornuta (Valenciennes, 1833). To 160 mm SL. Tropical/temperate worldwide.

Reference

Kotlyar, A.N. 1986. Classification and distribution of fishes of the family Anoplogastridae. *Voprosy Ikhtiologii*, 26(4): 531–551. [in Russian, English translation *Journal of Ichthyology*, 26(4): 133–152].

DIRETMIDAE

Spinyfins

by J.A. Moore, Florida Atlantic University, Jupiter, FL, USA

Diagnostic characters: Moderate-sized (to about 370 mm standard length) beryciform fishes. Body round to oval, strongly laterally compressed. Head moderate to large; deep sensory canals separated by thin serrated ridges and covered with membranous skin; no spine on preopercle in adults. **Eye very large, much longer than snout length.** Mouth large and oblique, jaws not extending behind eye; 1 supramaxilla. Teeth small, in villiform bands, on premaxilla and dentary, vomer and palatine toothless. **No true fin spines in dorsal or anal fins, soft rays with rows of very small spinules (hence spinyfins); dorsal- and anal-fin membranes have small roundish “windows” between bases of more posterior rays;** single dorsal fin very long based, with 23 to 30 rays; anal fin with 18 to 24 rays; caudal fin forked; pectoral fins with 16 to 20 rays; pelvic fins with 1 flattened serrate spine and 6 rays. Scales small and spinose; **enlarged scales along midventral line, forming an abdominal keel of spiny scutes.** **Lateral line absent.** Total number of vertebrae 26 to 32. **Glandular tissue found beneath gill cover, posteroventral to last gill arch.** Juveniles up to 1.5 cm have prominent spines on preopercle and parietals. **Colour:** silvery or greyish black.

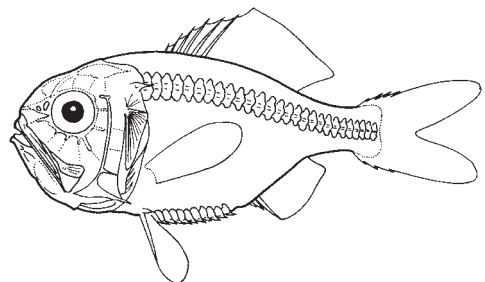


Habitat, biology, and fisheries: Meso- and bathypelagic, adults found from 200 to 2 100 m; larger adults of some species benthopelagic. Reportedly feed on small planktonic crustaceans. Uncommon deepsea fishes occasionally taken in trawls, sometimes locally abundant. No present commercial importance.

Remarks: Small family of 3 genera with 4 species, found in tropical to temperate waters worldwide. The most recent reviews are by Post and Quéro (1981) and Kotlyar (1988, 1996).

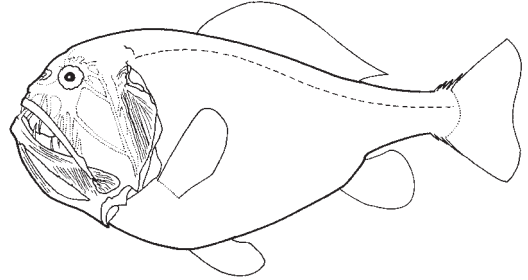
Similar families occurring in the area

Trachichthyidae: dorsal and anal fins with spines; lateral line present.



Trachichthyidae

Anoplogastridae: lateral line present; no abdominal keel; short-based anal fin; large fangs in adults.



Anoplogastridae

Key to the species of Diretmidae occurring in the area

- 1a.** Anus immediately anterior to anal fin; series of keeled scutes along ventral midline anterior to pelvic fins; 7 to 20 bony ridges on upper half of operculum; body profile round ***Diretmus argenteus***
- 1b.** Anus midway between pelvic and anal fins (separated from anal fin by at least 5 scutes); no series of keeled scutes along ventral midline anterior to pelvic fins; 3 to 6 bony ridges on upper half of operculum; body profile elliptical in adults → **2**
- 2a.** Tips of pelvic fins extend to or beyond anal-fin origin; 26 to 30 (usually 27 or 28) dorsal-fin rays; 18 to 20 rakers on first gill arch ***Diretmichthys parini***
- 2b.** Tips of pelvic fins do not extend to anal-fin origin; 24 to 26 (usually 25) dorsal-fin rays; 12 to 16 rakers on first gill arch ***Diretmoides pauciradiatus***

List of species occurring in the area

Diretmichthys parini (Post and Quéro, 1981). To 370 mm SL. Tropical/temperate worldwide.

Diretmoides pauciradiatus (Woods, in Woods and Sonoda 1973). To 140 mm SL. Tropical worldwide.

Diretmus argenteus Johnson, 1864. To 110.5 mm SL. Mesopelagic tropical/temperate worldwide.

References

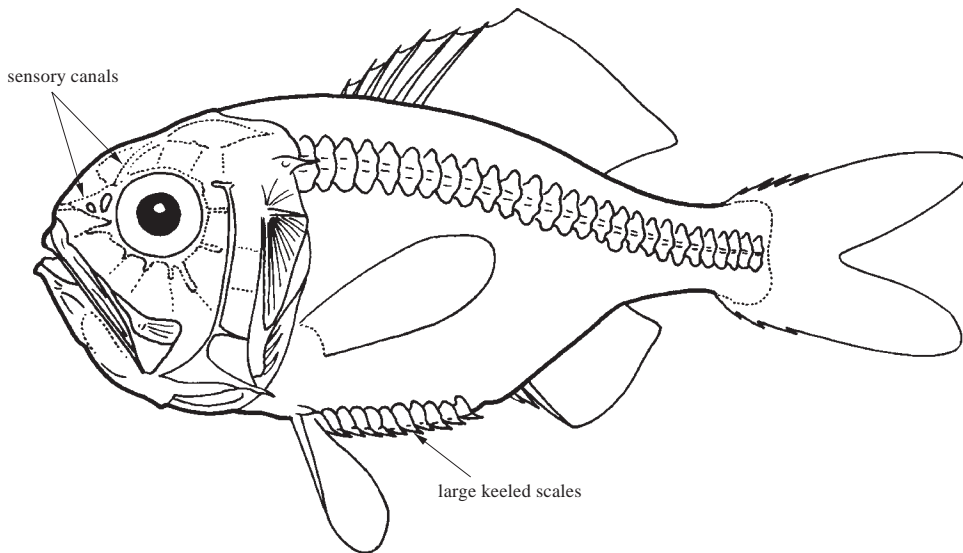
- Kotlyar, A.N.** 1988. Classification and distribution of fishes of the family Diretmidae (Beryciformes). *Journal of Ichthyology*, 28(2): 1–15.
- Kotlyar, A.N.** 1996. *Beryciform fishes of the world*. Moscow, VNIRO Publishing, 368 p. [in Russian]
- Post, A. & Quéro, J.-C.** 1981. Revision des Diretmidae (Pisces, Trachichthyoidei) de L'Atlantique avec description d'un nouveau genre et d'une nouvelle espèce. *Cybium*, 5(1): 33–60.

TRACHICHTHYIDAE

Roughies (slimeheads)

by J.A. Moore, Florida Atlantic University, Jupiter, FL, USA

Diagnostic characters: Medium-sized (to about 69 cm standard length) beryciform fishes; body oval, laterally compressed. Head large, **extensive sensory canals separated by spinous ridges and covered with membranous skin; flat, triangular spine on preopercle.** Eye moderate to large in diameter. Snout rounded, pair of anteriorly pointing rostral spines in *Gephyroberyx* and some *Hoplostethus*. Mouth large and obliquely angled when closed; **1 supramaxilla.** Teeth small, in villiform bands on jaws, present or absent on vomer, present on palatines. **One dorsal fin with 3 to 8 striated spines and 12 to 18 soft rays;** anal fin with 2 or 3 striated spines and 8 to 12 soft rays; caudal fin forked with 4 to 8 procurrent spines in upper and lower lobes; pectoral fins with 11 to 20 rays; pelvic fins with 1 striated spine and 6 rays. Scales thick and spinoid or thin and cycloid, adherent to deciduous. **Large keeled scales along midventral belly between pelvic and anal fins, forming row of well-developed scutes in most species.** **Colour:** generally reddish orange, pinkish, dusky silver, brownish, or grey to black.



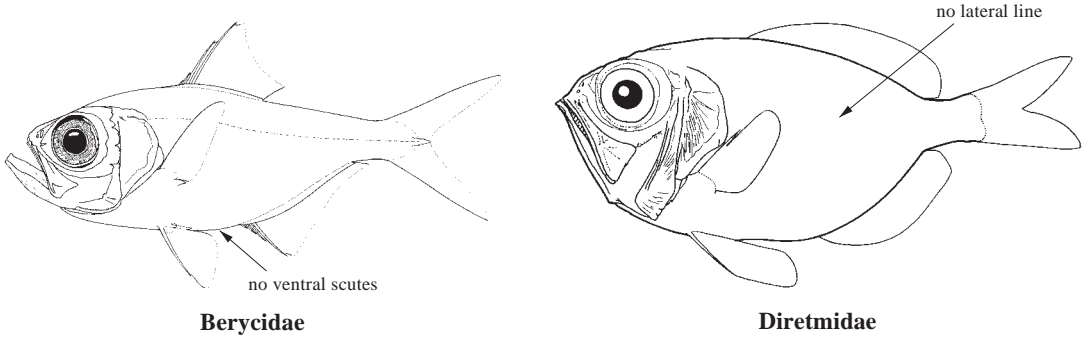
Habitat, biology, and fisheries: Occurring near the bottom over deeper parts of continental shelf, upper slope, and around seamounts at depths of 70 to more than 1 800 m, although most species are found in less than 950 m. Diets consist of mostly mesopelagic shrimp, small fishes, and squid. Some species are known to be locally abundant in feeding or spawning aggregations. Little known about reproduction or age and growth. Usually caught in bottom or pelagic trawls. Fisheries exist for orange roughy (*Hoplostethus atlanticus*) in the Atlantic off Namibia, west of Britain and France, and along the northern mid-Atlantic Ridge; fisheries also exist off New Zealand and Australia in the Pacific; however, recruitment in that species appears to be low and aggregations can be quickly depleted. Maximum age for orange roughy is reported at over 125 years.

Remarks: Most comprehensive reviews are by Maul (1986) and Kotlyar (1996).

Similar families occurring in the area

Berycidae: 2 supramaxillae; base of dorsal fin shorter than that of anal fin; pelvic fins with 9 to 13 rays; ventral scutes absent.

Diretmidae: no spine on preopercle; no lateral line; no true spines in dorsal or anal fins.



Key to the species of Trachichthyidae occurring in the area

- 1a. Dorsal fin with 8 (very rarely 7) spines; lateral-line scales only slightly larger than surrounding body scales with a small flat triangular spine on each lateral-line scale (Fig. 1a); prominent spine on opercle extending beyond posterior edge of opercle ***Gephyroberyx darwinii***
- 1b. Dorsal fin with 4 to 6 spines; lateral-line scales much larger than surrounding body scales and diamond-shaped (Fig. 1b), no spine on each lateral-line scale; no prominent spine extending beyond posterior edge of opercle → 2

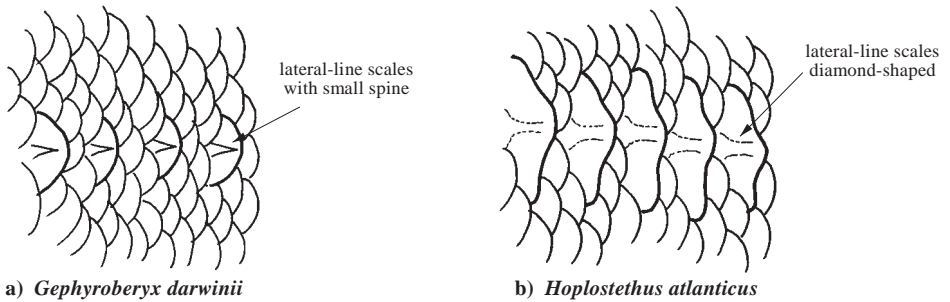









Fig. 1 lateral-line scales

- 2a. Dorsal soft rays 15 to 18; anal soft rays 10 to 12 (usually 11) ***Hoplostethus atlanticus***
- 2b. Dorsal soft rays 12 to 14; anal soft rays 8 to 10 (usually 9 or 10) → 3
- 3a. Ventral scutes very large, 8 to 12; pectoral and pelvic fins pale; body coloration silvery pink ***Hoplostethus mediterraneus***
- 3b. Ventral scutes smaller to inconspicuous, 12 to 18; pectoral and pelvic fins dark grey to black; body coloration brownish, grey, or black → 4

- 4a. Ventral scutes 15 to 18 forming a weak ventral keel, inconspicuous or only slightly larger than body scales; pectoral-fin rays 18 to 20; body coloration light brownish ***Hoplostethus melanopus***
- 4b. Ventral scutes 12 to 17, forming a well-developed and prominent ventral keel moderately to substantially enlarged; pectoral-fin rays 14 to 17; body coloration dark grey to black. → 5
- 5a. Pectoral fin does not reach anal fin; 10 pyloric caeca ***Hoplostethus vniro***
- 5b. Pectoral reaches to middle of anal fin; 18 to 23 pyloric caeca ***Hoplostethus cadenati***

List of species occurring in the area

The symbol  is given when species accounts are included.

-  *Gephyroberyx darwinii* (Johnson, 1866).
-  *Hoplostethus atlanticus* Collett, 1889.
-  *Hoplostethus cadenati* Quéro, 1974.
-  *Hoplostethus mediterraneus* Cuvier, 1829.
-  *Hoplostethus melanopus* (Weber, 1913).
-  *Hoplostethus vniro* Kotlyar, 1995.

References

Kotlyar, A.N. 1996. *Beryciform fishes of the world*. Moscow, VNIRO Publishing, 368 p. [in Russian].

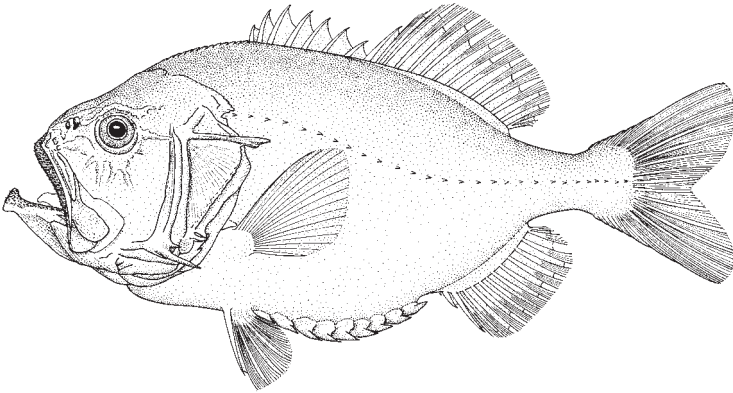
Kotlyar, A.N. 1995. *Hoplostethus vniro*, a new species of Trachichthyidae from the east Atlantic. *Voprosy Ikhtiologii*, 35(5): 702–704 [in Russian, English translation in *Journal of Ichthyology*, 35(9): 333–337.]

Maul, G. E. 1986. Trachichthyidae. In P.J.P. Whitehead, M.-L. Bauchot, J.-C. Hureau, J. Nielsen & E. Tortonese, EDS. *Fishes of the northeastern Atlantic and the Mediterranean, volume II*. Paris, UNESCO, pp. 749–752.

***Gephyroberyx darwinii* (Johnson, 1866)**

En – Darwin's slimehead (AFS: Big roughy); **Fr** – Hoplostète de Darwin; **Sp** – Reloj de Darwin.

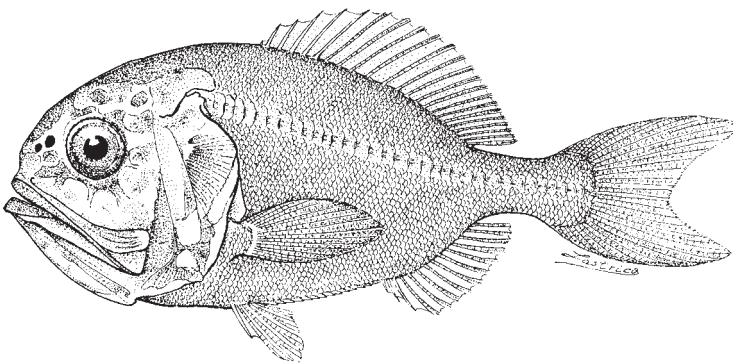
Maximum size to 480 mm standard length; common to 250 mm. Known throughout the eastern central Atlantic area from slopes of continents and islands between depths of 75 to 1 250 m. Reportedly found over hard bottoms. Taken occasionally in trawls. Similarity in size to orange roughy and potential for aggregations could make this a target for deepwater fisheries.



***Hoplostethus atlanticus* Collett, 1889**

En – Orange roughy; **Fr** – Hoplostète orange; **Sp** – Reloj anaranjado.

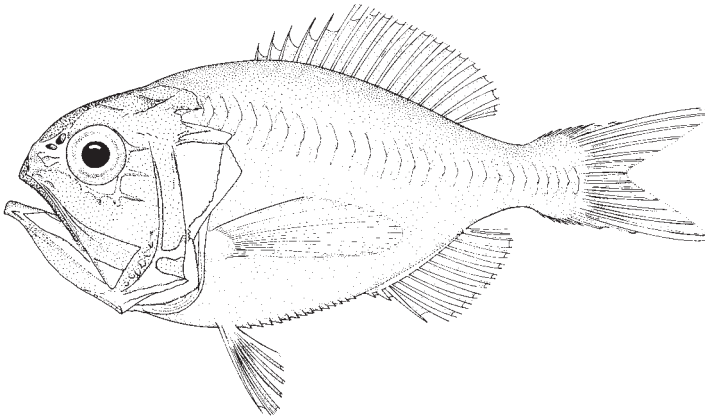
Maximum size to 690 mm standard length; commonly to 450 mm. Known in the area from Morocco, Azores, Madeira, Canary Islands, Great Meteor Seamount, Walvis Ridge and slope off Angola and Namibia, but could potentially be found around pinnacles and seamounts along mid-Atlantic Ridge. Benthopelagic, aggregating near high-relief topographic features at depths of 500 to 1 500 m or more, but individuals are known to occur at 1 844 m. Caught in trawls. Commercial catches off Namibia and an experimental fishery starting in the Azores.



***Hoplostethus cadenati* Quéro, 1974**

En – Black roughy; **Fr** – Hoplostète noir; **Sp** – Reloj negro.

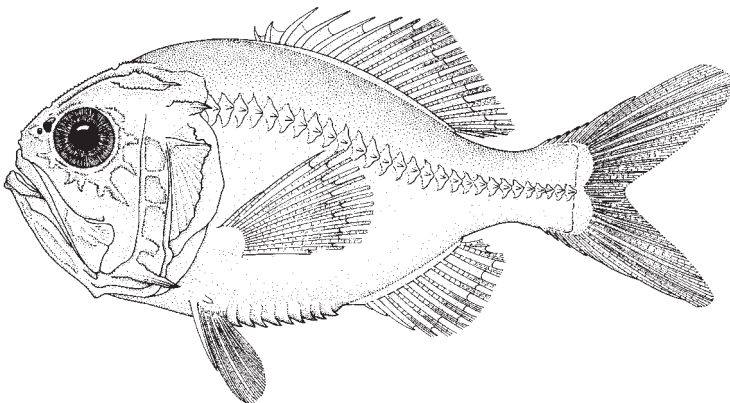
Maximum size 300 mm standard length, although it is possible that some of these large specimens are actually *H. vniro*. Known in the area from continental slopes off Morocco to Namibia and the Cape Verde Islands, but collected as far north as La Chapelle Bank off France. Benthopelagic at depths of 70 to 1 000 m or more. Of no commercial importance.



***Hoplostethus mediterraneus* Cuvier, 1829**

En – Mediterranean slimehead; **Fr** – Hoplostète argenté; **Sp** – Reloj mediterráneo.

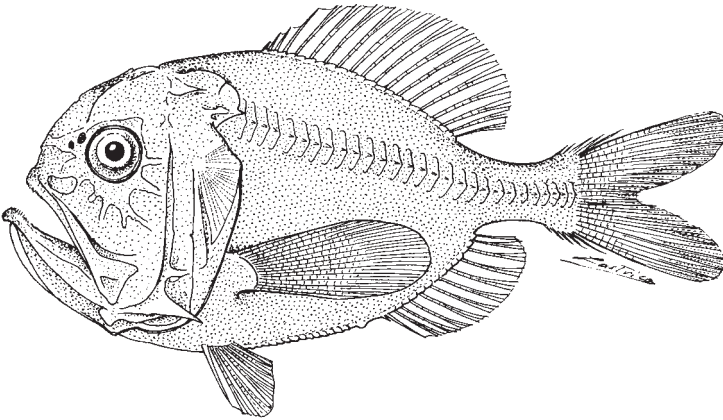
Maximum size reportedly 420 mm standard length; common 100 to 200 mm. Common in the area on the slope from Morocco to Senegal and around the islands of Madeira, Canaries, Azores, and Cape Verdes and also the Great Meteor Seamount. A separate subspecies (*H. mediterraneus trunovi*) is reported from off Namibia. Living near bottom in deep water, from 100 to 950 m depth. Taken as bycatch in deepwater fisheries.



***Hoplostethus melanopus* (Weber, 1913)**

En – Smallscale slimehead; **Fr** – Hoplostète scutelle; **Sp** – Reloj escama pequeña.

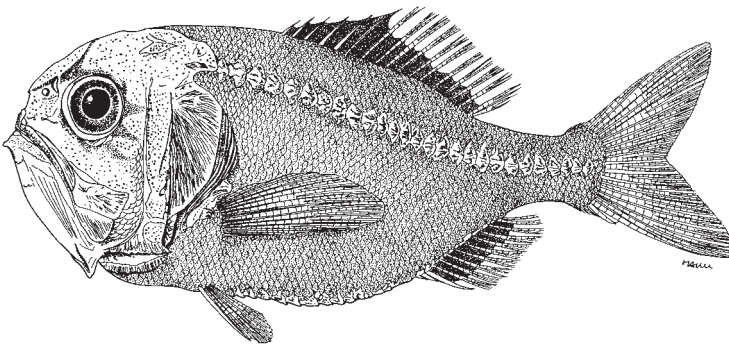
Maximum size to 250 mm standard length. Found off Namibia and South Africa and also known from Indo-West Pacific. Living near bottom along slopes at depths of 400 to 1 060 m. Of no commercial importance.



***Hoplostethus vniro* Kotlyar, 1995**

En – Vniro's roughy.

Maximum size to 196 mm standard length. Known from one specimen taken off Democratic Republic of Congo. Living near bottom along the slope at depths of 1 050 to 1 058 m. May be more widely distributed, but confusion of this species with *H. cadenati* makes it difficult to determine full extent of range. Of no commercial importance.

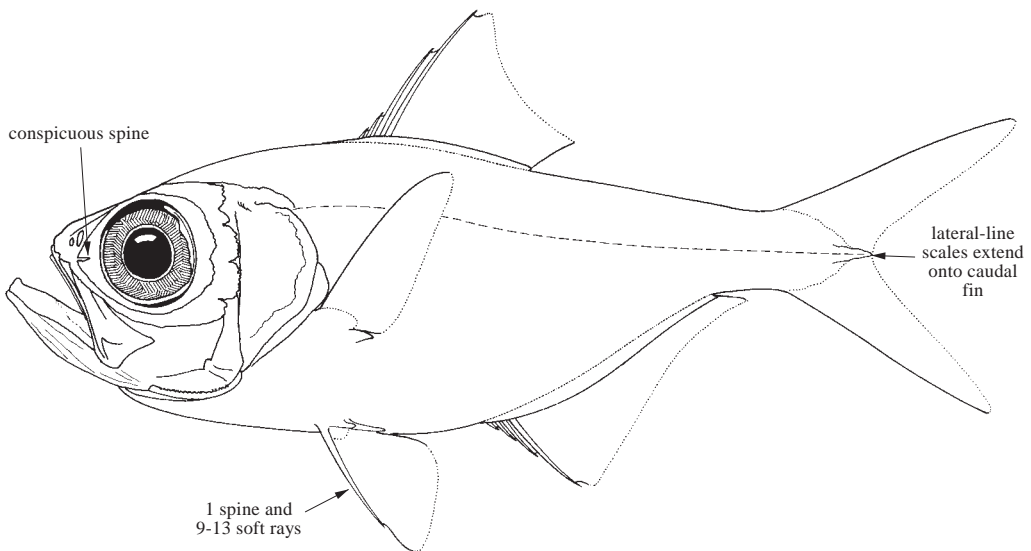


BERYCIDAE

Alfonsinos

by J.A. Moore, Florida Atlantic University, Jupiter, FL, USA

Diagnostic characters: Moderate-sized (to about 550 mm standard length) beryciform fishes. Body oval, moderately deep to very deep, compressed. Head moderately large; **large sensory canals on top of head separated by thin ridges and covered with membranous skin; conspicuous laterally-projecting spine on lachrymal, anterior to eye and ventral to nostrils;** cheeks and opercle largely covered by scales; **no spines on preopercle.** Eye very large, its diameter greater than snout length. Mouth large, oblique, jaws not reaching posterior margin of eye; maxilla expanded posteriorly; **2 supramaxillae.** Teeth small, in villiform bands on jaws, vomer, and palatines. In young individuals (less than 75 mm standard length), anterior dorsal soft rays and pelvic rays can be elongate; 1 dorsal fin with 3 to 5 spines and 12 to 20 soft rays; anal fin with 3 or 4 spines and 25 to 30 rays; caudal fin deeply forked; pectoral fins with 15 to 18 rays; **pelvic fins with 1 spine and 9 to 13 rays.** Scales spinose; **lateral line with 61 to 82 pored scales, the last few extending onto caudal fin;** no enlarged scales along ventral midline. Pyloric caeca 23 to 100. **Colour:** generally bright red on head, back and fins, silvery pink or yellowish pink on lower sides and belly.



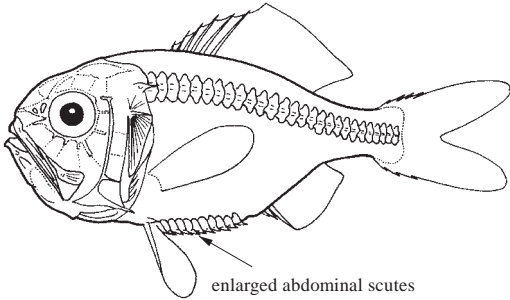
Habitat, biology, and fisheries: Benthic or benthopelagic fishes on shelf and slope, also associated with seamounts; found down to 1 300 m depth; sometimes known to vertically migrate into shallower waters at night. They are carnivores feeding mostly on mesopelagic crustaceans, fishes, and squids. Species in the genus *Beryx* are commercially important in many parts of the world. Usually caught in trawls or on longlines.

Remarks: Two genera with 9 or 10 species found throughout the tropical and temperate oceans, except the northeast Pacific. Most recent reviews are by Busakhin (1982) and Kotlyar (1996).

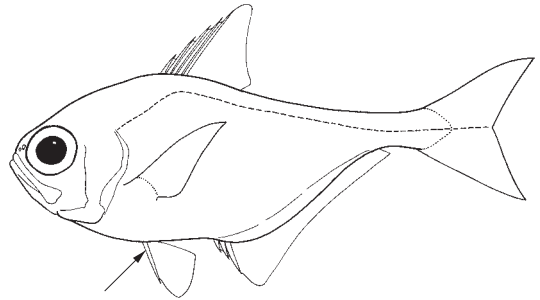
Similar families occurring in the area

Trachichthyidae: pelvic fin with 1 spine and 6 rays; enlarged abdominal scutes present; 1 supramaxilla.

Pempheridae: pelvic fin with 1 spine and 5 rays; no supramaxillae.



Trachichthyidae



1 spine and 5 soft rays

Pempheridae

Key to the species of Berycidae occurring in the area

- 1a. Greatest body depth 44 to 50% of standard length; 4 pairs of spines on head (on nasal, lachrymal, frontal, and lower cheek; Fig. 1); dorsal fin with 16 to 20 soft rays; anal-fin origin below middle of dorsal fin; pelvic fins with 9 or 10 soft rays; lateral-line scales 61 to 73; pyloric caeca 74 to 100 ***Beryx decadactylus***
- 1b. Greatest body depth 33 to 40% of standard length; only 1 pair of spines on head (lachrymal); dorsal fin with 13 to 15 soft rays; anal-fin origin behind or just below posterior end of dorsal fin; pelvic fins with 10 to 13 soft rays (usually 11 or more); lateral-line scales 69 to 82; pyloric caeca 23 to 30 ***Beryx splendens***

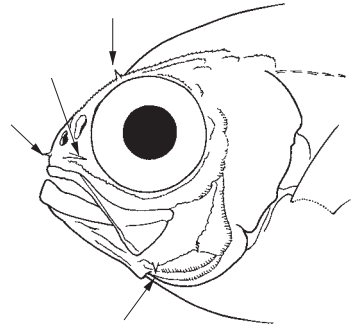



Fig. 1 pairs of spines on head *Beryx decadactylus*

List of species occurring in the area

The symbol  is given when species accounts are included.

 *Beryx decadactylus* Cuvier, 1829.

 *Beryx splendens* Lowe, 1834.

References

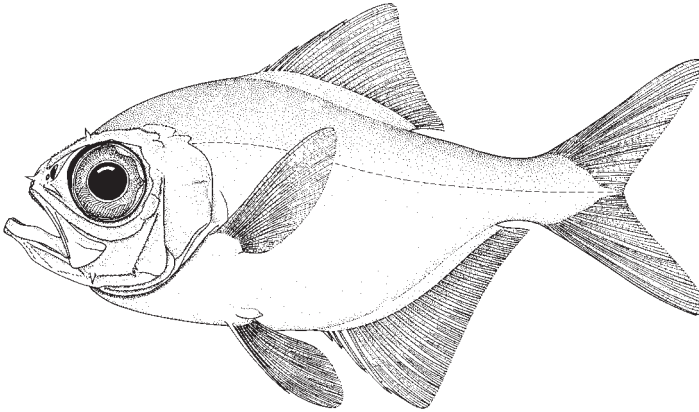
Busakhin, S.V. 1982. Systematics and distribution of the family Berycidae (Osteichthyes) in the world ocean. *Journal of Ichthyology*, 22(2):1–21.

Kotlyar, A.N. 1996. *Beryciform fishes of the world*. Moscow, VNIRO Publishing, 368 p. [in Russian].

***Beryx decadactylus* Cuvier, 1829**

En – Alfonsino (AFS: Red bream); **Fr** – Béryx commun; **Sp** – Alfonsino palometón.

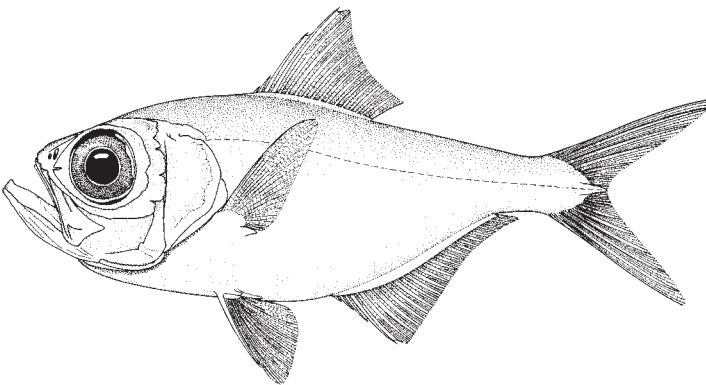
Maximum size to 430 mm standard length; common to 350 mm. Worldwide in tropical and temperate zones, known in the area from records off the Azores, Great Meteor Seamount, Madeira, Canary and Cape Verde Islands, and the continental slope from Morocco to Sierra Leone. Probably widespread throughout the area, but generally uncommon except in localized aggregations. Benthopelagic from 150 to 1 000 m. Feed on fish, crustaceans and squid. Widespread fisheries in eastern Atlantic and elsewhere. Highly regarded foodfish.



***Beryx splendens* Lowe, 1834**

En – Splendid alfonsino; **Fr** – Béryx long; **Sp** – Alfonsino besugo.

Maximum size to 550 mm standard length; common to 400 mm. Circumglobal, known in the area from the Azores, Great Meteor Seamount, Madeira, Canary Islands, Cape Verde Islands, St Helena, Walvis Ridge, and the continental slope from Morocco to Namibia. Can form dense aggregations in the area. Benthopelagic from 25 to 1 300 m. Feed on fish, crustaceans and squid. Widespread fisheries in eastern Atlantic and elsewhere. Highly regarded foodfish.

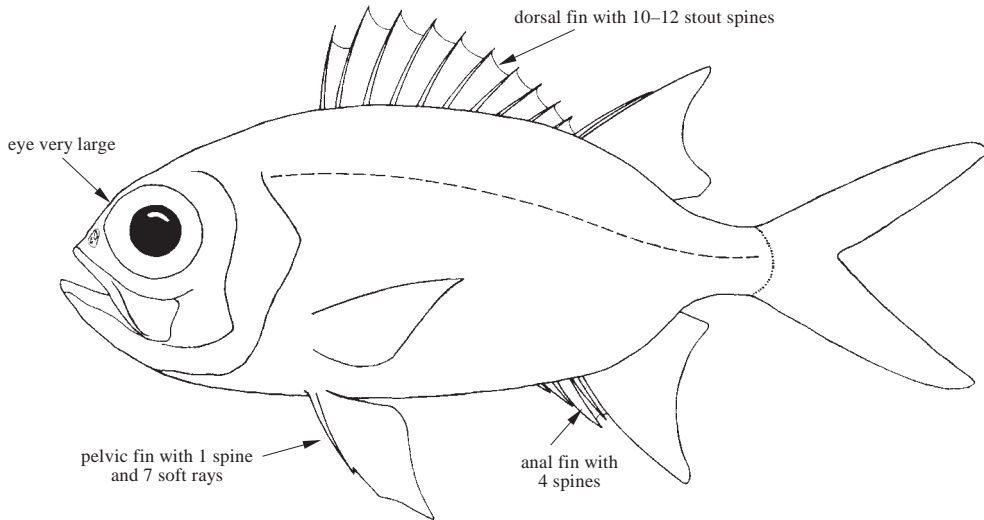


HOLOCENTRIDAE

Squirrelfishes (soldierfishes)

by D.W. Greenfield, California Academy of Sciences, San Francisco, CA, USA

Diagnostic characters: Small- to medium-sized (to 34.5 cm standard length in Atlantic, 36 cm worldwide); body ovate to moderately elongate; **body compressed**; **caudal peduncle slender**; head with upper profile rounded; **ridges and mucous channels dorsally on head**; **edges of external bones of head serrate or with spines**. **Eyes very large**. Mouth terminal or with lower jaw projecting; gape slightly to strongly oblique; mouth moderately large, the maxilla extending posteriorly at least to a vertical at front edge of pupil (often beyond middle of eye); upper jaw protractile; 2 supramaxillae present; small villiform teeth in bands in jaws and on roof of mouth (on vomer, palatines, and for some species on ectopterygoids). Branchiostegal rays 8. **Dorsal-fin base long, base of spinous portion 2 to 4 times that of soft portion; dorsal fin with 10 to 12 (worldwide rarely 13) stout spines** (includes one in second part of dorsal fin if it has a spine) and 9 to 16 (to 17 worldwide) soft rays, deeply or completely notched between spinous and soft portions or between last 2 dorsal-fin spines; **anal fin with 4 spines, the third stoutest and often longest, and 9 to 13 (7 to 16 worldwide) soft rays; pelvic fins with 1 spine and 7 soft rays; caudal fin forked with 17 branched rays**. **Lateral line complete, the pored scales 29 to 51 (25 to 57 worldwide); scales of body strongly spinoid**; surface of scales smooth or with ridges. **Colour:** usually **red or pink**, scale centres of body often lighter (may be silvery white), thus may form stripes; black pigment may be present on opercular membrane or as markings on fins. Fins may also have yellow or white markings.



Habitat, biology, and fisheries: Most of the squirrelfishes (subfamily Holocentrinae) and soldierfishes (subfamily Myripristinae) live in relatively shallow water on coral reefs or rocky bottoms, but a few occur in depths of at least 275 m or more. Their large eyes suit them well for their nocturnal habits. The family also is well known for sound production. Squirrelfishes feed mainly on crustaceans living on or near the bottom, whereas the soldierfishes of the genus *Myripristis* feed on the larger elements of the night zooplankton. The preopercular spine of at least some species of *Sargocentron* in the Indo-Pacific region is venomous; it is not known if Atlantic species are venomous. Although wounds from these spines may be very painful, they are not as serious as those from the dorsal-fin spines of most scorpionfishes. Many of the holocentrids are too small to be of any commercial value; the largest are frequently seen in local markets, but rarely in abundance. They are sometimes used in the aquarium trade.

Similar families occurring in the area

None. The serrate bony edges and spines on the head, in combination with the large eyes, the very long spinous portion (as compared to soft portion) of the dorsal fin, the presence of 4 spines in the anal fin and of 7 soft rays in the pelvic fins, readily distinguishes the squirrelfishes and soldierfishes from other fish families occurring in the area.

Key to subfamilies and species of *Holocentridae* occurring in the area

- 1a. Preopercle with a single strong spine, much longer than broad (Fig. 1a,b); no strong suborbital spines; 10 or 11 spines (usually 11) in anterior portion of dorsal fin, none in posterior portion; 10 or fewer segmented (soft) rays in anal fin . . . **Subfamily Holocentrinae** → 2
- 1b. Preopercle crescentric, without a spine (Fig. 1c) OR with 1 or 2 enlarged spines and strong suborbital spines (Figs 1b & 2); 10 or 11 spines (usually 10) in anterior portion of dorsal fin and always 1 spine in posterior portion; segmented (soft) anal-fin rays usually 11 or more (Fig. 3) **Subfamily Myripristinae** → 3

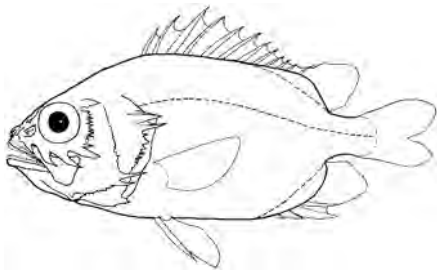
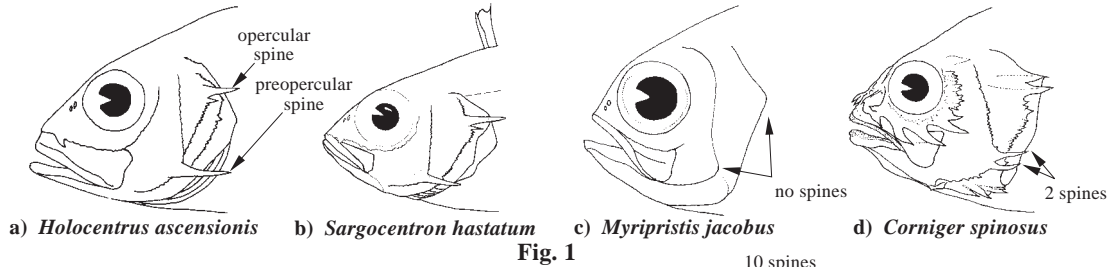


Fig. 2 *Corniger spinosus*

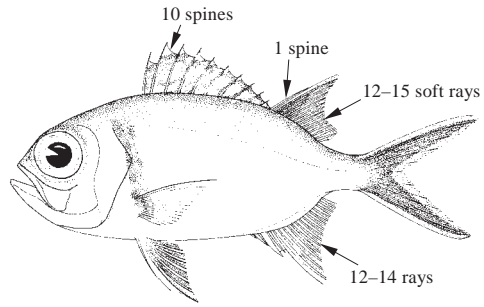


Fig. 3 *Myripristis jacobus*

- 2a. Third anal-fin spine not reaching, when folded back, to caudal-fin base (usually to middle of caudal peduncle); upper lobe of caudal fin notably longer than lower lobe (Fig. 4); body lacking distinct, alternating, red and white lines on entire side of body, dark red lines run length of body, upper half of body more reddish, lower half lighter to white; dorsal fin with yellow on spines and membranes, no distinct white spots on membranes; 14 to 16 segmented (soft) rays in posterior portion of dorsal fin, the anterior rays elongate; 10 segmented (soft) anal-fin rays; total gill rakers on first arch 23 or 24 (including rudiments and the raker at angle of arch) ***Holocentrus adscensionis***
- 2b. Third anal-fin spine reaching, when folded back, to caudal-fin base; lobes of caudal fin nearly equal in length (Fig. 5); body with distinct, alternating, red and white lines on entire side; dorsal fin red with distinct white spots on basal half of membranes; 13 segmented (soft) rays in posterior portion of dorsal fin, none of them elongate; 9 segmented (soft) anal-fin rays; total gill rakers on first arch 17 to 21 ***Sargocentron hastatum***

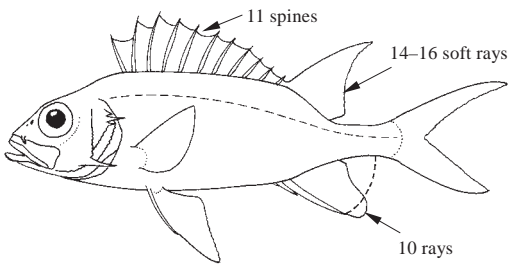


Fig. 4 *Holocentrus adscensionis*

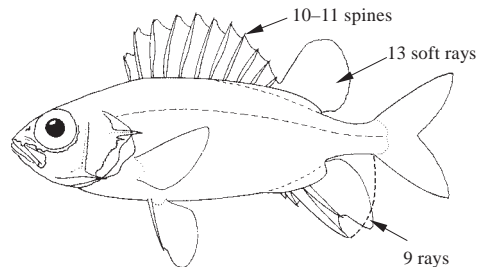



Fig. 5 *Sargocentron hastatum*

- 3a.** A dark bar from upper edge of gill opening to pectoral-fin axil; no enlarged preopercular spines or suborbital spines; 10 spines in anterior portion of dorsal fin, one in posterior part; segmented (soft) anal-fin rays 12 to 14 (usually 13); total gill rakers on first arch 29 to 33 (usually 31) (Fig. 3) ***Myripristis jacobus***
- 3b.** No dark bar from upper gill opening to pectoral-fin axil; 1 or 2 enlarged preopercular spines and long, strong, retrorse (directed posteriorly) suborbital spines (Fig. 2); 11 spines in anterior portion of dorsal fin, one in posterior part; segmented (soft) anal-fin rays 9 to 12 (usually 11); total gill rakers on first arch 18 to 21 ***Corniger spinosus***

List of species occurring in the area

The symbol  is given when species accounts are included

Subfamily HOLOCENTRINAE

 *Holocentrus adscensionis* (Osbeck, 1765).

 *Sargocentron hastatum* (Cuvier, 1829).

Subfamily MYRIPRISTINAE

 *Corniger spinosus* Agassiz, 1831.

 *Myripristis jacobus* Cuvier, 1829.

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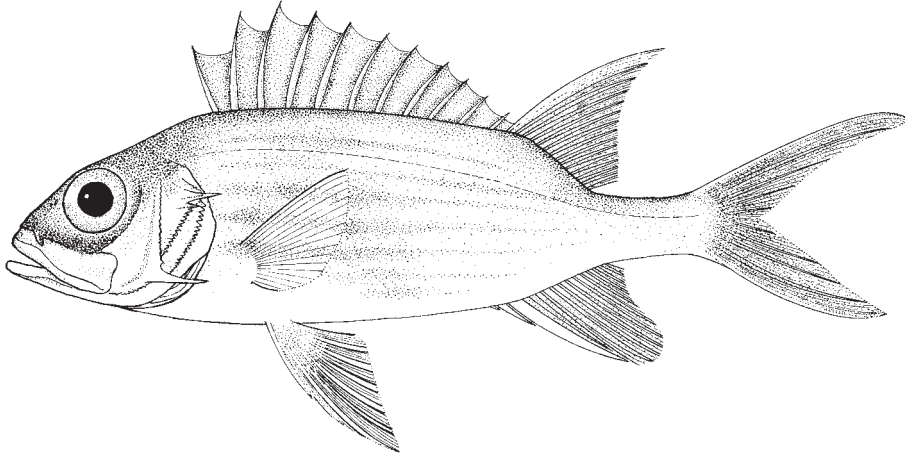
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Subfamily HOLOCENTRINAE

***Holocentrus adscensionis* (Osbeck, 1765)**

Frequent synonyms / misidentifications: *Holocentrus ascensionis* (Osbeck, 1771) / None.

FAO names: En – Squirrelfish; Fr – Marignon coq; Sp – Candil gallito.



Diagnostic characters: A large species with a moderately compressed, relatively slender, oblong body; caudal peduncle slender and long. Edges of membrane bones of head serrate and spiny; a long strong spine present at angle of preopercle, longer than opercular spine; **third anal-fin spine not reaching, when folded back, to caudal-fin base; upper lobe of caudal fin notably longer than lower lobe; total gill rakers on first gill arch 23 or 24.** Anterior portion of dorsal fin with 11 spines, **posterior portion of fin with 14 to 16 soft rays; anterior soft dorsal-fin rays elongate;** anal fin with 4 spines, followed by **10 soft rays. Pored lateral-line scales 45 to 51, usually 47 to 49.** **Colour:** back and upper sides reddish with gold reflections; silvery stripes following scale intersections on upper sides; stripes broader on lower scale rows; lower sides, belly, and breast white. Snout and top of head dark red; upper portion of maxilla white; a white streak diagonally across cheek, lower jaw white; iris bright red near pupil, distal margin blackish. Dorsal-fin spines yellowish or yellowish green; interspinal membranes yellowish green adjacent to spines and basally; margin of membrane red; soft dorsal-fin rays pink; outer caudal-fin rays white, the rest pink; first 3 anal-fin spines white, fourth spine and soft rays pink; pectoral fin pink, upper edge of first 2 rays darker red; pelvic-fin spine and anterior margin of first ray white, other pelvic-fin rays pink.

Size: Maximum to at least 34.5 cm standard length, reported to reach 60.8 cm total length in the literature.

Habitat, biology, and fisheries: Found from shallow coral reefs to offshore deeper waters up to more than 90 m, but more common at inshore reef zones. A nocturnal species, hiding by day in deep crevices or under coral ledges at night, usually feeding away from the reef over sand and grass beds, taking mainly crabs, shrimps and other small crustaceans. Caught incidentally throughout its range. Caught mainly in traps, occasionally with trammel nets. Marketed mostly fresh. Separate fisheries statistics are not reported for this species.

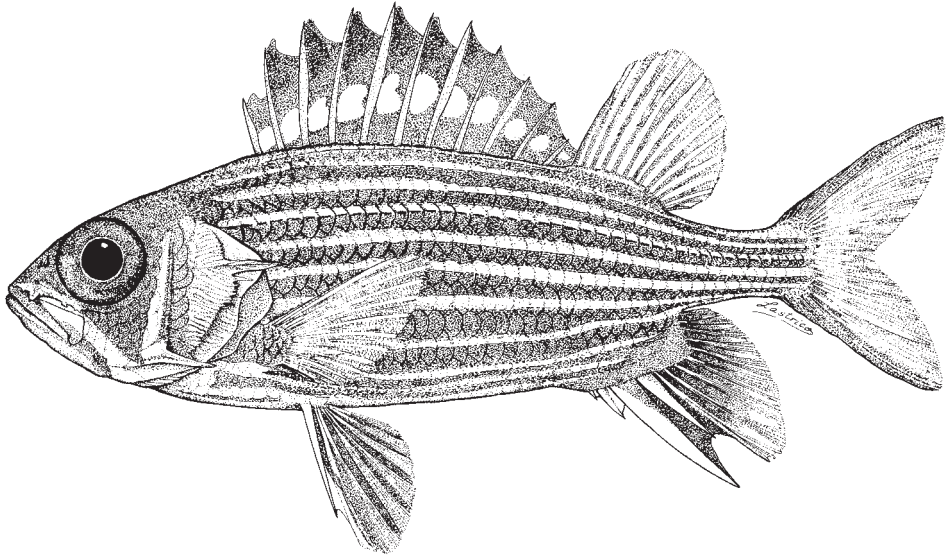
Distribution: Shore and shallow waters along the African coast from São Tomé Island and Gabon south to Angola. Also at Canary, St Helena, and Ascension islands. Outside the area it occurs in the western Atlantic at Bermuda, Chesapeake Bay, Virginia south through Florida, northwestern, northeastern and southern Gulf of Mexico, throughout the West Indies and Caribbean shores south to Santos, Brazil, and at Atol das Rocas and St Paul's Rocks.



Sargocentron hastatum (Cuvier in Cuvier and Valenciennes, 1829)

Frequent synonyms / misidentifications: *Holocentrus hastatus* Cuvier, 1829; *Adioryx hastatus* (Cuvier, 1829) / None.

FAO names: En – Red squirrelfish; Fr – Marignan rouge; Sp – Candil africano.



Diagnostic characters: A large species with a moderately compressed, relatively slender, oblong body; caudal peduncle slender and long. Edges of membrane bones of head serrate and spiny; nasal and lachrymal bones each with a strong spine extending anteriorly over upper lip; **third anal-fin spine long, reaching, when folded back, to base of caudal fin; lobes of caudal fin about equal in length; total gill rakers on first arch 17 to 21.** Anterior portion of dorsal fin with 11 (rarely 10) spines, **posterior portion of fin with 13 soft rays, none of them elongate; anal fin with 4 spines followed by 9 soft rays. Pored lateral-line scales 39 to 43.** Opercular spine equal to or longer than preopercular spine. **Colour: head and body red with 9 white, longitudinal lines from head back to tail.** Two distinct white lines on head, one along preopercular edge and second from snout back across upper jaw back to lower preopercular edge. Opercle and spines with yellow tinge. **First dorsal fin red with a white spot at base of membrane between each spine;** anterior borders of pelvic and anal fins white, remainder of fin red; second dorsal and caudal fins red; pectoral fin yellow.

Size: Maximum at least to 25 cm total length.

Habitat, biology, and fisheries: Inhabits rocky and coral reef areas, from shoreline to 200 m depth. Feeds mainly on benthic invertebrates. Taken mainly in artisanal fisheries. Caught mainly in traps, and set nets, occasionally with trawls. Marketed mostly fresh or smoked. Separate statistics are not reported for this species.

Distribution: Portugal southward to Angola, including the Cape Verde Islands. Outside of the area, recorded from St Vincent and San Andres Islands in the western Atlantic Ocean.

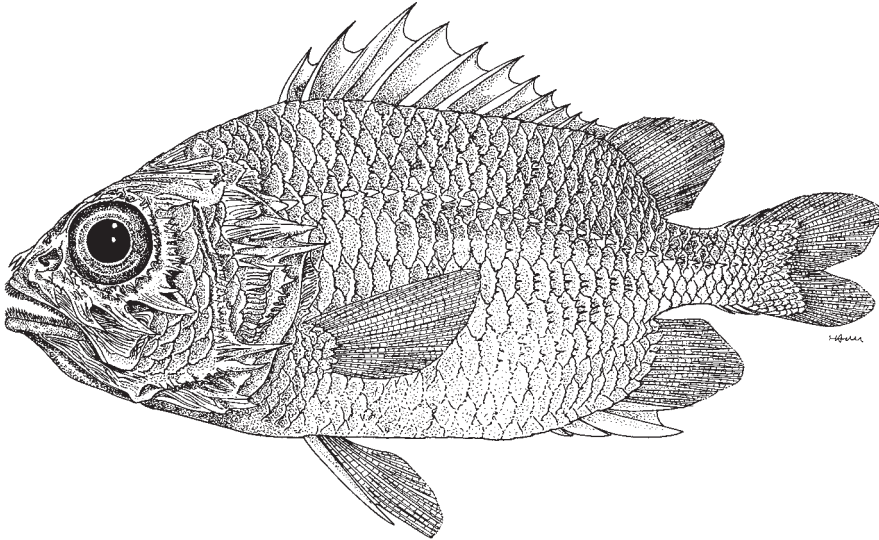


Subfamily MYRIPRISTINAE

***Corniger spinosus* Agassiz, 1831**

Frequent synonyms / misidentifications: None / None.

FAO names: En – Spinycheek soldierfish; Fr – Marignon épineus; Sp – Candil espinosa.



Diagnostic characters: A medium-sized species with a moderately compressed, relatively deep, elongate body. Anterior profile triangular; eyes very large; **bones of head very spiny; 2 large spines on opercle and 1 or 2 on preopercle; suborbitals with 4 or 5 marginal spines and 3 larger, strong spines that are curved posteriorly; nasals rugose with anteriorly directed spines of various sizes; 11 spines in anterior portion of dorsal fin, one in posterior part**, followed by 13 or 14 (usually 14) soft rays; anal fin with 4 spines followed by 9 to 12 (usually 11) soft rays; total gill rakers on first arch 18 to 21; pored lateral-line scales 29 or 30. **Colour:** head and body bright red with more intense red lines running along each scale row; ventral region lighter with a silvery appearance; interspinal membranes of first dorsal fin red chestnut coloured, especially along bases of spines; soft dorsal, anal, caudal, and pelvic fins about same colour as body; pectoral fins transparent rosy. A spot of more intense red, nearly black, just below soft dorsal and extending toward upper part of caudal peduncle. Iris red with metallic iridescence.

Size: Maximum to 19.5 cm standard length.

Habitat, biology, and fisheries: This is a relatively deep-living species, having been taken from depths of 42 to 275 m. It is thought to inhabit deep rocky slopes. Nothing is known of its biology and it is only rarely caught by fishers.

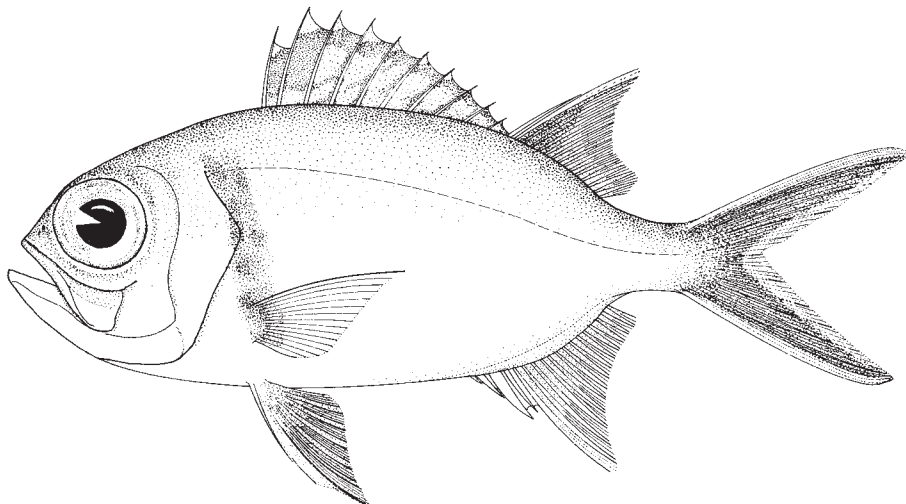
Distribution: Recorded from the west African coast of Benin and from St Helena, Ascension and the Canary Islands in the eastern Atlantic. Outside the area recorded only from South Carolina, Florida, and Gulf of Mexico in the United States, Cuba, French Guiana, Suriname, and Rio de Janeiro, Brazil. This species usually is found in deeper water (42 m or more) and certainly is more widespread in other areas than collections indicate.



***Myripristis jacobus* Cuvier, 1829**

Frequent synonyms /misidentifications: None / None.

FAO names: En – Blackbar soldierfish; Fr – Marignon mombin; Sp – Candil colorado.



Diagnostic characters: A medium-sized species with a moderately compressed, relatively deep, oblong body. Anterior profile triangular; eyes very large; bones of head smooth except their margins usually finely serrate; **no spine on preopercle or on preorbital bone**; total gill rakers on first gill arch 29 to 33, usually 31. Anterior portion of dorsal fin with 10 spines, posterior portion of fin with 1 spine, followed by 12 to 15 soft rays, usually 14; anal fin with 4 spines, followed by 12 to 14 soft rays, usually 13. **Scales present on the membranes between rays of soft dorsal and anal fins, covering over one-half of the fin length**; pored lateral-line scales 33 to 37, usually 35. **Colour:** head and back reddish orange above, shading into a more reddish pink on flanks and silvery below; reddish black pigment on post-temporal, supracleithrum, cleithrum, posterior margin of opercle, and opercular flap, **giving the appearance of a broad rectangular bar running from the upper end of gill opening to pectoral-fin base**. Central portion of membranes between first 2 dorsal-fin spines reddish orange, with white on distal and basal portions; membranes of remaining dorsal-fin spines reddish orange only on distal portions; anterior border of pelvic fins, soft dorsal and anal fins, and caudal fin white, with a darker band of reddish orange directly posterior to the white edge.

Size: Maximum to 21.6 cm standard length.

Habitat, biology, and fisheries: Found from shallow coral reefs to offshore deeper waters to depths of about 90 m. A nocturnal species aggregating around coral reefs and deeper rocky reefs. Feeds at night, predominantly on planktonic organisms. Caught incidentally throughout its range, more regularly taken in some local artisanal fisheries. Caught mainly in traps and marketed mostly fresh. Separate statistics are not reported for this species.

Distribution: Occurs at Cape Verde, Canary, Ascension, Principe, São Tomé, and St Helena islands, and the coast of Africa at Ghana, and Benin. Outside of the area it is found from North Carolina, United States to Rio de Janeiro, Brazil, including Bermuda, the Gulf of Mexico, throughout the West Indies, Central American coast, Campeche Bank, Venezuela, offshore Guianas, and St Paul's Rocks.



New Index

A

ANOLOGASTRIDAE	2182
<i>Adioryx hastatus</i>	2199
Alfonsino	2194
Alfonsino besugo	2194
Alfonsino palometón	2194
Alfonsinos	2192
ANOLOGASTRIDAE	2185

B

BERYCIDAE	2192
BERYCIFORMES	2182
BERYCIDAE	2187
<i>Beryx</i>	2192
<i>Beryx decadactylus</i>	2194
<i>Beryx splendens</i>	2194
Big roughy	2189
Black roughy	2190
Blackbar soldierfish	2201
Béryx commun	2194
Béryx long	2194

C

Candil africano	2199
Candil colorado	2201
Candil espinosa	2200
Candil gallito	2198
<i>Corniger spinosus</i>	2200

D

DIRETMIDAE	2184
Darwin's slimehead	2189
DIRETMIDAE	2183,2187

F

Fangtooths	2182
------------------	------

G

<i>Gephyroberyx</i>	2186
<i>Gephyroberyx darwinii</i>	2189

H

HOLOCENTRIDAE	2195
HOLOCENTRINAE	2198
HOLOCENTRINAE	2195
<i>Holocentrus adscensionis</i>	2198

<i>Holocentrus ascensionis</i>	2198
<i>Holocentrus hastatus</i>	2199
Hoplostethus	2186
<i>Hoplostethus atlanticus</i>	2186,2189
<i>Hoplostethus cadenati</i>	2190-2191
<i>Hoplostethus mediterraneus</i>	2190
<i>Hoplostethus mediterraneus trunovi</i>	2190
<i>Hoplostethus melanopus</i>	2191
<i>Hoplostethus vniro</i>	2190-2191
Hoplostète argenté	2190
Hoplostète de Darwin	2189
Hoplostète noir	2190
Hoplostète orange	2189
Hoplostète scutelle	2191

M

MYRIPRISTINAE	2200
Marignan rouge	2199
Marignon coq	2198
Marignon mombin	2201
Marignon épineus	2200
Mediterranean slimehead	2190
MYRIPRISTINAE	2195
<i>Myripristis</i>	2195
<i>Myripristis jacobus</i>	2201

O

Orange roughy	2186,2189
---------------------	-----------

P

PEMPHERIDIDAE	2193
----------------------------	------

R

Red bream	2194
Red squirrelfish	2199
Reloj anaranjado	2189
Reloj de Darwin	2189
Reloj escama pequeña	2191
Reloj mediterráneo	2190
Reloj negro	2190
Roughies	2186

S

<i>Sargocentron</i>	2195
<i>Sargocentron hastatum</i>	2199
Slimeheads	2186
Smallscale slimehead	2191
Soldierfishes	2195

Spinycheek soldierfish	2200
Spinyfins	2184
Splendid alfonsino	2194
Squirrelfish	2198
Squirrelfishes	2195

T

TRACHICHTHYIDAE	2186
TRACHICHTHYIDAE	2183-2184,2193

V

Vniro's roughy	2191
--------------------------	------

A

<i>adscensionis</i> , <i>Holocentrus</i>	2198
<i>ascensionis</i> , <i>Holocentrus</i>	2198
<i>atlanticus</i> , <i>Hoplostethus</i>	2186,2189

C

<i>cadenati</i> , <i>Hoplostethus</i>	2190-2191
---	-----------

D

<i>darwinii</i> , <i>Gephyroberyx</i>	2189
<i>decadactylus</i> , <i>Beryx</i>	2194

H

<i>hastatum</i> , <i>Sargocentron</i>	2199
<i>hastatus</i> , <i>Adioryx</i>	2199
<i>hastatus</i> , <i>Holocentrus</i>	2199

J

<i>jacobus</i> , <i>Myripristis</i>	2201
---	------

M

<i>mediterraneus trunovi</i> , <i>Hoplostethus</i>	2190
<i>mediterraneus</i> , <i>Hoplostethus</i>	2190
<i>melanopus</i> , <i>Hoplostethus</i>	2191

S

<i>spinosus</i> , <i>Corniger</i>	2200
<i>splendens</i> , <i>Beryx</i>	2194

T

<i>trunovi</i> , <i>Hoplostethus mediterraneus</i>	2190
--	------

V

<i>vniro</i> , <i>Hoplostethus</i>	2190-2191
--	-----------

Order ZEIFORMES

CYTTIDAE

Lookdown dories

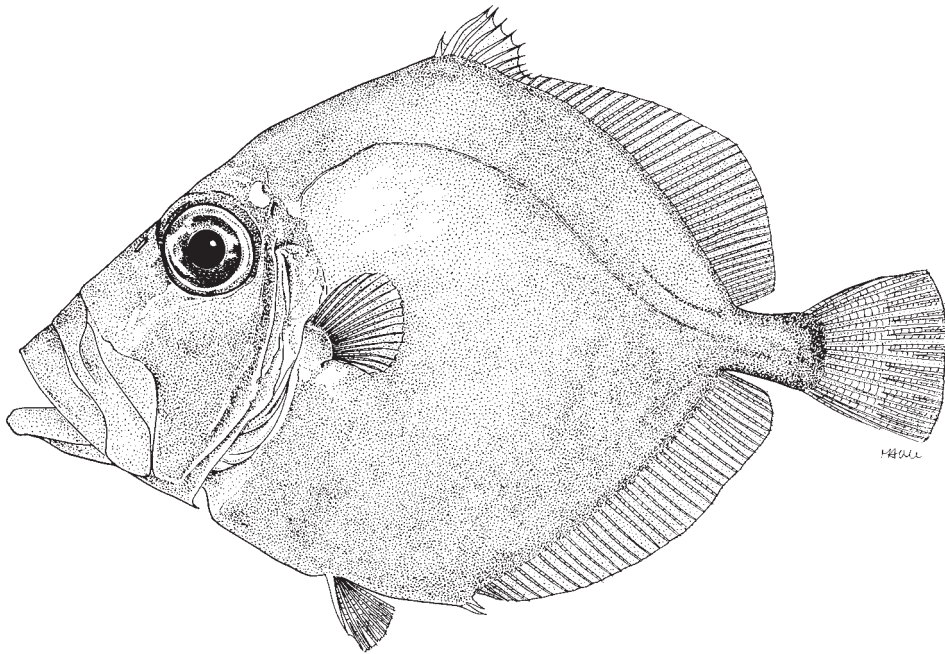
by P.C. Heemstra, South African Institute for Aquatic Biodiversity, Grahamstown, South Africa

A single species occurring in the area.

Cyttus traversi (Hutton, 1872)

Frequent synonyms / misidentifications: None / None.

FAO names: En – King dory.

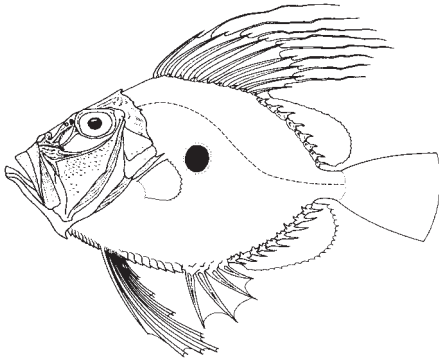
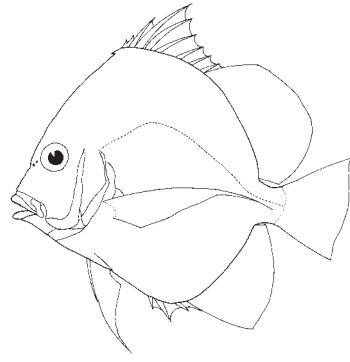


Diagnostic characters: Body deep, strongly compressed, its depth much greater than head length and more than half standard length; caudal peduncle depth more than half peduncle length. Head bones thin and soft; eye diameter subequal to preorbital depth and contained 2.6 to 4.0 times in head; mouth large, greatly protrusile, upper jaw length greater than eye diameter; maxilla widely expanded posteriorly, mostly exposed when mouth is closed; small teeth in narrow bands on jaws and vomer. Branchiostegal rays 7, membranes separate, free from isthmus; gills 3.5 (no opening medial to fourth gill). Dorsal fin with 9 or 10 short spines, 35 to 37 rays; no locking dorsal-fin spines; anal fin with 2 minute spines, 36 to 38 rays; first spine sometimes fused with anal-fin pterygiophore; pelvic fins with well developed spine, 6 branched rays, inserted below pectoral-fin base. Body covered with small spinoid scales, which have rows of alternating short, sharp, conical spines on rear half of scale; low sheath of 2 rows of scales (no spines or bony plates) along bases of dorsal and anal fins; zip-like double row of small scutes on midventral part of belly and thoracic area from isthmus to anus. **Colour:** adult silvery grey; spinous dorsal fin black distally; juveniles silvery with brown blotches.

Similar families occurring in the area

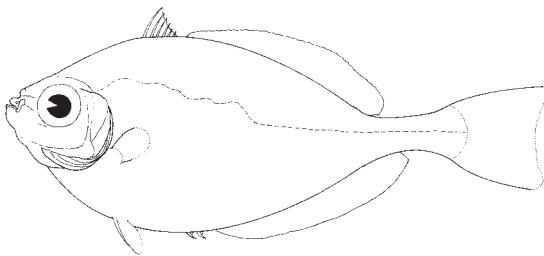
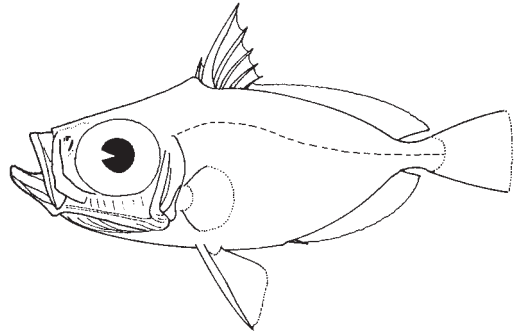
Zeidae: bony bucklers or spinous plates along bases of dorsal and anal fins; anal fin with 3 or 4 spines, 20 to 26 rays; scales cycloid, rudimentary or absent.

Drepaneidae: pectoral fins falcate, reaching caudal peduncle; pelvic fins with 1 spine, 5 rays; peduncle depth greater than its length; no small scutes on belly.

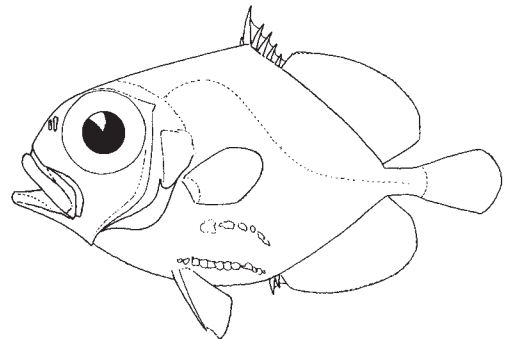
**Zeidae****Drepaneidae**

Grammicolepididae: scales greatly elongated vertically; dorsal-fin spines 5 to 7; mouth small, upper jaw length less than eye diameter; head length less than half body depth.

Zeniontidae: body oblong, depth subequal to head length, contained 2.5 to 2.8 times in standard length; eye enormous, diameter about half length of head and about 3 times preorbital depth.

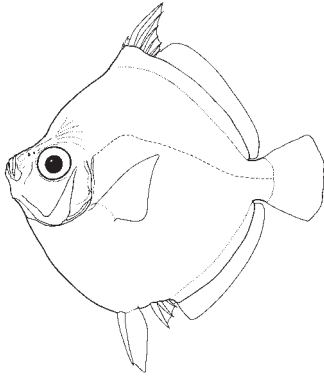
**Grammicolepididae****Zeniontidae**

Oreosomatidae: juveniles with some body scales modified to form large plates or elevated cones; eye diameter subequal to upper jaw length, 1.8 to 2.6 times in head length; dorsal fin with 5 to 8 spines, 29 to 36 rays; anal fin with 2 to 4 spines, 26 to 34 rays; pelvic fins with a distinct spine, 5 to 7 rays.

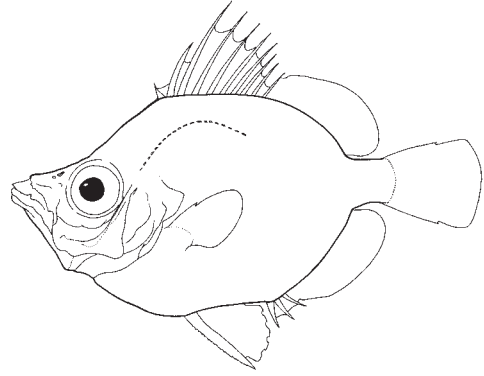
**Oreosomatidae**

Antigoniidae: eye diameter greater than upper jaw length; no zip-like rows of small scutes along ventral midline of body; pelvic fins with 1 spine and 5 soft rays.

Caproidae: anal fin with 3 short spines and 22 to 24 rays; no zip-like rows of small scutes along ventral midline of body; pelvic fins with 5 branched rays.



Antigoniidae



Caproidae

Size: Maximum 50 cm.

Habitat, biology and fisheries: Demersal in depths of 360 to 460 m. Feeds on fish and crustaceans. Caught with trawls. Flesh excellent. Marketed fresh or frozen. Separate statistics are not available for this species.

Remarks: The genus *Cyttus* and its 3 species were previously included in the family Zeidae. Recognition of the family Cyttidae for these species follows Tyler *et al.* (2003).

Distribution: Southern Africa from Walvis Ridge off Namibia to South Africa and southern Mozambique; also known from Australia and New Zealand.



References

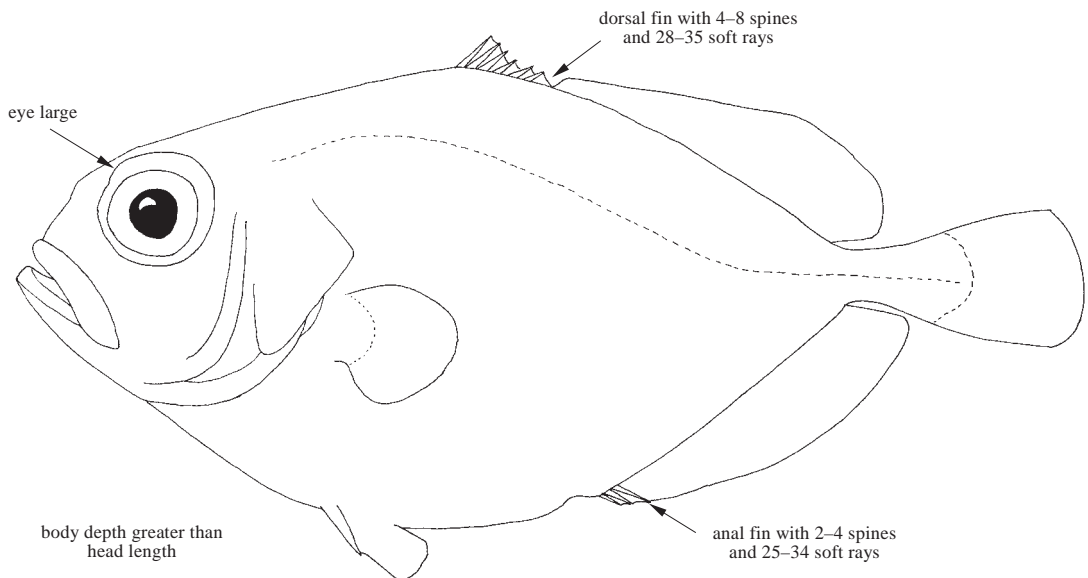
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OREOSOMATIDAE

Oreos

by P.C. Heemstra, South African Institute for Aquatic Biodiversity, Grahamstown, South Africa

D **Diagnostic characters:** Moderate fishes (to 60 cm) with **deep, compressed body; the depth distinctly greater than head length and contained 1.3 to 1.9 times in standard length. Head length a third or more of standard length; eyes huge, the diameter greater than snout length, 0.3 to 0.5 times in head length and 2 or 3 times more than depth of caudal peduncle.** Upper jaw protrusile; jaws with a band of villiform teeth; vomer with or without teeth. Numerous short strong spines or serrations on head bones in front, above and behind eyes; and on horizontal ridge of upper operculum in some species. Branchiostegal rays 7. Gill rakers 3 to 6 on upper limb and 17 to 26 on lower limb. **Dorsal fin with 5 to 8 spines and 27 to 36 soft rays; anal fin with 2 to 4 spines and 25 to 34 soft rays;** caudal fin small and rounded, branched rays 10 or 11; caudal peduncle narrow, the depth less than half eye diameter; pectoral-fin length about one-third head length; **dorsal, anal and pectoral-fin rays unbranched;** pelvic fins with 1 spine and 5 to 7 branched rays. Body covered with minute spinoid or cycloid scales; head with scales on cheeks; operculum with or without scales; lateral line continuous, with 84 to 110 tubed scales, not extending onto caudal fin. The pelagic prejuvenile (*Oreosoma*) stage is quite different from the adult or juvenile stages in shape, with expanded belly, groups of transformed scales forming large plates or conical protuberances on the abdomen and (some species) near base of spinous dorsal fin. Prejuveniles also usually have a spotted or marbled colour pattern that fades with growth.

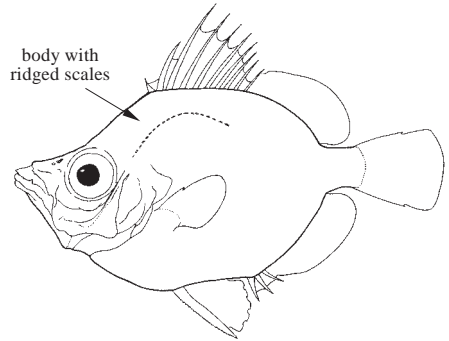


Habitat, biology, and fisheries: Adults mesopelagic, bathypelagic or demersal on continental slope in 220 to 1 900 m. Feed on salps, crustaceans, cephalopods and fish. Eggs and larvae pelagic; the pelagic prejuveniles (4 to 16 cm standard length) look very different from the demersal adults and are rarely caught. Oreos grow slowly, with maturity attained at about 30 years, and they may live more than 100 years. In view of their slow growth and low productivity, oreo stocks are vulnerable to over-fishing. Oreos have been abundant off New Zealand, Australia and Japan; and the larger species were of some commercial importance in the fisheries of these countries in the 1990s.

Remarks: The family comprises 4 genera, with a total of 10 species.

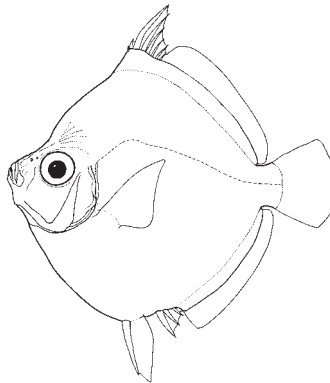
Similar families occurring in the area

Caproidae: body with ridged scales; dorsal fin with 9 or 10 strong, grooved spines, 23 to 25 branched rays; anal fin with 3 short, stout spines, 22 to 24 branched rays; vertebrae 9 + 12.



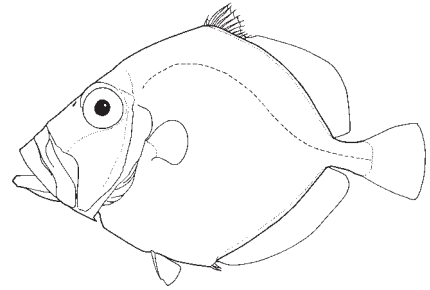
Caproidae

Antigoniidae: body depth about 3 times head length and 0.8 to 1.0 times in standard length; body covered with spinoid scales; each scale with a row of spines along rear edge; most species also have a cluster of short sharp spines on rear half of scale. Lateral line present but tubed scales are difficult to count; vertebrae 10+12.



Antigoniidae

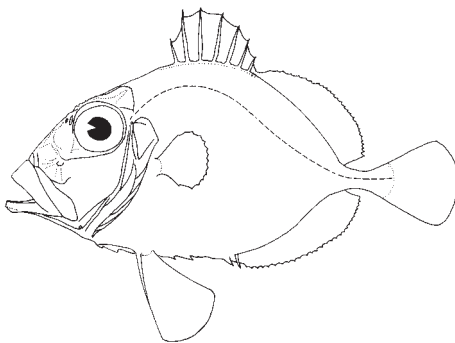
Cyttidae: orbit diameter less than snout or upper jaw length; anal fin with 2 minute spines, 36 to 38 rays.



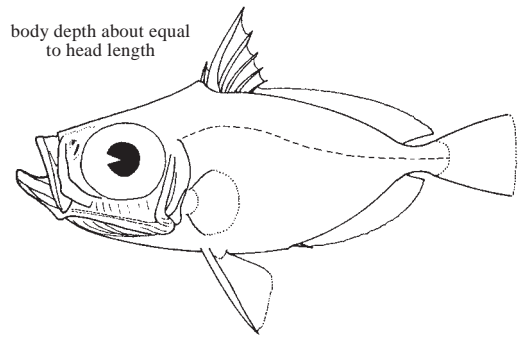
Cyttidae

Zeniidae: body and head distinctly compressed; eye diameter less than snout or upper jaw length; a row of bony bucklers or scutes along base of dorsal and anal fins.

Zeniontidae: body depth about equal to head length, 2.3 to 2.7 times in standard length.



Zeidae




Zeniontidae







Key to species occurring in the area

- 1a. Dorsal fin with 5 or 6 spines (first visible spine much longer than second) and 34 to 36 soft rays; pelvic fin with 1 spine and 5 rays; anal fin with 2 or 3 spines and 31 to 34 rays; cheeks and operculum covered with weakly ctenoid adherent scales; midlateral body scales cycloid, deciduous; adults dark brown, fins darker; prejuveniles (12 to 25 cm) with 3 small hillocks in a row on belly; body silvery, covered with dark spots of various sizes, becoming larger and fainter with growth ***Pseudocyttus maculatus***
- 1b. Dorsal fin with 5 to 8 spines (first spine much shorter than second) and 28 to 35 soft rays; pelvic-fin rays 6 or 7; anal fin with 2 to 4 spines and 26 to 33 soft rays; opercle not scaly, with radiating bony ridges; scales spinoid and adherent; adults blackish violet → 2

- 2a. Predorsal body profile convex, straight or slightly concave; pelvic fins not reaching anal-fin origin; dorsal- and anal-fin spines weak, first anal-fin spine less than peduncle depth → 3
- 2b. Predorsal body profile distinctly concave, rising steeply before dorsal fin; pelvic fins reach anal-fin origin; dorsal- and anal-fin spines well developed, first anal spine about twice peduncle depth → 4
- 3a. Scales cycloid, strongly adherent; second dorsal-fin spine subequal to peduncle depth; belly of prejuvenile swollen, with a lateral row of small scaly hillocks ending in a minute cone *Allocyttus guineensis*
- 3b. Scales distinctly spinoid; second dorsal-fin spine distinctly longer than peduncle depth; abdomen of prejuveniles (3 to 20 cm SL) swollen, with 2 rows of enlarged, subrectangular plate-like scales on each side, less distinct with age but their remnants may still be seen on adults; prejuvenile silvery greenish dorsally, with dark grey blotches fading at about 12 cm; adults dark brown or blackish with violet sheen *Allocyttus verrucosus*
- 4a. Body scales cycloid, deciduous; dorsal-fin spines + rays 35 to 37; first anal-fin spine distinctly less than orbit diameter; abdomen of prejuvenile (9 to 11 cm) swollen, with a row of 5 large cones along each side laterally, other cones along ventral midline and on predorsal part of body *Oreosoma atlanticum*
- 4b. Scales distinctly spinoid; dorsal-fin spines + rays 38 to 42; first anal-fin spine subequal to orbit diameter; no large cones on abdomen of prejuvenile → 5
- 5a. Head length 3.0 to 3.2 times in standard length; orbit diameter 6.4 to 8.3 times in standard length; pectoral-fin rays 17 to 19 *Neocyttus helgae*
- 5b. Head length 2.2 to 2.9 times in standard length; orbit diameter 5.3 to 6.1 times in standard length; pectoral-fin rays 19 to 21 *Neocyttus rhomboidalis*

List of species occurring in the area

The symbol  is given when species accounts are included

-  *Allocyttus guineensis* Trunov and Kukuev, 1982.
-  *Allocyttus verrucosus* (Gilchrist, 1906).
-  *Neocyttus helgae* (Holt and Byrne, 1908).
-  *Neocyttus rhomboidalis* Gilchrist, 1906.
-  *Oreosoma atlanticum* Cuvier, 1829.
-  *Pseudocyttus maculatus* Gilchrist, 1906.

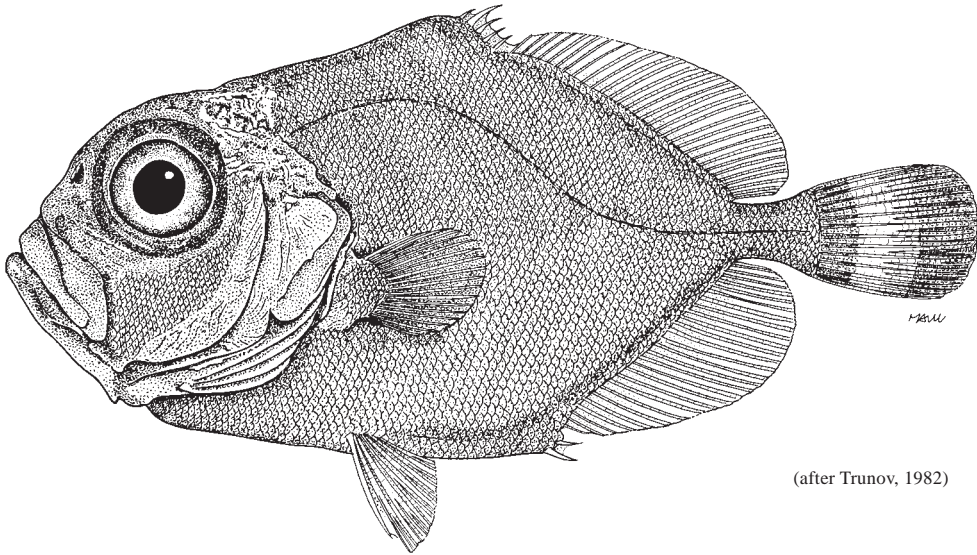
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Allocyttus guineensis Trunov and Kukuev, 1982

Frequent synonyms / misidentifications: None / *Neocyttus helgae* (not of Holt and Byrne 1908).

FAO names: En – Guinea oreo.



(after Trunov, 1982)

Diagnostic characters: Body deep, oval, compressed, predorsal profile straight or slightly concave; depth contained 1.5 to 1.9 times in standard length; head length contained 2.2 to 2.5 times in standard length; eye diameter longer than snout, about 2.5 times in head length; maxilla reaches past vertical at front edge of eye; 1 or 2 rows of minute teeth on jaws. Gill rakers 3 to 6 on upper limb, 17 to 22 on lower limb. Dorsal fin with 4 to 6 minute spines, 30 to 32 soft rays; anal fin with 2 minute spines separated from 26 to 29 soft rays; tail fin rounded; pectoral fin with 17 or 18 rays; pelvic fin with a slender spine and 6 branched rays. Body covered with minute cycloid scales mostly with a raised centre; lateral-line scales 84 to 92. Belly of prejuveniles not much enlarged, but abdomen and chest with enlarged scales, forming a lateral row of 4 small hillocks ending in a minute cone; a swollen area on each side of spinous dorsal fin. **Colour:** uniformly dark brown; middle third of caudal fin pale.

Habitat, biology, and fisheries: Probably a midwater species occurring in 230 to 1 900 m. No published information on biology or fisheries.

Size: Attains at least 25 cm total length.

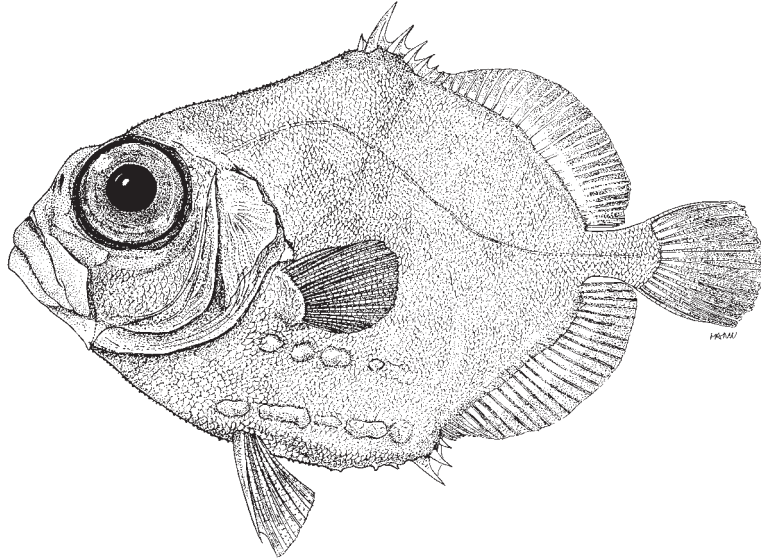
Distribution: Mauritania to Angola; 1 record west of Cape Town.



***Alloctytus verrucosus* (Gilchrist, 1906)**

Frequent synonyms / misidentifications: None / None.

FAO names: En – Warty dory.



Diagnostic characters: Body deep, compressed, oval, predorsal profile straight or slightly convex, depth contained 1.4 to 1.7 times in standard length; head length contained 2.2 to 2.7 times in standard length; eye diameter longer than snout, about half head length; maxilla reaches past vertical at front edge of eye; 1 or 2 rows of minute teeth on jaws. Gill rakers 4 to 6 on upper limb, 19 to 22 on lower limb. Dorsal fin with 5 to 7 minute spines, 29 to 33 soft rays; anal fin with 2 or 3 minute spines and 27 to 31 soft rays; tail fin rounded; pectoral fin with 17 to 20 rays; pelvic fin with a slender spine and 6 branched rays. Body covered with minute spinoid scales; lateral-line scales 83 to 91. Abdomen and chest of prejuveniles distinctly enlarged, with 2 well-separated rows of about 8 enlarged plates on each side of abdomen; plates less distinct with age but remnants still visible on adults. Vertebrae 34 to 37. Metamorphosis to juvenile stage occurs at about 10 cm. **Colour:** adult blackish with violet sheen; prejuveniles silvery, greenish dorsally with large round dark blotches.

Habitat, biology, and fisheries: Probably a midwater species occurring in 230 to 1 900 m over the continental slope. No published information on biology or fisheries.

Size: Attains 42 cm total length.

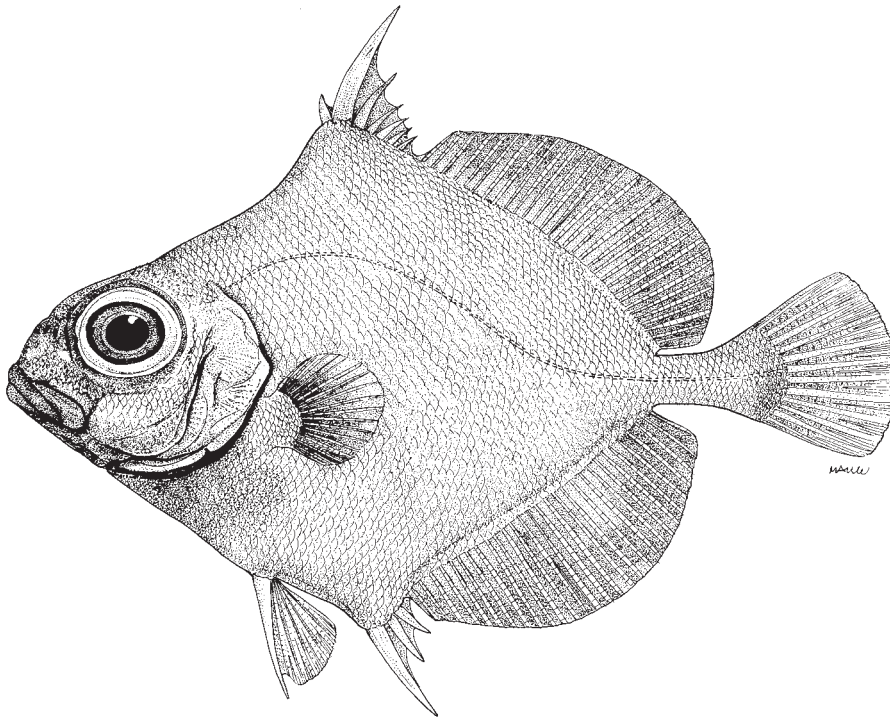
Distribution: Mauritania to Angola; one record west of Cape Town. Also reported from Suriname, Argentina, Namibia, southern Africa, western Indian Ocean, Australia, and New Zealand.



***Neocyttus helgae* (Holt and Byrne, 1908)**

Frequent synonyms / misidentifications: *Crassispinus granulatus* Maul 1948 / *Neocyttus rhomboidalis* Gilchrist, 1906.

FAO names: En – Irish oreo.



Diagnostic characters: Body rhomboid, strongly compressed; predorsal profile strongly concave, rising steeply before dorsal fin; body depth contained 1.2 to 1.3 times in standard length; head length 3.0 to 3.2, head depth 4.0 to 4.4 in standard length; orbit diameter 6.4 to 8.3 in standard length; maxilla reaches past vertical at front edge of eye; head bones spinulose, numerous short spines on supraorbital ridges; scales spinoid, adherent; radiating ridges on opercle; band of villiform teeth on jaws and a small patch on vomer. Gill rakers 4 or 5 on upper limb, 16 to 18 on lower limb. Dorsal fin with 6 to 8 strong spines, the second spine longest, longer than eye diameter, and 30 to 33 soft rays; anal fin with 3 or 4 strong spines, 29 to 30 soft rays; pectoral-fin rays 17 to 19; pelvic fin with a strong spine and 5 or 6 branched rays. Body scales of adults minute, spinoid, strongly adherent; lateral-line scales 76 to 90. Vertebrae 39 to 40.

Habitat, biology, and fisheries: Demersal in 990 to 1 210 m over the continental slope. Adults occur over rocky bottom near pinnacles and sea mounts. Caught with trawls.

Size: Attains 31 cm total length.

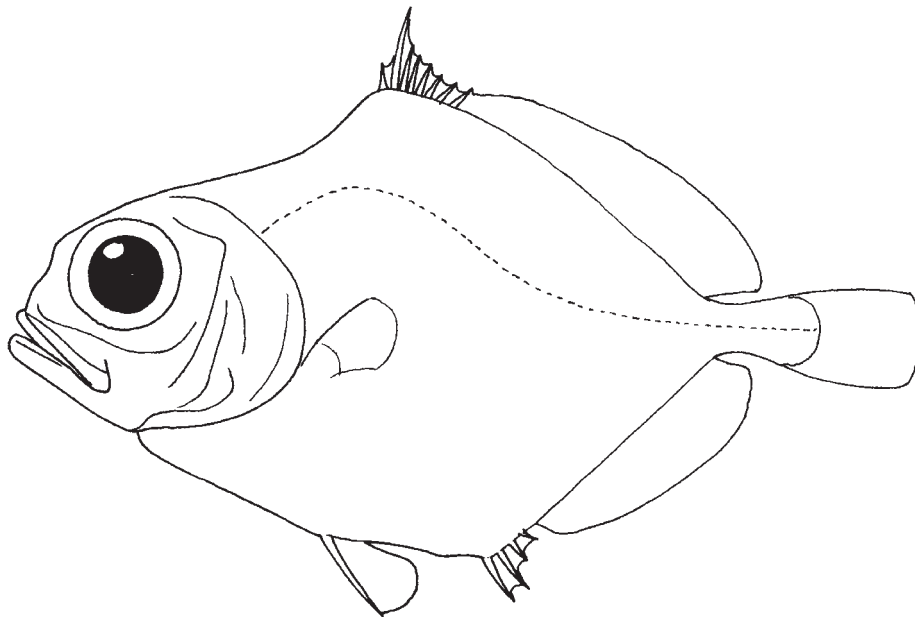
Distribution: Eastern North Atlantic from off the Faeroes Islands to Madeira.



***Neocyttus rhomboidalis* Gilchrist, 1906**

Frequent synonyms / misidentifications: None / *Neocyttus helgae* (Holt and Byrne, 1908).

FAO names: En – Spiky oreo.



Diagnostic characters: Body compressed, rhomboid, predorsal profile strongly concave, rising steeply before dorsal fin, body depth contained 1.3 to 1.5 times in standard length; head length 2.2 to 2.9 times in standard length; orbit diameter longer than snout, about half head length; 5.3 to 6.1 times in standard length; maxilla reaches past vertical at front edge of eye; head bones rugose, numerous short spines on supraorbital ridges; radiating ridges on opercle; band of villiform teeth on jaws and a small patch on vomer. Gill rakers 4 or 5 on upper limb, 16 to 18 on lower limb. Dorsal fin with 7 or 8 strong spines, the second spine longest, longer than eye diameter, and 31 to 34 soft rays; anal fin with 3 or 4 strong spines, 29 to 33 soft rays; tail fin rounded; all fin soft rays with minute spinules; pectoral fin with 19 to 22 rays; pelvic fin with a strong spine and 6 branched rays. Body scales of adults minute, spinoid, slightly deciduous; lateral-line scales 88 to 114; vertebrae 39 or 40. Abdomen and chest of prejuveniles moderately distended, more ventrally than laterally, with enlarged, thickened, moderately conical, cycloid scales; no abdominal plates or protuberances. Vertebrae 38 to 40. Metamorphosis to the juvenile stage occurs at about 7 or 8 cm standard length. **Colour:** adults uniform pale brownish; fin rays grey, membranes black; mouth cavity and branchiostegal membranes black. Prejuveniles bluish grey with indistinct dark blotches dorsally.

Habitat, biology, and fisheries: Demersal species occurring in 200 to 1 240 m over the continental slope. Adults occur over rocky bottom near pinnacles and sea mounts. Feeds on salps, fish, crustaceans and squid. Maximum age reported as 100 years. Caught with trawls.

Size: Attains 48 cm total length, maximum weight 2 kg.

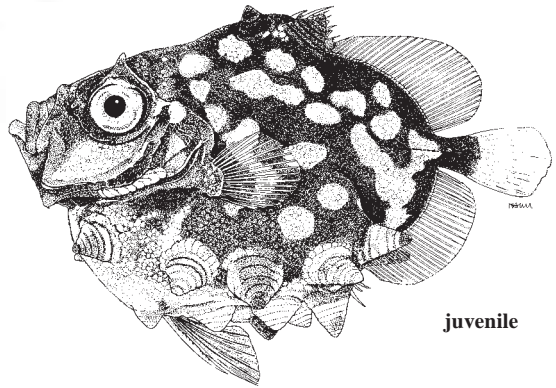
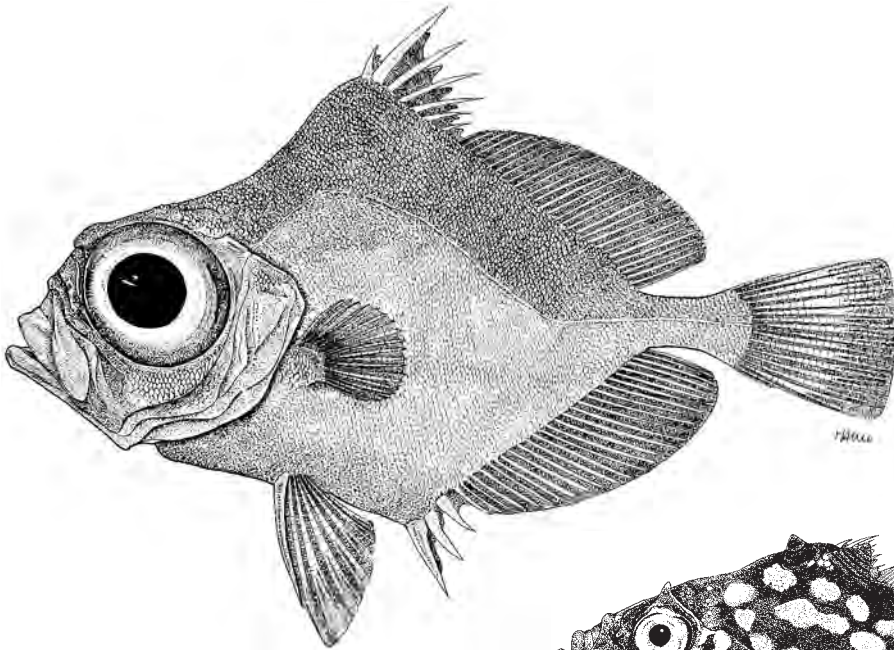
Distribution: Circumglobal in temperate seas. Known from Walvis Bay and Walvis Ridge off southern Namibia, Madeira, Ireland, Iceland, South Africa (west coast), Australia (south coast), New Zealand and Argentina.



***Oreosoma atlanticum* Cuvier, 1829**

Frequent synonyms / misidentifications: *Cyttosoma boops* Gilchrist, 1904 / None.

FAO names: En – Ox-eyed oreo.



juvenile

Diagnostic characters: Body compressed, discoid or rhomboid, predorsal profile of adult concave, rising steeply before dorsal fin, body depth contained 1.4 to 1.7 times in standard length; head length contained 2.3 to 2.9 times in standard length; eye diameter longer than snout, 50 to 60% head length; maxilla reaches past vertical at front edge of eye; head bones rugose, ridges in front and behind eyes serrate; operculum with strongly serrate horizontal ridge dorsally; band of villiform teeth on jaws and a small patch on vomer. Mouth toothless except for minute teeth at front of lower jaw. Gill rakers 4 or 5 on upper limb, 22 to 26 on lower limb. Dorsal fin with 6 to 8 slender, strong spines and 29 to 31 soft rays; anal fin with 2 or 3 strong spines, 28 to 31 soft rays; tail fin rounded; pectoral fin with 19 to 21 rays; pelvic fin with a strong spine and 6 or 7 branched rays. Scales on sides of body minute, cycloid, deciduous; scales on nape, top of head and ventral part of body adherent, tubercular and spinoid; lateral-line scales 82 to 98. Vertebrae 36 to 38. Abdomen and chest of prejuveniles distinctly expanded laterally, with a row of 5 large cones on each side, a pair of cones on either side of spinous dorsal fin, one cone on each side of anus, another pair in front of pelvic-fin bases, on ventral midline of belly a cone anterior to anus and 2 pairs between this cone and pelvic fins. Adult (> 11 cm standard length) without protuberances or abdominal plates. Metamorphosis to the juvenile stage occurs at about 10 cm standard length. **Colour:** adult grey brown, head, nape, fins and ventral part of body dark grey; iris golden. Prejuveniles head and body dark greyish black, with several greenish silvery grey blotches laterally; dorsal cones dark, lateral cones pale grey to silver, ventral cones white to silver; soft dorsal and anal fins hyaline, first dorsal and pelvic fins grey; proximal third of tail fin pale, rest of fin grey.

Habitat, biology, and fisheries: Adults demersal in 220 to 1 550 m over the continental slope. Prejuveniles epipelagic and mesopelagic. Caught with trawls.

Size: Attains 21 cm total length.

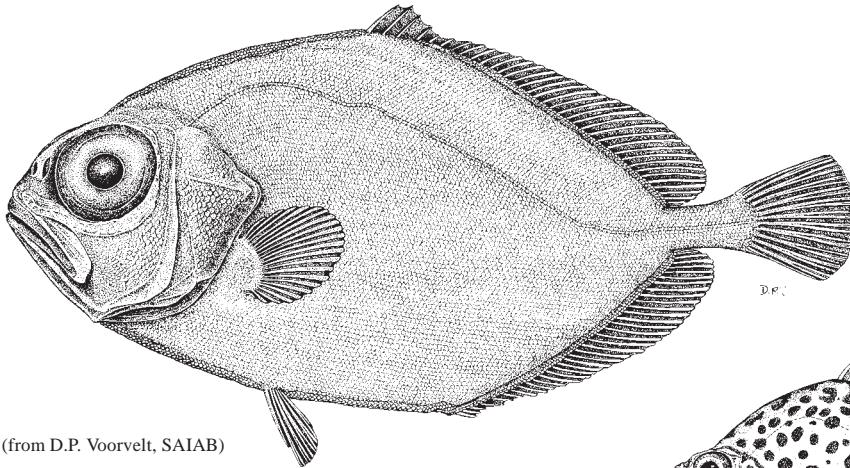
Distribution: Known from Walvis Ridge off southern Namibia, South Africa (west coast), Walters Shoal south of Madagascar, Australia (south coast) and New Zealand.



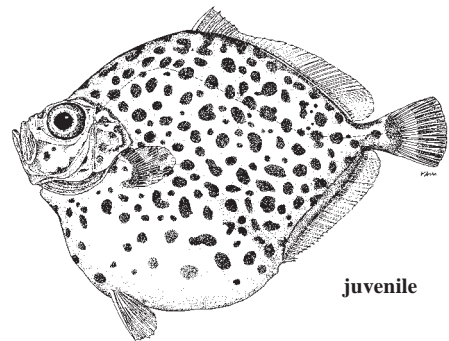
Pseudocyttus maculatus Gilchrist, 1906

Frequent synonyms / misidentifications: None / None.

FAO names: En – Smooth oreo dory.



(from D.P. Voorvelt, SAIAB)



Diagnostic characters: Body compressed, ovoid, nape profile strongly convex, rising steeply before dorsal fin, body depth contained 1.5 to 1.8 times in standard length; head length contained 2.2 to 2.9 times in standard length; eye diameter longer than snout, one-third to almost half head length; maxilla reaches past vertical at front edge of eye; head bones rugose, a few short spines on ridges about the eyes; opercle and preopercle fully scaly; band of villiform teeth on jaws, sometimes a small patch of teeth on vomer. Gill rakers 6 or 7 on upper limb, 17 to 21 on lower limb. Dorsal fin with 5 or 6 weak spines, the first spine longest, and 34 to 36 soft rays; anal fin with 2 or 3 weak spines, 31 to 34 soft rays; tail fin truncate; pectoral fin with 19 to 21 rays; pelvic fins with a weak, short spine and 5 branched rays; pelvic spine reaches about halfway to anus. Body scales of adults minute, cycloid, deciduous; scales on cheek, operculum and interorbital area slightly spinoid and adherent; lateral line scales 98 to 119. Prejuveniles (5 to 16 cm standard length) discoid, strongly compressed; scales strongly adherent, cycloid, conical with fine serrations on prominent circuli, a small spine on rear edge of most scales; scales of abdomen and chest enlarged, thickened, moderately conical, forming a mosaic pattern; several small indistinct, irregular protuberances in horizontal series along midventral part of abdomen. Metamorphosis to the juvenile stage occurs at 14 to 15 cm standard length. **Colour:** adults uniform bluish grey to greyish brown; subadults (< 28 cm) with some darker blotches; fins dark grey; mouth cavity and branchiostegal membranes black. A 50 cm, fresh, ripe female was dark brown with black fins. Prejuveniles silvery grey, with numerous dark blue spots and blotches dorsally.

Habitat, biology, and fisheries: Demersal species occurring in 400 to 1 500 m over the continental slope. Adults occur over rocky bottom near pinnacles and sea mounts. Feeds primarily on salps. Maximum age reported as 100 years. Caught with trawls. Common and commercially important in the New Zealand region.

Size: Attains 61 cm total length, maximum weight 5 kg, age 100 years.

Distribution: Known from off Walvis Bay and Walvis Ridge off southern Namibia, South Africa (off Cape Town and Agulhas Bank), Australia (south coast), New Zealand, Argentina, Falkland Islands, Kerguelen Islands and coast of Antarctica.



ZENIONTIDAE

Zeniontids

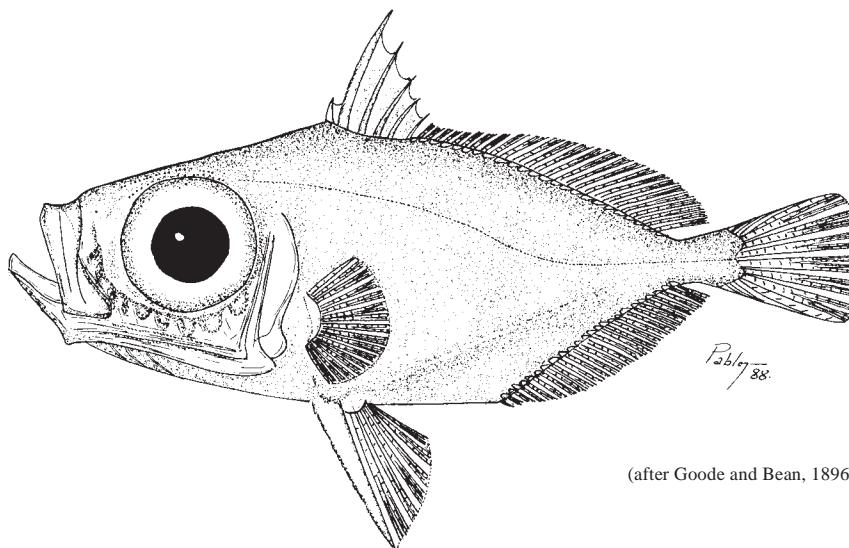
by P.C. Heemstra, South African Institute for Aquatic Biodiversity, Grahamstown, South Africa

A single species occurring in the area.

Zenion hololepis (Goode and Bean, 1896)

Frequent synonyms / misidentifications: *Zenion longipinnis* Kotthaus, 1970; *Z. japonicum* Kamohara, 1934; *Cyttus hololepis* Goode and Bean, 1896 / None.

FAO names: En – Dwarf dory.



(after Goode and Bean, 1896)

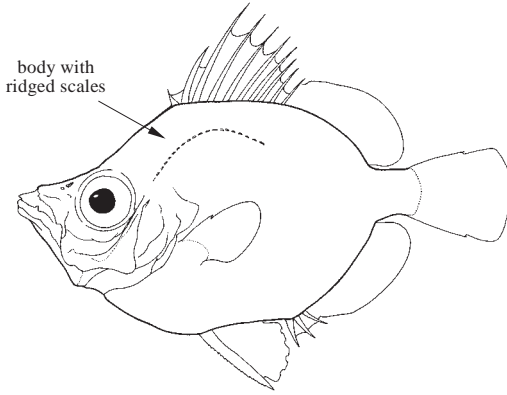
Diagnostic characters: Small (to 16 cm) oblong fish, body compressed; body depth about equal to head length (with upper jaw retracted), contained 2.3 to 2.7 times in standard length; head bones thin, with numerous serrate ridges; mouth large, vertical, lower jaw projecting; upper jaw extremely protrusile, its length (from symphysis of retracted premaxillae to rear end of maxilla) about equal to eye diameter; lips well developed; with mouth closed, maxilla slips under preorbital bone and upper lip overlaps front part of preorbital; a few minute, conical teeth at front of jaws, none on vomer or palatines. Eye large, its diameter contained 1.9 to 2.8 times in head length. Scales minute, spinoid; lateral line inconspicuous. Branchiostegal rays 7, the membranes free from isthmus; gills 3.5 (no opening medial to fourth gill); gill rakers 13 to 15, plus 1 to 3 rudiments on lower limb, 2 or 3 rudiments on upper limb. **Dorsal fin with 6 or 7 spines and 25 to 31 rays, the second and third spines can be locked erect, front edge of second spine distinctly serrate; anal fin with 1 (rarely 2) weak spines and 23 to 28 rays; dorsal, anal and pectoral-fin rays unbranched; caudal fin with 11 branched rays and 2 or 3 spiniform procurrent rays on upper and lower edges of fin base; pectoral fins round, with 15 to 17 rays, longest about one-third head length; pelvic fins with a strong, serrate spine and 6 branched rays, the fins widely separated and much longer than pectoral fins. Vertebrae 25 to 27. Colour: body dusky silver; head orange.**

Remarks: The family comprises one genus and 2 or 3 species; at least 1 species occurs in the eastern central Atlantic area. The characters thought to differentiate *Zenion longipinnis* from *Z. hololepis* are erroneous. The course of the lateral line is the same for both species. The isthmus of *Z. hololepis* is completely scaly, but scales were missing on the holotype from abrasion in the trawl. The membrane joining the pelvic-fin spine to the rays is fragile and easily torn in trawl-caught specimens.

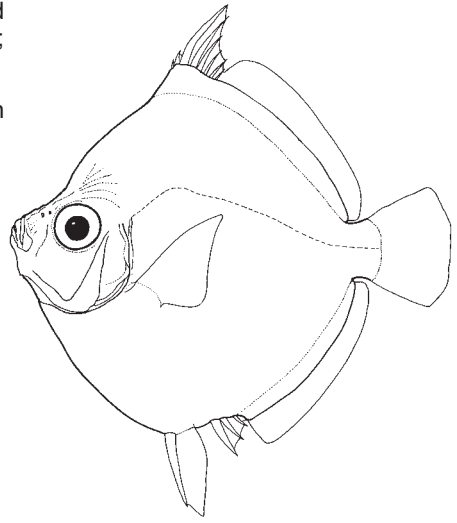
Similar families occurring in the area

Caproidae: body oval, the depth 0.8 to 1.6 times in standard length and 2 to 3 times head length; body with ridged scales; pectoral fins about equal to head length; anal-fin spines 3.

Antigoniidae: body greatly compressed and disc-like, the depth about 3 times head length.



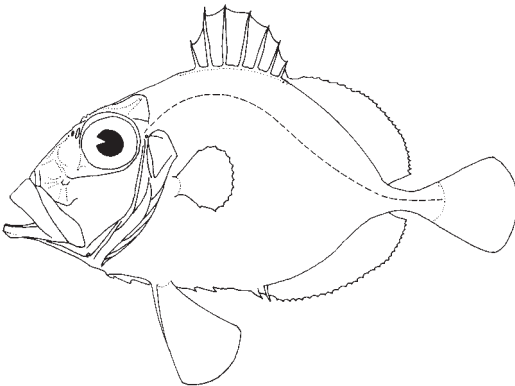
Caproidae



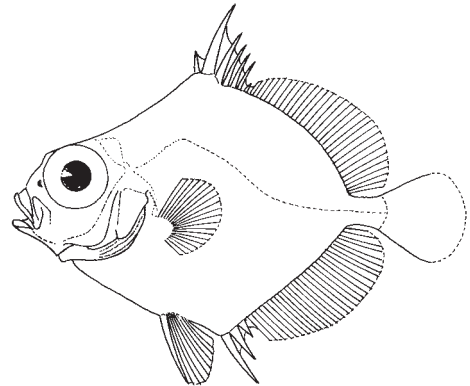
Antigoniidae

Zeidae: body depth distinctly greater than head length, 1.6 to 2.1 times in standard length.

Oreosomatidae: body depth distinctly greater than head length, 1.4 to 1.8 times in standard length.

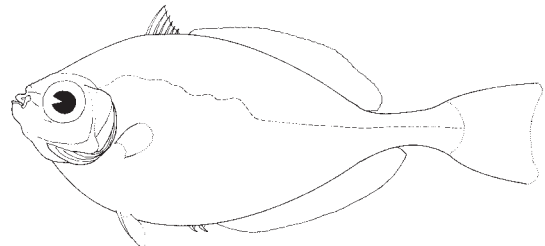


Zeidae



Oreosomatidae

Grammicolepididae: body depth much greater than head length, upper jaw length about half eye diameter.



Grammicolepididae

Size: Maximum 16 cm.

Habitat, biology, and fisheries: Zeniontids occur in depths of 180 to 700 m in a variety of habitats. Nothing has been published on the biology of these species. They are usually caught near the bottom with trawls; because of their small size, zeniontids are of no commercial interest.

Distribution: Mauritania to Angola, Ascension, St Helena, also western North Atlantic from Canada, east coast of the United States, Bermuda, Bahamas, Gulf of Mexico and Caribbean to Suriname; also reported from Indo-West Pacific region.



References

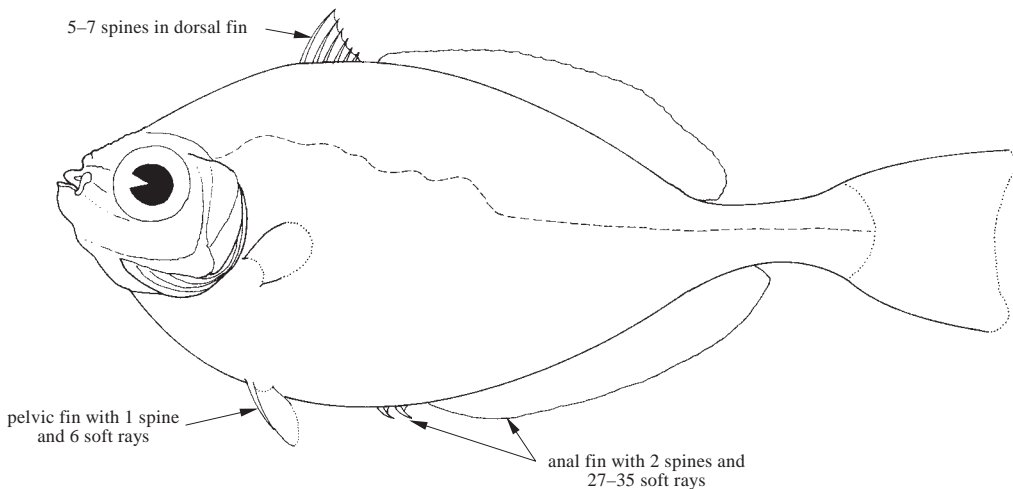
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GRAMMICOLEPIDIDAE

Tinselifishes

by P.C. Heemstra, South African Institute for Aquatic Biodiversity, Grahamstown, South Africa

Diagnostic characters: Moderate-sized (to 64 cm) **oblong or diamond-shaped fishes, head and body greatly compressed; body depth much greater than head length, contained 0.8 to 2.3 times in standard length; head bones thin and soft; mouth minute, upper jaw length contained twice in eye diameter;** maxilla ridged, bound to ascending process of premaxilla and loosely connected to palatines; jaws with a few minute, conical teeth, none on vomer or palatines. **Scales each elongated vertically, covering body and most of head; a row of small spines on body along each side of dorsal and anal-fin bases.** Branchiostegal rays 7, membranes joined to isthmus. **Dorsal fin with 5 to 7 spines, 27 to 34 rays; anal fin with 2 spines, 27 to 35 rays; dorsal, anal and pectoral-fin rays unbranched; caudal fin with 13 branched rays; pectoral rays 14 to 15, much shorter than head length; pelvic fins with 1 slender spine, 6 rays.** Vertebrae 36 or 37 (*Xenolepidichthys*) or 43 to 46 (*Grammicolepis*). In juveniles, the first anal spine is greatly elongated, reaching to or well beyond caudal fin, and the second dorsal spine is usually longer than the head; these elongated spines become greatly shortened in adults. **Colour:** body silvery, young with irregular black spots or blotches.

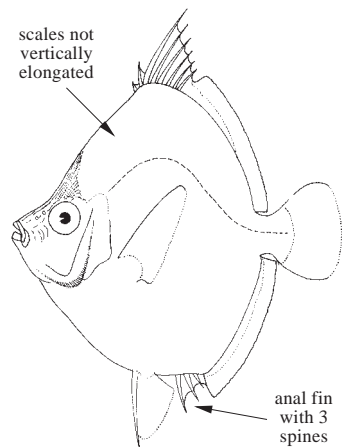


Habitat, biology, and fisheries: Grammicolepids occur in depths of 100 to 800 m in a variety of habitats. Nothing has been published on the biology of tinselifishes. They are usually caught near the bottom with trawls. Not common. No commercial interest.

Remarks: The family comprises 2 genera, each with a single species.

Similar families occurring in the area

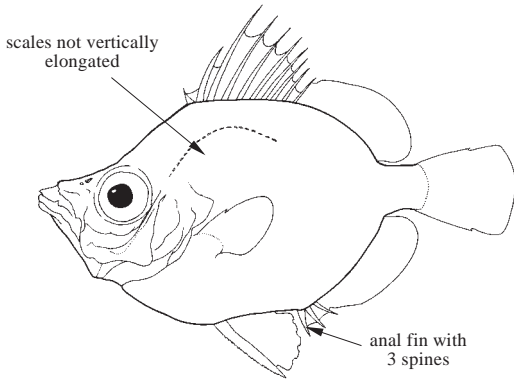
Antigoniidae: scales not vertically elongated; pelvic fins with 1 spine, 5 rays; caudal fin shorter than head, with 10 branched rays.



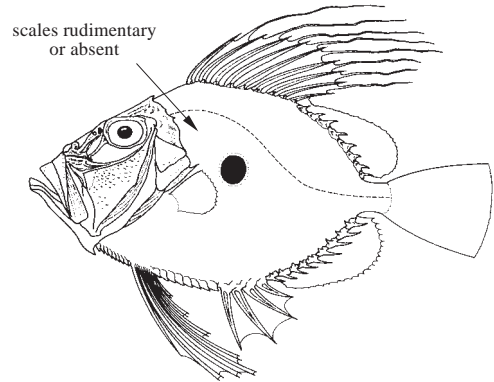
Antigoniidae

Caproidae: scales not vertically elongated; body with ridged scales; pectoral fins about equal to head length; anal fin with 3 spines.

Zeidae: scales rudimentary or absent; mouth large, upper jaw length greater than eye diameter; dorsal fin with 7 to 10 spines.



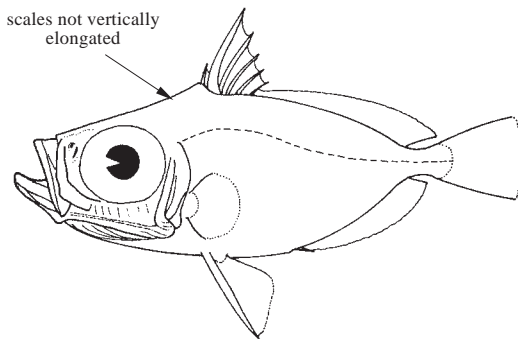
Caproidae



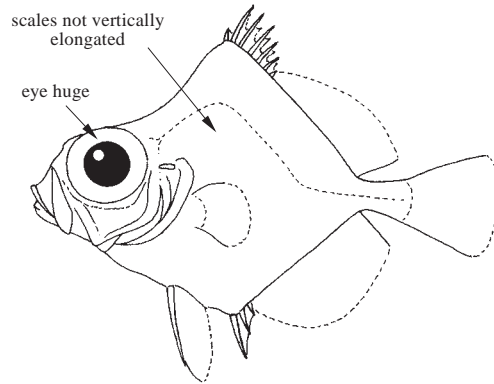
Zeidae

Zeniontidae: scales not vertically elongated; body depth about equal to head length, 2.3 to 2.7 times in standard length; distance from pectoral-fin base to pelvic-fin base less than eye diameter.

Oreosomatidae: Scales not vertically elongated; head length half or more of body depth; eye huge, 2 or more times depth of caudal peduncle.



Zeniontidae




Oreosomatidae

Key to species of Grammicolepididae occurring in the area

- 1a. Total dorsal-fin spines plus soft (segmented) rays equals 32 to 35; no spiny scutes on body at any stage; 29 spinous protuberances along base of dorsal fin ***Xenolepidichthys dalgleishi***
- 1b. Total dorsal-fin spines plus rays equals 39 to 41; sides of body and caudal peduncle of young (8 to 24 cm standard length) with 10 or 11 widely separated, shelf-like spiny scutes which disappear with growth; 34 to 36 spinous protuberances along dorsal-fin base ***Grammicolepis brachusculus***

List of species occurring in the area

The symbol  is given when species accounts are included.

 *Grammicolepis brachiusculus* Poey, 1873.

= *Daramattus americanus* (Nichols and Firth, 1939).

 *Xenolepichthys dalgleishi* Gilchrist, 1922.

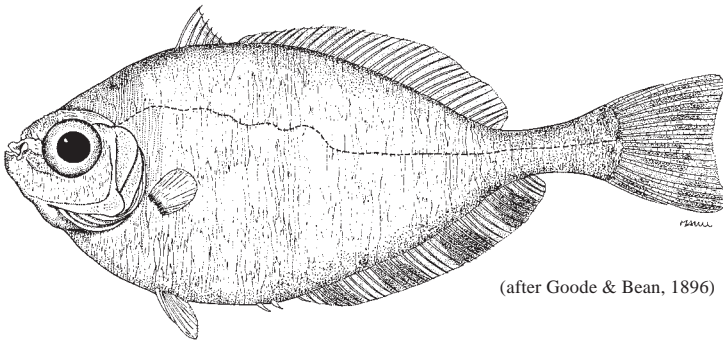
References

Karrer, C & Heemstra, P.C. 1990. Oreosomatidae. In: *Check-list of the fishes of the eastern tropical Atlantic*, Vol. II: 634-636. Junta Nacional de Investigação Científica e Tecnológica, Lisbon.

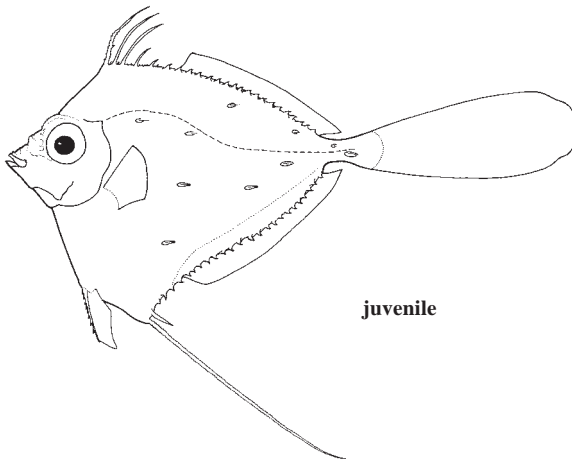
***Grammicolepis brachiusculus* Poey, 1873**

En – Thorny tinselfish.

Body deep, much compressed; maximum size 65 cm; body depth of prejuveniles (less than 20 cm standard length) contained 1.4 to 1.6 times (2.0 to 2.3 times in adult) in standard length; head length 3.2 to 3.8 times (4.2 to 4.4 times in adult) in standard length; conspicuous, horizontally flattened, spiny scutes on body of prejuveniles; body silvery with irregular black blotches, black spots on caudal fin and 4 or 5 black bars on anal fin. Metamorphosis from the prejuvenile stage occurs at about 25 to 30 cm standard length, at which time the body becomes more elongate and rounded, the spiny scutes are lost and the elongate fin spines are greatly shortened. Caught with trawls in depths of 300 to 1 026 m. Eastern Atlantic, Mediterranean to southern Africa, Japan, and Hawaii; also in western central Atlantic from Canada to Venezuela.



(after Goode & Bean, 1896)

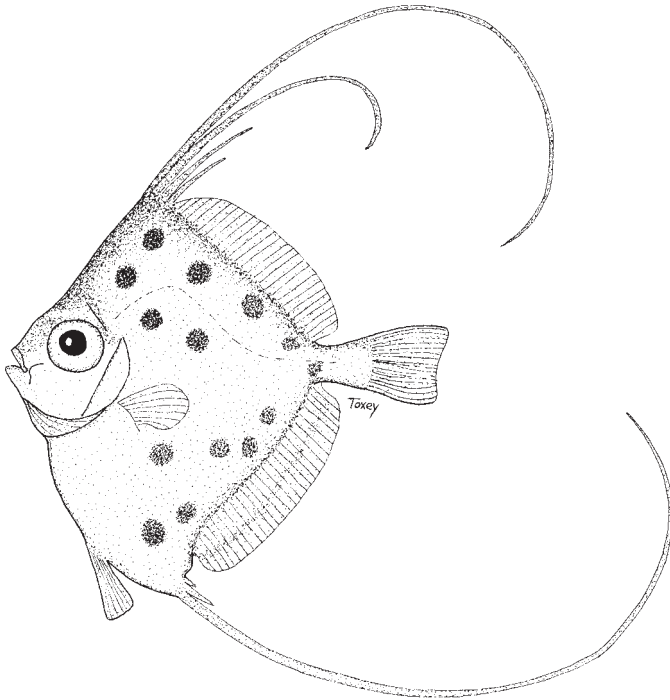


juvenile

***Xenolepidichthys dalgleishi* Gilchrist, 1922**

En – Spotted tinselfish.

Body deep, much compressed; maximum size to 15 cm. Body depth contained 0.8 to 1.2 times, head length 2.9 to 3.7 times in standard length; body silvery, with round black spots; anterior pelvic fin rays and rear margin of caudal fin black. Caught with trawls in depths of 90 to 900 m. Eastern central Atlantic from Senegal to South Africa; western Atlantic from Emerald Bank Nova Scotia, Gulf of Maine to Florida, Bermuda, Nicaragua, Honduras, Venezuela and Suriname; western central Pacific from Japan to Australia, Tonga and New Zealand.

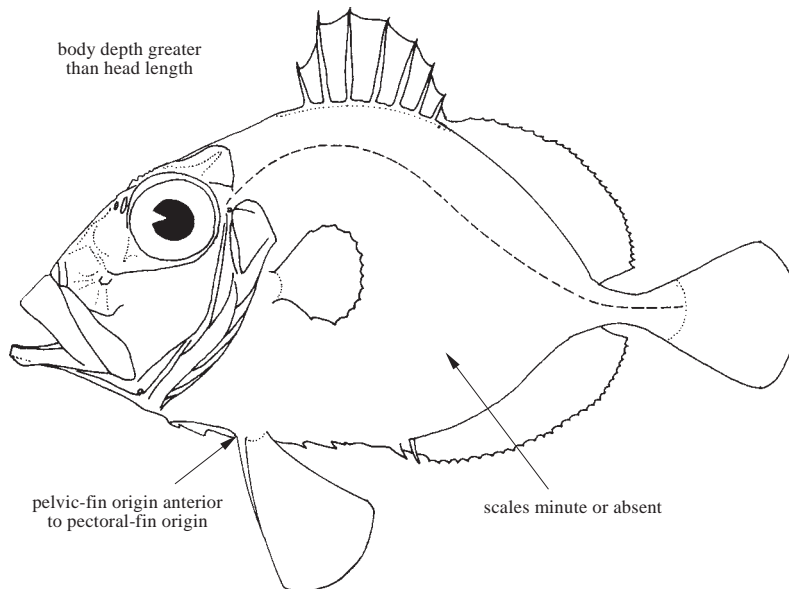


ZEIDAE

Dories

by P.C. Heemstra, South African Institute for Aquatic Biodiversity, Grahamstown, South Africa

D **Diagnostic characters:** Body deep, extremely compressed, disk-shaped or oblong, body depth much greater than head length, 45 to 60% standard length; zeids attain 60 to 90 cm. Mouth large, strongly oblique and highly protrusile; upper jaw length much greater than eye diameter; maxilla widely expanded posteriorly, mostly exposed when mouth is closed; small teeth in narrow bands on jaws and vomer; eye above horizontal axis through upper jaw symphysis; eye diameter contained 2.3 to 4.6 times in head length; interorbital area flat; head bones thin and soft; nostrils close together and near front edge of eye; no spines or serrae on opercular bones. Branchiostegal rays 7, membranes narrowly joined at anterior end of isthmus. Gill rakers rudimentary. Dorsal fin with 7 to 11 spines, 22 to 30 soft rays; anal fin with 1 to 4 spines, 20 to 30 soft rays; pectoral fins less than half head length; **pelvic fins with 6 to 10 rays, with or without a spine and inserted below or in advance of pectoral-fin bases**; caudal fin convex, with 13 principal rays, 11 branched rays; dorsal, anal and pectoral-fin rays unbranched. Body naked or covered with minute, rudimentary cycloid scales; bony scutes (enlarged modified scales) present along ventral part of belly and isthmus; in *Zenopsis* and *Zeus* there are also series of large bony plates or smaller scutes along the dorsal and anal-fin bases. Vertebrae 29 to 36. **Colour:** usually silvery grey or pink to reddish; some species (i.e. *Zeus faber*) with conspicuous markings on body.



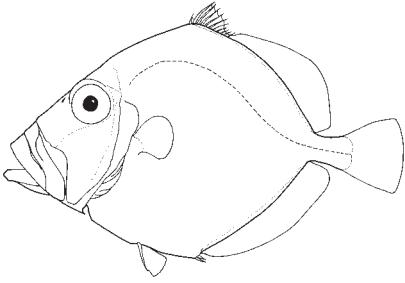
Habitat, biology, and fisheries: Zeids live in temperate and tropical areas, either near the bottom or in midwater, from close inshore to depths of about 600 m. Solitary or in loose aggregations. Zeids feed on fish, squid and crustaceans. Excellent foodfish; caught mainly with bottom trawls. Marketed fresh or frozen; also used for fishmeal and oil.

Remarks: Three genera are here assigned to the Zeidae. The fourth genus, *Stethopristes* Gilbert, 1905 is monotypic and known only from the Hawaiian Islands and is now placed in Parazenidae.

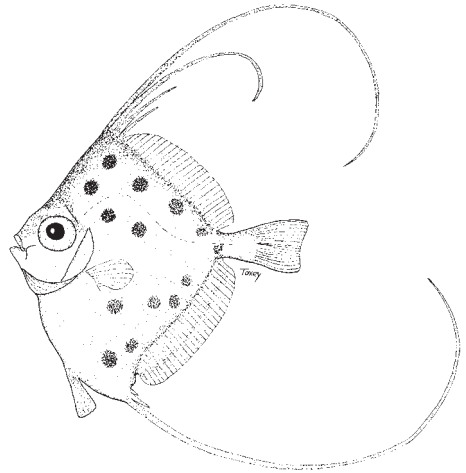
Similar families occurring in the area

Cyttidae: no bony plates or spines along dorsal- and anal-fin bases; body covered with small ctenoid scales; zip-like double row of small scutes from front of isthmus to anus; dorsal fin with 9 or 10 spines, 35 to 37 rays; anal fin with 2 spines, 36 to 38 rays; pelvic fins with 1 spine, 6 rays.

Grammicolepididae: scales greatly elongated vertically; dorsal-fin spines 5 to 7; mouth small, upper jaw length less than eye diameter; head length less than half body depth.



Cyttidae

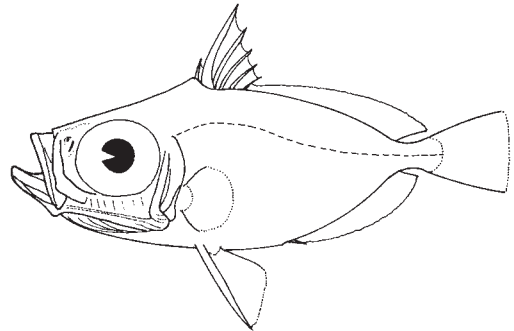


Grammicolepididae

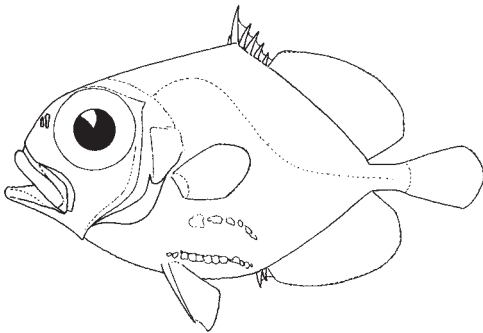
Zeniontidae: body fully scaled, oblong, depth subequal to head length, contained 2.5 to 2.8 times in standard length; eye enormous, about half length of head.

Oreosomatidae: body of adults with minute scales; juveniles with some scales modified to form large plates or elevated cones on the body; eye diameter subequal to upper jaw length, 1.8 to 2.6 times in head length; dorsal fin with 5 to 8 spines, 29 to 36 rays; anal fin with 2 to 4 spines, 26 to 34 rays; pelvic fins with a distinct spine and 5 to 7 rays.

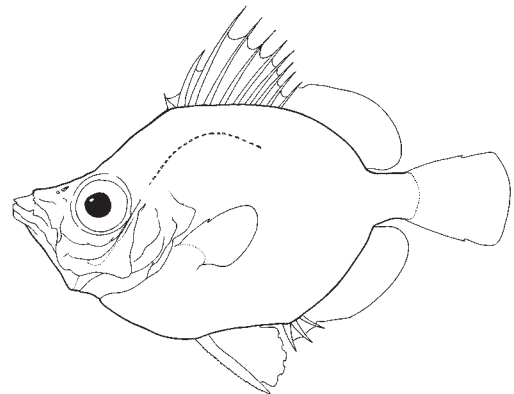
Caproidae: body covered with spinoid (rough) scales; pelvic fins with 1 spine and 5 branched soft rays.



Zeniontidae



Oreosomatidae




Caproidae

Key to species of Zeidae occurring in the area

- 1a.** A series of large bony plates or spinous scutes along each side of dorsal- and anal-fin bases; anal fin with 3 or 4 spines, 20 to 26 rays; dorsal fin with 8 to 10 spines and locking mechanism between first 3 spines; pelvic fins with 6 or 7 rays → **2**
- 1b.** No large bony plates or spinous scutes along each side of dorsal and anal-fin bases; anal fin with 1 or 2 spines, 28 to 30 rays; dorsal fin with 7 or 8 spines and no locking mechanism between first 3 spines; pelvic fins with 9 or 10 segmented rays and no spine ***Cyttopsis rosea***
- 2a.** Large bony bucklers, each with a short spine, along base of anal fin and both spinous and soft parts of dorsal fin; anal fin with 3 spines, 24 to 26 rays; pelvic fins inserted below eye; body silvery grey, with faint dusky midlateral spot near head, juveniles with several black spots ***Zenopsis conchifer***
- 2b.** No bony bucklers along base of spinous dorsal fin; anal fin with 4 spines, 20 to 23 rays; pelvic fins inserted below pectoral-fin base → **3**
- 3a.** Five to 8 large bucklers, each with 1 or 2 short spines, along base of soft dorsal and anal fins; dorsal-fin spines filamentous, extending well beyond dorsal-fin membrane; midlateral blue-black ocellus below lateral line at tip of pectoral fin ***Zeus faber***
- 3b.** Nine to 13 spines along base of soft dorsal and anal fins; dorsal-fin spines elongate but not projecting beyond fin membranes; black spot (sometimes indistinct) surrounded by several smaller silver spots, on or above lateral line and below front dorsal rays . . ***Zeus capensis***

List of species occurring in the area

The symbol  is given when species accounts are included

 *Cyttopsis rosea* (Lowe, 1843).

 *Zenopsis conchifer* (Lowe, 1852).

 *Zeus capensis* Valenciennes 1835.

 *Zeus faber* Linnaeus, 1758.

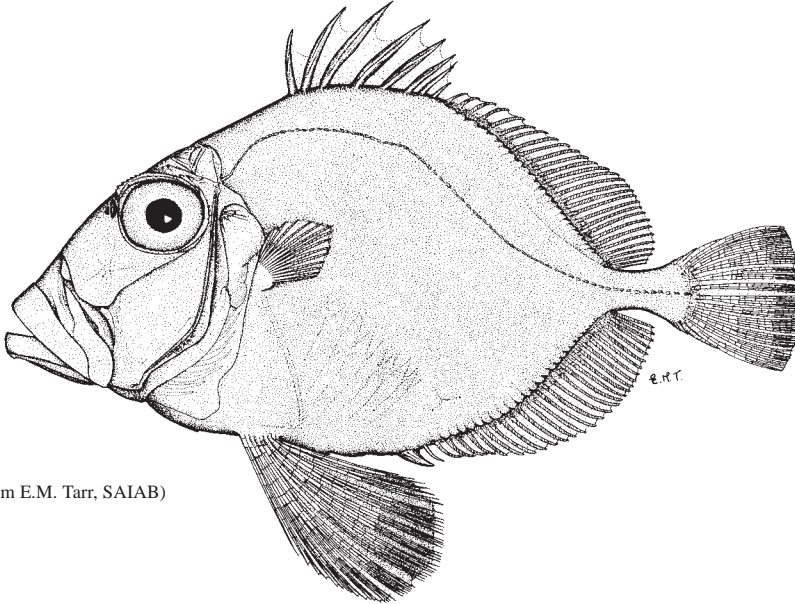
References

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- Tyler, J.C., O'Toole, B. & Winterbottom, R.** 2003. Phylogeny of the genera and families of zeiform fishes, with comments on their relationships with tetraodontiforms and caproids. *Smithsonian Contributions to Zoology*, 618: 1–110.

***Cyttopsis rosea* (Lowe, 1843)**

Frequent synonyms / misidentifications: None / None.

FAO names: En – Red dory; Fr – Saint Pierre rouge; Sp – San Pedro colorado.



(from E.M. Tarr, SAIAB)

Diagnostic characters: Body depth greater than head length, contained 1.7 to 2.0 times in standard length; thoracic region (between or in front of pelvic fins) broad and flattened ventrally. No spines or serrae on opercular bones; upper rim of orbit with several small spines. Gill rakers rudimentary, 1 on upper limb, 8 to 10 on lower limb. **Dorsal fin with 7 or 8 stiff spines, 28 to 30 short rays; anal fin with 1 or 2 spines (first short, broad and immovable, second spine very small) and 29 or 30 rays;** pectoral fin with 13 or 14 rays, much shorter than head length or pelvic fins; **pelvic fins large, with 9 or 10 rays and no spine;** caudal fin with 3 or 4 spiny (unsegmented) procurrent rays. **Scales small, cycloid, deciduous; a row of low bony ridges on each side of base of soft dorsal and anal fins; a row of 3 keeled scutes between pelvic fins and anus;** region between and in front of pelvic fins flattened and broad; distance between pelvic-fin origins 10 to 13% standard length. **Colour:** body reddish silvery; pelvic fins reddish, the membranes black.

Size: Maximum to 22 cm.

Habitat, biology, and fisheries: Common in depths of 200 to 600 m in a variety of habitats. Biology little known. Usually caught near bottom with trawls. Although the flesh is excellent, this species is too small and not abundant enough to be important as a fishery resource.

Distribution: Eastern Atlantic, France, Madeira, Mauritania to South Africa; Canada, South Carolina (USA) to Gulf of Mexico, Cuba, Costa Rica, Colombia, Venezuela; and Indo-West Pacific.

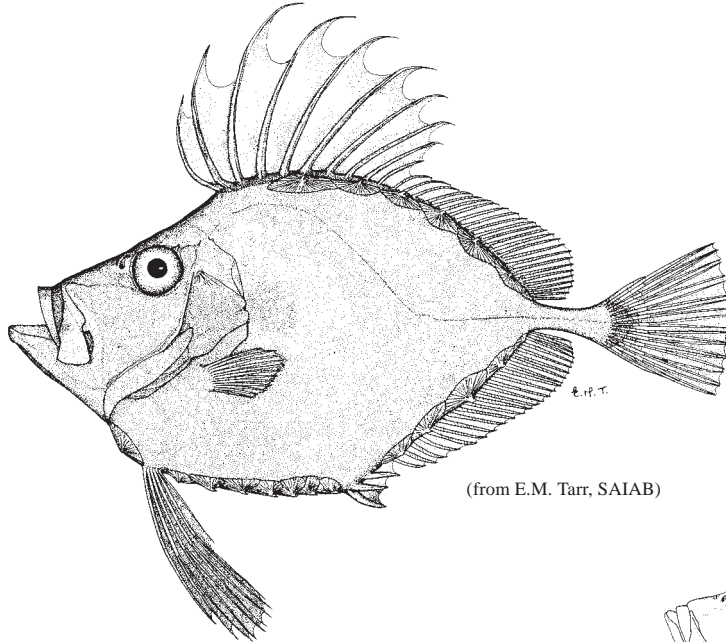
Remarks: *Cyttopsis rosea* (Lowe, 1843) is now recognized as belonging to the family Parazenidae, but the original family designation at the time of writing has been retained for the sake of organization.



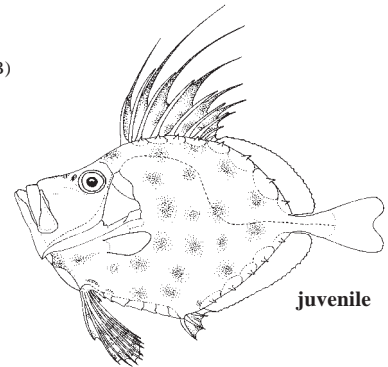
***Zenopsis conchifer* (Lowe, 1852)**

Frequent synonyms / misidentifications: *Zenopsis ocellatus* (Storer, 1857) / None.

FAO names: **En** – Silver John dory (AFS: Buckler dory); **Fr** – Saint Pierre argenté; **Sp** – San Pedro plateato.



(from E.M. Tarr, SAIAB)



juvenile

Diagnostic characters: **Body strongly compressed; caudal peduncle depth equals one third its length.** Eyes small, diameter contained more than 4 times in head. **Dorsal fin with 9 or 10 spines and 24 to 27 soft rays, the spinous portion with interspinous membrane filaments about as long as the spines; anal fin with 3 spines and 24 to 26 soft rays;** locking mechanism between first 2 dorsal-fin spines and first 2 anal-fin spines; pelvic fins with 6 rays, the first element is considered a ray (not a spine) although it is unsegmented and unbranched, as it is divided into 2 halves for its entire length; pelvic fins inserted below eye. Body scaleless, but a row of **large, exposed, bony bucklers (each with a short central spine) present along each side of dorsal- (6 to 9 bucklers) and anal-fin (4 to 9 bucklers) bases;** 2 rows of 7 or 8 keeled bony scutes between pelvic fins and anus; 2 bucklers in front of pelvic fins. **Colour:** silvery grey; eye-sized black spots present in juveniles.

Size: Maximum: 80 cm, over 3 kg.

Habitat, biology, and fisheries: Found near bottom or in deep midwater between 100 and 600 m, but more common between 200 and 300 m. Slow swimmer; feeds on a variety of fishes. Occurs in small groups. Caught mainly with bottom trawls. Separate statistics are not reported for this species. Excellent foodfish; utilized fresh, frozen and dried-salted; also used for fishmeal and oil.

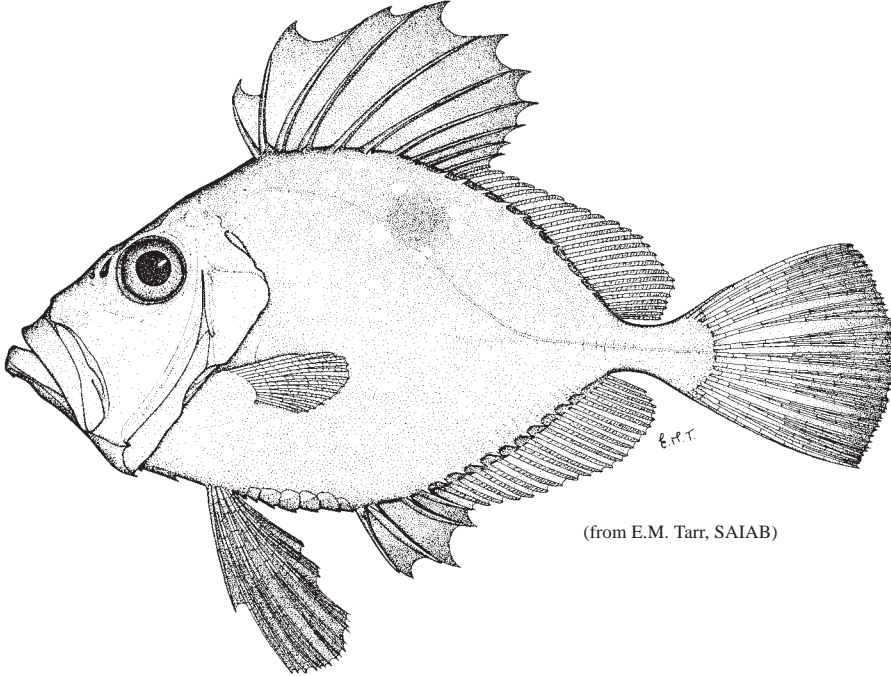
Distribution: Occurs throughout the area; extending northward to Bay of Biscay (48°N) and southward to South Africa. Also present in western Atlantic (from Canada to Argentina) and western Indian Ocean (India and Somalia to South Africa). Records from the Pacific Ocean are probably based on misidentifications of *Zenopsis nebulosa* (Temminck and Schlegel, 1845).



Zeus capensis Valenciennes, 1835

Frequent synonyms / misidentifications: None / None.

FAO names: En – Cape John dory; Fr – Saint Pierre du Cap; Sp – San Pedro del Cabo.



(from E.M. Tarr, SAIAB)

Diagnostic characters: Body depth 1.5 to 2.1 times in standard length; caudal peduncle depth about half of its length. Dorsal head profile straight or convex; eye diameter less than snout length, contained 2.8 to 4.1 times in head; 2 spines at rear end of lower jaw; jaws and vomer with a narrow band of small conical teeth. Dorsal fin with 9 or 10 spines, 22 to 24 rays; interspinous membranes not extended past the spines; anal fin with 4 spines, 20 to 22 rays; first 3 dorsal spines and first 2 anal-fin spines with locking mechanism; pelvic fins with 1 slender, flexible spine and 6 branched rays, inserted below pectoral-fin base. Scales rudimentary, not imbricate; 9 to 13 spines along bases of soft dorsal and anal fins; 2 rows of 7 to 10 spiny scutes between pelvic and anal fins. **Colour:** silvery grey; black spot (sometimes indistinct) surrounded by smaller silver spots, on or above lateral line and below front dorsal rays.

Size: Maximum 90 cm.

Habitat, biology and fisheries: Known from depths of 35 to 200 m over a variety of substrates.

Distribution: Southern Africa from Namibia to Mozambique.

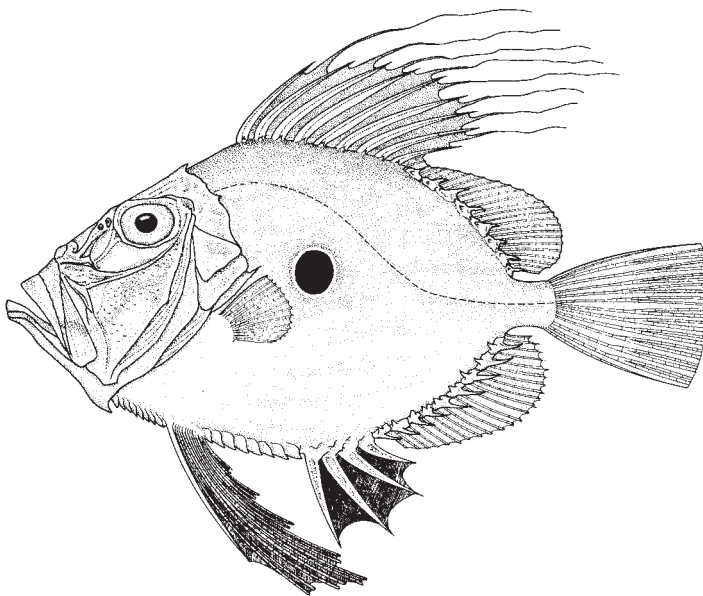


***Zeus faber* Linnaeus, 1758**

Frequent synonyms / misidentifications: None / None.

FAO names: En – John dory; Fr – Saint Pierre; Sp – Paz de San Pedro.

Diagnostic characters: Body depth contained 1.6 to 2.1 times in standard length; caudal peduncle about as long as deep. Dorsal head profile straight or convex; eye diameter less than snout length, contained 3.4 to 6.7 times in head; 2 spines at rear end of lower jaw; jaws and vomer with a narrow band of small conical teeth. Dorsal fin with 9 to 11 spines and 21 to 25 soft rays; **spinous portion with interspinous membrane filaments about as long as spines; anal fin with 3 to 5 spines, 20 to 24 soft rays;** first 3 dorsal-fin spines and first 2 anal-fin spines with locking mechanism; dorsal-fin spines 3 to 8 with a short spine at their base; pelvic fins with 1 spine and 6 or 7 rays, inserted below rear margin of eye. Body covered with very small, cycloid, non-imbricate, embedded scales; 5 to 10 bony



bucklers along each side of dorsal-fin base; first buckler opposite last spine and first dorsal ray, with a large, central, posteriorly-directed spine and a much smaller accessory spine ventral to the main spine and directed posterolaterally; accessory spine of subsequent bucklers gradually increase in size posteriorly, and on last buckler the main spine and accessory spine are subequal; second to fourth anal-fin spines with well-developed accessory spine on each side at base of the spines; 6 to 11 bony bucklers along each side of anal-fin base; all bucklers with 2 spines, the dorsal accessory spines increase in size posteriorly, and the last buckler has 2 subequal spines. Two rows of 7 to 10 spiny scutes between pelvic and anal fins. **Colour:** golden greenish grey with conspicuous ocellus (black spot encircled by a narrow greyish or yellowish border) on middle of side; fin membrane of spinous dorsal fin dark, those of the spinous anal and pelvic fins black.

Size: Maximum: about 90 cm, 8 kg.

Habitat, biology, and fisheries: Found either near bottom or in midwater, from coast to at least 400 m, but more common between 20 and 160 m. Feeds on a wide range of fish (especially schooling species) and also on cephalopods and crustaceans. Usually solitary. Mature at age 4. Spawns in spring in the northeast Atlantic; eggs pelagic. Continental and island shelves of eastern Atlantic. Caught mainly with bottom trawls. Excellent foodfish; marketed fresh, frozen, dried-salted and smoked. Also processed for fishmeal and oil by offshore fishing fleets.

Distribution: Mediterranean, Black Sea and eastern Atlantic from Norway and Faeroe Islands to South Africa, and in Indo-West Pacific region from South Africa to Kenya, Australia, New Zealand and Japan.



New Index

A*Allocyttus guineensis* 2208*Allocyttus verrucosus* 2209**ANTIGONIIDAE** 2204,2206,2216,2218**B**

Buckler dory 2227

C**CYTTIDAE** 2202

Cape John dory 2228

CAPROIDAE 2204,2206,2216,2219,2224*Crassispinus granulosus* 2210**CYTTIDAE** 2206,2224*Cyttopsis rosea* 2226*Cyttosoma boops* 2212*Cyttus* 2204*Cyttus hololepis* 2215*Cyttus traversi* 2202**D**

Dories 2223

DREPANEIDAE 2203

Dwarf dory 2215

G**GRAMMICOLEPIDIDAE** 2218**GRAMMICOLEPDIIDAE** 2216**GRAMMICOLEPIDIDAE** 2203,2224

Grammicolepids 2218

Grammicolepis 2218*Grammicolepis brachiusculus* 2221

Guinea oreo 2208

I

Irish oreo 2210

J

John dory 2229

K

King dory 2202

L

Lookdown dories 2202

N*Neocyttus helgae* 2208,2210-2211*Neocyttus rhomboidalis* 2210-2211**O****OREOSOMATIDAE** 2205

Oreos 2205

Oreosoma 2205*Oreosoma atlanticum* 2212**OREOSOMATIDAE** 2203,2216,2219,2224

Ox-eyed oreo 2212

P

Parazenidae 2223,2226

Paz de San Pedro 2229

Pseudocyttus maculatus 2214**R**

Red dory 2226

S

Saint Pierre 2229

Saint Pierre argenté 2227

Saint Pierre du Cap 2228

Saint Pierre rouge 2226

San Pedro colorado 2226

San Pedro del Cabo 2228

San Pedro plateato 2227

Silver John dory 2227

Smooth oreo dory 2214

Spiky oreo 2211

Spotted tinselfish 2222

Stethopristes 2223**T**

Thorny tinselfish 2221

Tinselfishes 2218

W

Warty dory 2209

X*Xenolepidichthys* 2218*Xenolepidichthys dalgleishi* 2222**Z****ZEIDAE** 2223**ZEIFORMES** 2202**ZENIONTIDAE** 2215

ZEIDAE	2203,2216,2219	<i>granulosus</i> , <i>Crassispinus</i>	2210
<i>Zeids</i>	2223	<i>guineensis</i> , <i>Allocyttus</i>	2208
ZENIIDAE	2206	H	
<i>Zenion hololepis</i>	2215	<i>helgae</i> , <i>Neocyttus</i>	2208,2210-2211
<i>Zenion japonicum</i>	2215	<i>hololepis</i> , <i>Cyttus</i>	2215
<i>Zenion longipinnis</i>	2215	<i>hololepis</i> , <i>Zenion</i>	2215
ZENIONTIDAE	2203,2206,2219,2224	J	
<i>Zeniontids</i>	2215	<i>japonicum</i> , <i>Zenion</i>	2215
<i>Zenopsis</i>	2223	L	
<i>Zenopsis conchifer</i>	2227	<i>longipinnis</i> , <i>Zenion</i>	2215
<i>Zenopsis nebulosa</i>	2227	M	
<i>Zenopsis ocellatus</i>	2227	<i>maculatus</i> , <i>Pseudocyttus</i>	2214
<i>Zeus</i>	2223	N	
<i>Zeus capensis</i>	2228	<i>nebulosa</i> , <i>Zenopsis</i>	2227
<i>Zeus faber</i>	2223,2229	O	
A		<i>ocellatus</i> , <i>Zenopsis</i>	2227
<i>atlanticum</i> , <i>Oreosoma</i>	2212	R	
B		<i>rhomboidalis</i> , <i>Neocyttus</i>	2210-2211
<i>boops</i> , <i>Cyttosoma</i>	2212	<i>rosea</i> , <i>Cyttopsis</i>	2226
<i>brachiusculus</i> , <i>Grammicolepis</i>	2221	T	
C		<i>traversi</i> , <i>Cyttus</i>	2202
<i>capensis</i> , <i>Zeus</i>	2228	V	
<i>conchifer</i> , <i>Zenopsis</i>	2227	<i>verrucosus</i> , <i>Allocyttus</i>	2209
D			
<i>dalgleishi</i> , <i>Xenolepidichthys</i>	2222		
F			
<i>faber</i> , <i>Zeus</i>	2223,2229		
G			

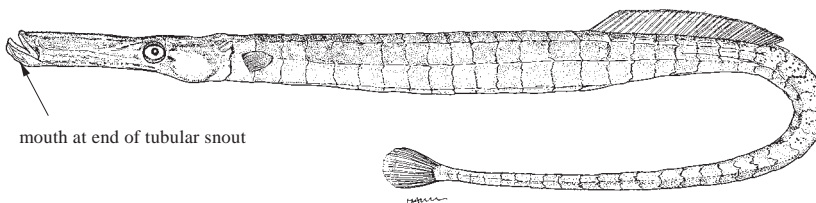
GASTEROSTEIFORMES

SYNGNATHIDAE

Pipefishes and seahorses

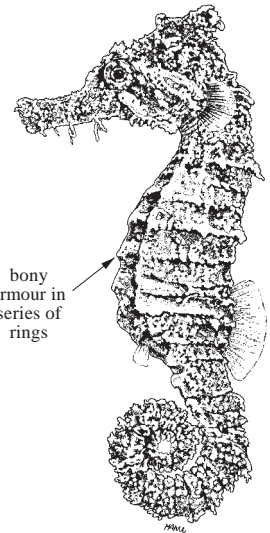
by R.A. Fritzsche, Department of Fisheries Biology, Humboldt State University, Arcata, CA, USA

Diagnostic characters: Body **elongate to extremely so; encased in bony armour arranged into series of rings**. Maximum length near 46 cm, but most average 100 to 200 mm total length. **Mouth small, toothless, placed at end of tubular snout**. Gills tufted and lobe-like. Gill openings restricted to upper border of operculum. All fins except pelvics may be present, but reduction or absence of any or all is possible. Dorsal fin relatively long, up to 60 rays. Anal fin minute with 0 to 6 rays. Caudal fin with 0 to 11 rays and pectoral fin with 0 to 23 rays. Tail may be prehensile in some (seahorses). Anterior 3 vertebrae are elongate. **Colour:** highly variable, however most species are mottled with shades of brown, green and gray. Some may be quite pale.



mouth at end of tubular snout

Syngnathus



bony armour in series of rings

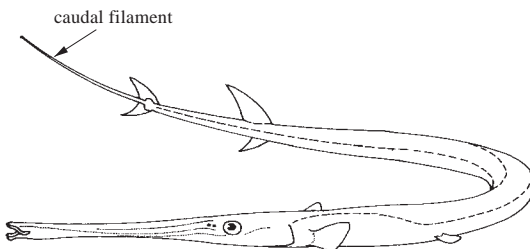
Hippocampus

Habitat, biology, and fisheries: Found in all tropical and warm-temperate marine waters, and some even found in freshwater environments. Males care for the eggs and sometimes even the young. This is accomplished by means of a specialized area or even a pouch under the belly or tail. Pipefishes and seahorses use the long snout and small mouth as pipette-like suction device for obtaining small crustaceans and other organisms. Locomotion is achieved by rapid undulations of the dorsal and pectoral fins. Most species are taken incidentally and can be found in markets as curios or aquarium fishes. Seahorses (*Hippocampus*) however are taken in large numbers and primarily dried for export. Separate statistics are not reported.

Similar families occurring in the area

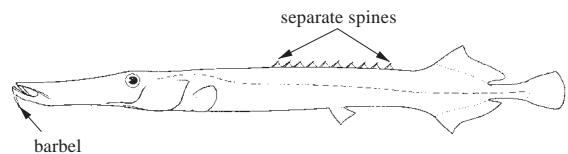
Fistulariidae: a distinct caudal filament present; body depressed; no armour rings.

Aulostomidae: barbel present; distinct separate spines anterior to soft dorsal fin; no armour rings.



caudal filament

Fistulariidae



barbel


separate spines



Aulostomidae

Key to the species of Syngnathidae occurring in the area

- 1a. Distal part of tail prehensile; head at right angle to body axis → 2
- 1b. Distal part of tail not prehensile; head in line with body axis → 4
- 2a. Snout short, usually less than one-third head length; pectoral-fin rays usually 14 (range 13 to 15); coronet smoothly connected to nape of neck . . . *Hippocampus hippocampus*
- 2b. Snout longer; pectoral-fins rays usually 16 or 17 (range 15 to 18); coronet distinct, not smoothly connected to nape of neck → 3
- 3a. Coronet with 5 rounded points or knobs; filaments on neck and head often prominent and dense; body with dark edged white spots; dorsal-fin rays usually 19 or 20 . *Hippocampus guttulatus*
- 3b. Coronet low, rounded and back turned; no filaments on neck or head; body with tiny white or larger brown spots; dorsal-fin rays 17 or 18 *Hippocampus algiricus*
- 4a. Caudal fin absent; pectoral and anal fins absent in adults → 5
- 4b. Caudal fin present (may be minute) → 6
- 5a. Snout short and upturned; dorsal-fin base over fewer than 11 body rings; dorsal-fin rays 24 to 28 *Nerophis lumbriciformis*
- 5b. Snout straight, with longitudinal crest; dorsal-fin base over greater than 11 body rings; dorsal-fin rays 32 to 44 *Nerophis ophidion*
- 6a. Caudal-fin rays 8; trunk rings 20 or 21; pectoral-fin rays 9 *Minyichthys sentus*
- 6b. Caudal-fin rays >8; trunk rings < 20; pectoral-fin rays >9 → 7
- 7a. Caudal-fin rays 9; primarily freshwater, occasionally estuarine → 8
- 7b. Caudal-fin rays 10; primarily marine → 10
- 8a. Brood pouch of male under trunk; snout < 2 times in head length *Microphis brachyurus aculeatus*
- 8b. Brood pouch of male under tail; snout 2 times in head length → 9
- 9a. Snout length ~2.5 times in head length; median dorsal snout ridge denticulate; pectoral- fin rays 12 to 15 (usually 13) *Enneacampus ansorgii*
- 9b. Snout length ~2 times in head length; median dorsal snout ridge smooth; pectoral-fin rays 14 to 17 (usually 17) *Enneacampus kaupi*
- 10a. Opercular ridge vestigial or absent; no dermal flaps on head; usually benthic in vegetation, or if pelagic also with vegetation → 11
- 10b. Opercular ridge usually distinct; minute, unbranched dermal flaps on head; pelagic *Cosmocampus retropinnis*
- 11a. Snout laterally compressed, depth more than eye diameter *Syngnathus typhle*
- 11b. Snout cylindrical and slender, depth less than eye diameter → 12
- 12a. Dorsal-fin rays 34 to 45; marine coastal and brackish *Syngnathus acus*
- 12b. Dorsal-fin rays 28 to 31; marine pelagic *Syngnathus pelagicus*

List of species occurring in the area

The symbol  is given when species accounts are included.

-  *Cosmocampus retropinnis* Dawson, 1982.
-  *Enneacampus ansorgii* (Boulenger, 1910).
-  *Enneacampus kaupi* (Bleeker, 1863).
-  *Hippocampus algiricus* Kaup, 1856.
-  *Hippocampus guttulatus* Cuvier, 1829.
-  *Hippocampus hippocampus* (Linnaeus, 1758).
-  *Microphis brachyurus aculeatus* (Kaup, 1856).
-  *Minyichthys sentus* Dawson, 1982.
-  *Nerophis lumbriciformis* (Jenyns, 1835).
-  *Nerophis ophidion* (Linnaeus, 1758).
-  *Syngnathus acus* Linnaeus, 1758.
-  *Syngnathus pelagicus* Linnaeus, 1758.
-  *Syngnathus typhle* Linnaeus, 1758.

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- Lourie, S.A., Vincent, A.C.J. & Hall, H.J.** 1999. *Seahorses: an identification guide to the world's species and their conservation*. Project Seahorse, 214 pp.

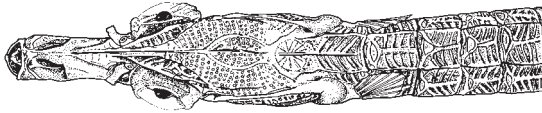
***Cosmocampus retropinnis* Dawson, 1982**

En – Back-finned pipefish.

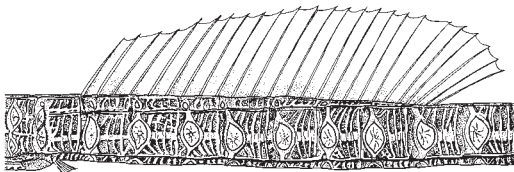
Maximum size: 5.2 cm. Coastal and oceanic waters. Known only from pelagic juveniles. Eastern Atlantic from off southern Morocco to Gambia.



lateral view of head



dorsal view of head



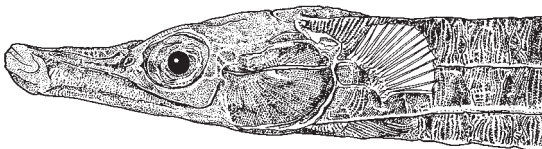
lateral view of body



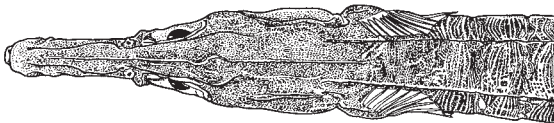
***Enneacampus ansorgii* (Boulenger, 1910)**

En – African freshwater pipefish.

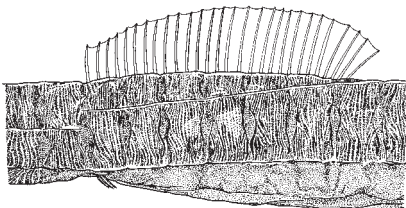
Maximum size: 13.8 cm. Coastal rivers, streams and brackish water. Gambia to the Cuanza River, Angola.



lateral view of head



dorsal view of head



lateral view of body

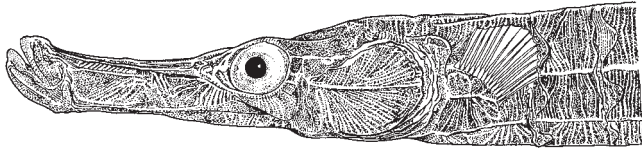


lateral view of tail

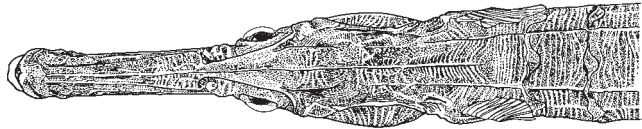
***Enneacampus kaupi* (Bleeker, 1863)**

En – Long-snouted freshwater pipefish.

Maximum size: 20.0 cm. Rivers and estuaries in algae. Utilized in the aquarium trade. Guinea to the Banana River, Democratic Republic of Congo.



lateral view of head



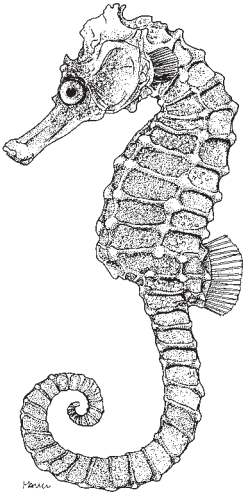
dorsal view of head



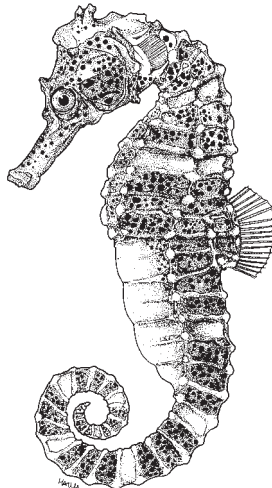
***Hippocampus algiricus* Kaup, 1856**

En – West African seahorse.

Maximum size: 19.2 cm. West African coast from Senegal to Angola, also recorded from Algeria in the Mediterranean.



female



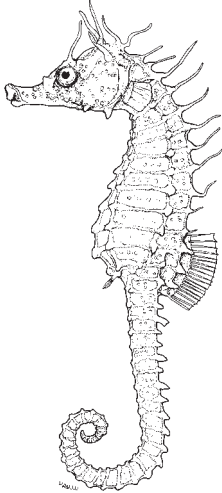
male



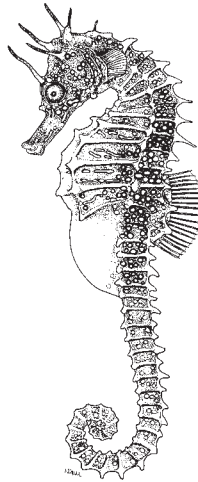
***Hippocampus guttulatus* Cuvier, 1829**

En – Long-snouted seahorse; **Fr** – Hippocampe à long bec; **Sp** – Caballito de mar.

Maximum size: 18.0 cm. Shallow near-shore waters to 12 m in seaweed, deeper in winter. Utilized for the aquarium trade and dried. British Isles to Morocco, Canary Islands, Madeira, the Azores including the Mediterranean.



female



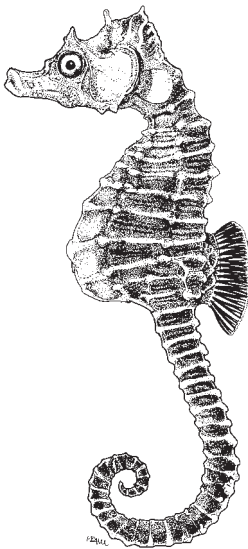
male



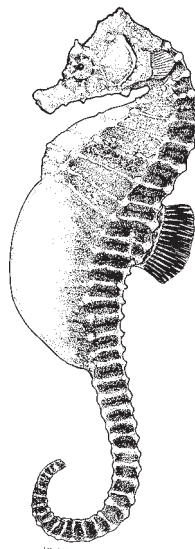
***Hippocampus hippocampus* (Linneaus, 1758)**

En – Short-snouted seahorse; **Fr** – Hippocampe à nez court.

Maximum size: 15.0 cm. Benthic in algal beds, nearshore to 60 m. Utilized live for the aquarium trade and dried for curios. Wadden Sea south to the Canary Islands, and along the African coast to São Tomé and Príncipe, including the Mediterranean.



female



male



***Microphis brachyurus aculeatus* (Kaup, 1856)**

En – Short-tail pipefish.

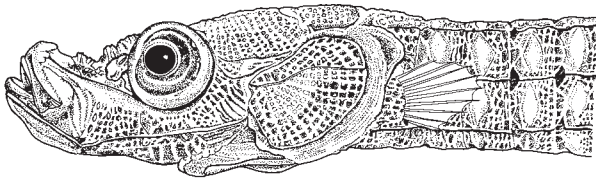
Maximum size: 20.0 cm. Coastal rivers, streams and estuaries. Dakar, Senegal to near Ambrizette, Angola.



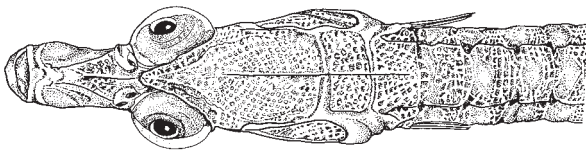
***Minyichthys sentus* Dawson, 1982**

En – East Atlantic pipefish.

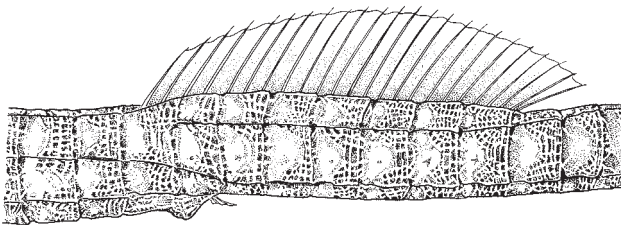
Maximum size: 6.0 cm. Oceanic and coastal waters in depths of 50 to 100 m. Rare with juveniles benthic and adults pelagic. Northern Morocco, Canary Islands and off Algeria in the Mediterranean.



lateral view of head



dorsal view of head



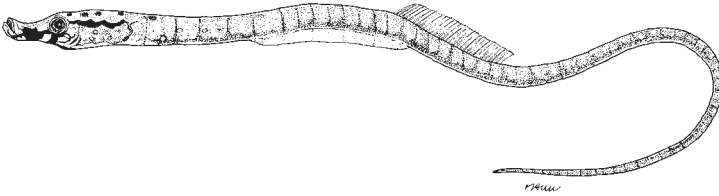
lateral view of body



***Nerophis lumbriciformis* (Jenyns, 1835)**

En – Worm pipefish.

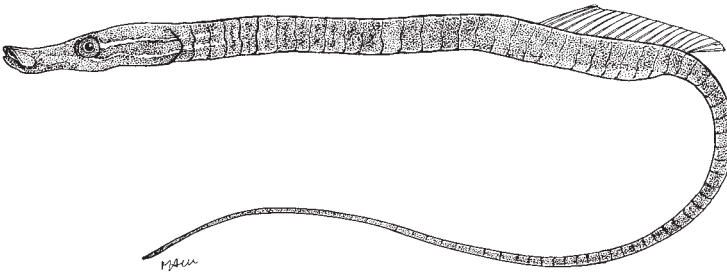
Maximum size: 15.0 cm. Intertidal to 30 m near rocks and algae. Southern Norway and British Isles south to Rio de Oro, Western Sahara.



***Nerophis ophidion* (Linnaeus, 1758)**

En – Straightnose pipefish.

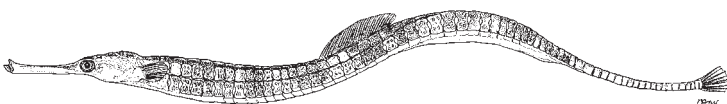
Maximum size: 30.0 cm. From 5 to 30 m in algal and eelgrass beds. Norway to Morocco, including Mediterranean and the Black Sea.



***Syngnathus acus* Linnaeus, 1758**

En – Greater pipefish.

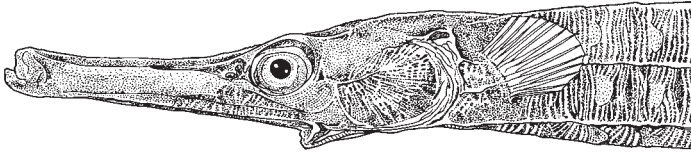
Maximum size: 50.0 cm. Benthic from 10 to 110 m in algal and eelgrass beds. Eastern Atlantic from Norway, Faeroes and British Isles to Western Sahara, Senegambia, and from Namibia to Cape of Good Hope and north to Zululand in western Indian Ocean.



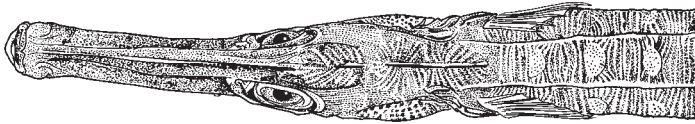
***Syngnathus pelagicus* Linnaeus, 1758**

En – Sargassum pipefish.

Maximum size: 18.1 cm. Pelagic marine associated with floating *Sargassum*. Eastern Atlantic from Mauritania to Gabon. Western Atlantic from Maine to Argentina, including Bermuda, also Indo-Pacific.



lateral view of head



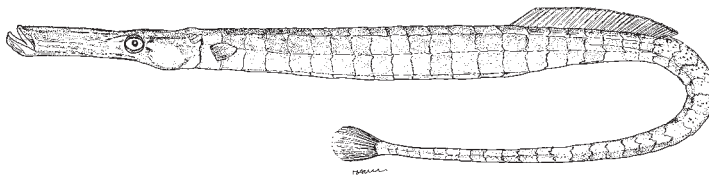
dorsal view of head



***Syngnathus typhle* Linnaeus, 1758**

En – Broadnosed pipefish.

Maximum size: 35.0 cm. Benthic at 1 to 20 m associated with vegetation. Norway, Baltic Sea and British Isles to Morocco, including Mediterranean, Black Sea and Sea of Azov.



AULOSTOMIDAE

Trumpetfishes

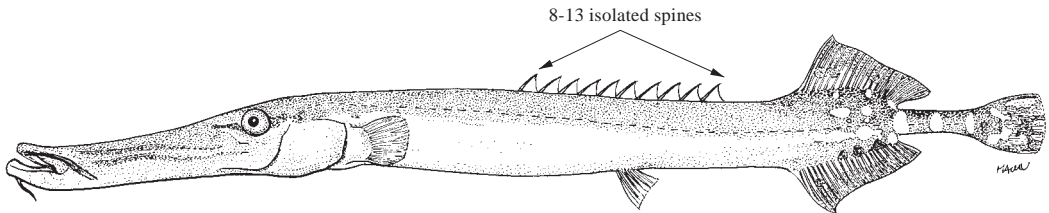
by R.A. Fritzsche, Department of Fisheries Biology, Humboldt State University, Arcata, CA, USA

A single species occurring in the area.

Aulostomus strigosus Wheeler, 1955

Frequent synonyms / misidentifications: *Aulostomus chinensis strigosus* Wheeler, 1955; *A. chinensis maculatus* Valenciennes, 1839 / None.

FAO names: **En** – Trumpetfish; **Fr** – Trompette tachetée; **Sp** – Trompeta pintada.

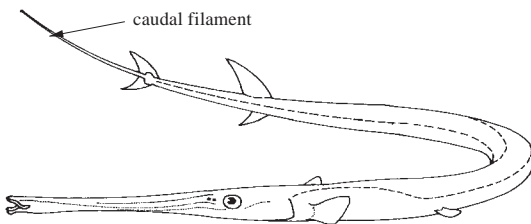


Diagnostic characters: Body elongate and compressed. Mouth at end of elongate snout; a single barbel on chin. First dorsal fin with 8 to 13 isolated spines; second dorsal and anal fins opposite to each other and similarly shaped, both with 24 or 25 segmented (soft) rays; pelvic fins small, abdominal, with 6 rays. Lateral line continuous. Body covered with small ctenoid (rough) scales, except for the head and anterior part of the back, which are scaleless. Vertebrae 62 or 63, the first 4 elongate and fused. **Colour:** overall colour variable from light to very dark; body most commonly brown with scattered, dark spots on belly and back. A black maxillary stripe usually present; dorsal and anal fins dark, but with irregular light patches; caudal peduncle crossed by 3 light bars.

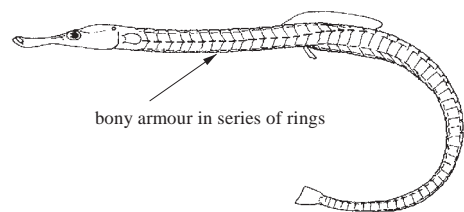
Similar families occurring in the area

Fistulariidae: a distinct caudal filament present; body depressed rather than compressed; no spines before soft dorsal fin.

Syngnathidae: body covered with armour; no pelvic fins; no chin barbel; size much smaller to 40 cm.



Fistulariidae

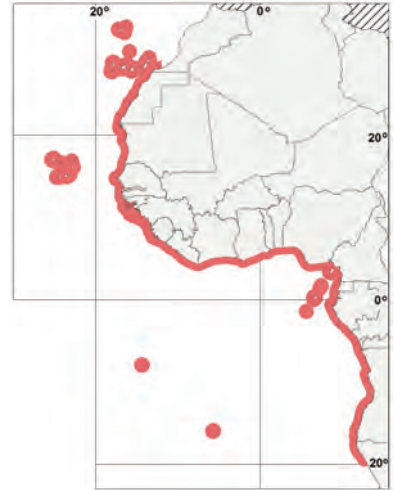


Syngnathidae

Size: Maximum: 75 cm; common to 50 cm.

Habitat, biology, and fisheries: Medium-sized fishes reaching to about 75 cm in total length, occurring in shallow, clear water. Most frequently observed to hanging vertically in the water with the head down. Trumpetfishes feed on small fishes and shrimps. They are not regularly caught and have no commercial importance.

Distribution: From the Canary, Cape Verde, Madeira, Ascension, and St Helena Islands, and the African coast from Morocco to Namibia.



References

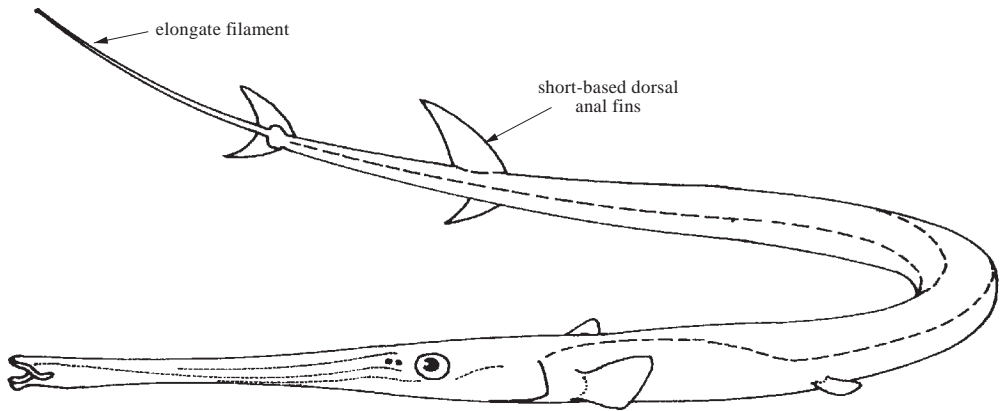
- Bowen, B.W., Bass, A.L., Rocha, L.A., Grant, W.S. & Robertson, D.R.** 2001. Phylogeography of the trumpetfishes (*Aulostomus*): ring species complex on a global scale. *Evolution*, 55(5): 1029–1039.
- Maul, G.E.** 1959. *Aulostomus*, a recent spontaneous settler in Madeiran waters. *Bocagiana* No. 1, pp. 1–18.
- Wheeler, A.** 1955. A preliminary revision of the fishes of the genus *Aulostomus*. *Annals and Magazine of Natural History*, 12(8)92: 613–623.

FISTULARIIDAE

Cornetfishes, flutemouths

by R.A. Fritzsche, Department of Fisheries Biology, Humboldt State University, Arcata, CA, USA

Diagnostic characters: Body elongate and depressed. Mouth small, at end of a long tubular snout, hexagonal in cross-section; teeth in jaws small. Dorsal and anal fins short-based and opposite, with 14 to 16 segmented (soft) rays; pectoral fins with 15 to 17 rays; pelvic fins small and abdominal, with 6 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, the line composed of tube-shaped ossifications that gradually take the form of long bony shields sometimes bearing sharp spines. Body of small juveniles covered with rows of small spinules which may be retained in the adults of only one small Atlantic species (*Fistularia petimba*) a row of elongate bony plates may be present along dorsal and ventral midlines of body just anterior to dorsal and/or anal fin. Total number of vertebrae 76 to 87, with the first 4 elongate and fused. **Colour:** variable; either red to orange-brown above and silvery below, or brownish olive above, lighter below, with a series of blue spots on back and snout.

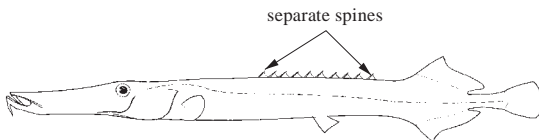


Habitat, biology, and fisheries: Large fishes, reaching up to about 2 m in total length. *Fistularia petimba* is typically found in coastal areas over soft bottoms, usually at depths greater than 10 m. *Fistularia tabacaria* is most often seen in seagrass beds and coral reefs. Cornetfishes feed on small fishes and shrimps. Although not important in the commercial fishery of the area, they are frequently taken in trawls and by various types of artisanal gear and may appear in local fish markets. Although edible, they are most often used for fishmeal.

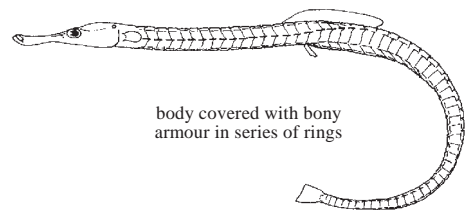
Similar families occurring in the area

Aulostomidae: no caudal filament; barbel present on lower jaw; body compressed rather than depressed; distinct separate spines anterior to soft dorsal fin.

Syngnathidae: smaller to about 40 cm; body encased in bony rings; no pelvic fins; anal fin reduced or absent; caudal filament absent.



Aulostomidae

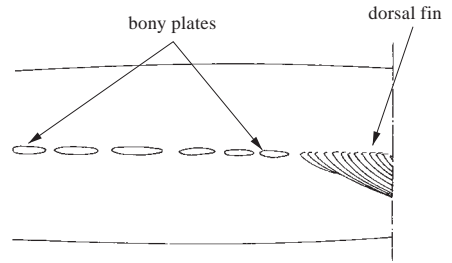



body covered with bony
armour in series of rings

Syngnathidae

Key to the species of Fistulariidae occurring in the area

- 1a.** A row of elongate bony plates embedded in skin along midline of back anterior to dorsal fin (Fig. 1); posterior lateral-line ossifications ending in a sharp spine; immaculate red or brown above *Fistularia petimba*
- 1b.** No elongate bony plates along midline of back; posterior lateral-line ossifications without a spine (may be rough to the touch); rows of blue spots on back, sides and snout . . . *Fistularia tabacaria*

**Fig. 1** detail of back in front of dorsal fin**List of species occurring in the area**

The symbol  is given when species accounts are included.

 *Fistularia petimba* Lacépède, 1803.

 *Fistularia tabacaria* Linnaeus, 1758.

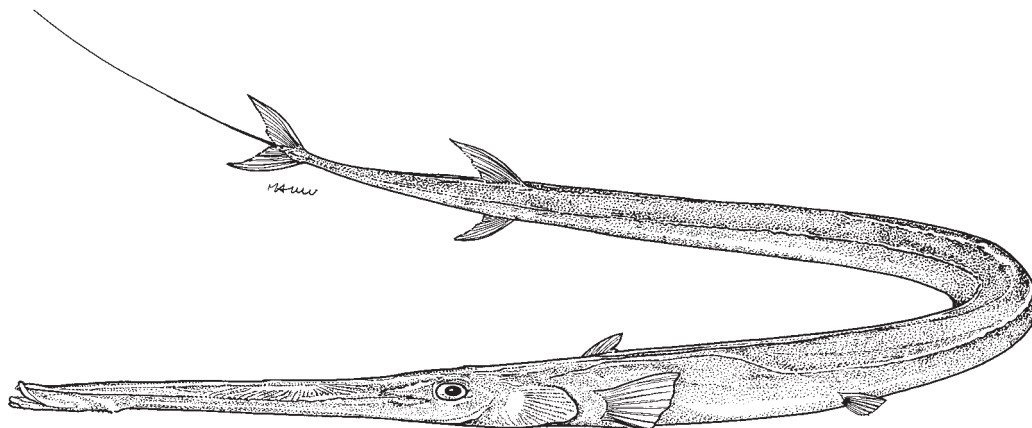
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***Fistularia petimba* Lacépède, 1803**

Frequent synonyms / misidentifications: *Fistularia serrata* Cuvier, 1816; *F. villosa* Klunzinger, 1871 / None.

FAO names: **En** – Red corneffish; **Fr** – Cornette rouge; **Sp** – Corneta colorada.



Diagnostic characters: Body elongate and depressed. Mouth at end of a long, tubular snout, hexagonal in cross-section; teeth in jaws small; **ridges on snout with antrorse (forward-pointing) serrations**, the upper ridges parallel; interorbital space narrow and nearly flat. Dorsal and anal fins short-based and opposite, with 14 to 16 segmented (soft) rays; pectoral fins with 15 or 16 rays; pelvic fins small and abdominal, with 6 rays. Lateral line arched, running anteriorly almost along middle of back, then bending down to middle of sides and continuing posteriorly onto an elongate filament produced by the middle 2 caudal-fin rays; **posterior lateral-line ossifications bearing sharp, retrorse (backward-pointing) spines**. **A row of elongate bony plates present on midlines of body just anterior to dorsal and/or anal fin; spinules in skin well developed at all sizes.** Vertebrae 76, the first 4 elongate and fused. **Colour:** in life red to orange-brown or greenish brown above, silvery below; night with broad bands; vertical fins also have an orange cast.

Size: Maximum to 150 cm; common to 100 cm.

Habitat, biology and fisheries: Found in coastal areas over soft bottoms, usually at depths greater than 10 m. Feeds on small fishes and shrimps. No special fishery, but caught frequently in bottom trawls and in artisanal fisheries. Separate statistics are not reported for this species. Caught with bottom trawls, gillnets and line gear. Utilized fresh, dried-salted or smoked, but more often reduced to fishmeal.

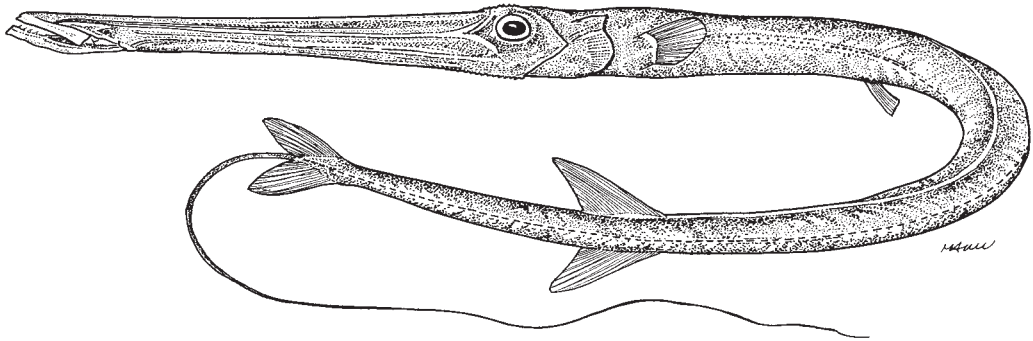
Distribution: In the eastern Atlantic, from Cape Blanc and Cape Verde Islands southward to about Democratic Republic of Congo or Angola. Also in the western tropical Atlantic, Indo-West Pacific and Hawaii.



***Fistularia tabacaria* Linnaeus, 1758**

Frequent synonyms / misidentifications: None / None.

FAO names: En – Cornetfish (AFS: Bluespotted cornetfish); Fr – Cornette tachetée; Sp – Corneta.



Diagnostic characters: Body elongate and depressed. Mouth at end of a long, tubular snout, hexagonal in cross-section; teeth in jaws small; **ridges on snout smooth in adults**, the upper ridges parallel; interorbital space narrow with a smooth depression. Dorsal and anal fins short-based and opposite, with 14 to 16 segmented (soft) rays; pectoral fins with 15 or 16 rays; pelvic fins small and abdominal, with 6 rays. Lateral line arched, running anteriorly almost along middle of back, then bending down to side and continuing posteriorly onto an elongate filament produced by the middle 2 caudal-fin rays; posterior lateral line ossifications without spines. Body covered in juveniles with rows of small spinules which become obsolete in adults. Vertebrae 87, the first 4 elongate and fused. **Colour:** in life brownish above, lighter below, but general pattern variable with environment; a series of pale blue spots running on midline of back from head to dorsal fin and row of pale blue spots on either side often coalescing into a solid line posteriorly, lateral to the mid-dorsal row; 2 lateral rows of blue spots on snout.

Size: Maximum to about 180 cm; common to 100 cm.

Habitat, biology, and fisheries: Most common in seagrass beds and coral reefs in shallow water. Feeds on small fishes and shrimps. No special fishery, but taken frequently in trawls and artisanal fisheries. Separate statistics are not reported for this species. Caught with bottom trawls, gillnets and line gear. Utilized fresh, dried-salted or smoked, but more often reduced to fishmeal.

Distribution: In the eastern Atlantic, from about Cape Blanc and Cape Verde Islands southward to Angola. Also found in the western central Atlantic. Nova Scotia to Brazil, including the Bahamas and northern Gulf of Mexico; also Bermuda.

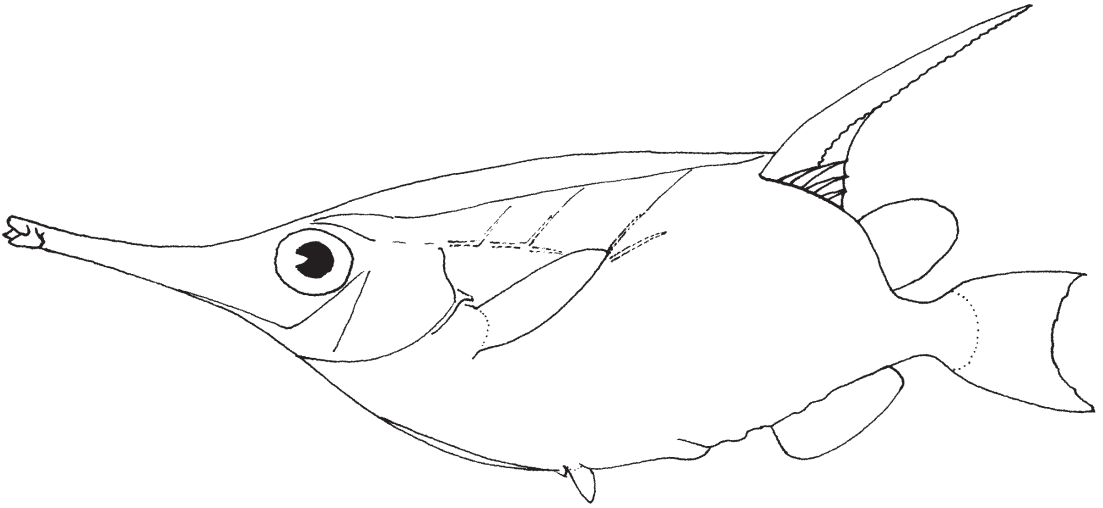


MACRORAMPHOSIDAE

Snipefishes

by R.A. Fritzsche, Department of Fisheries Biology, Humboldt State University, Arcata, CA, USA

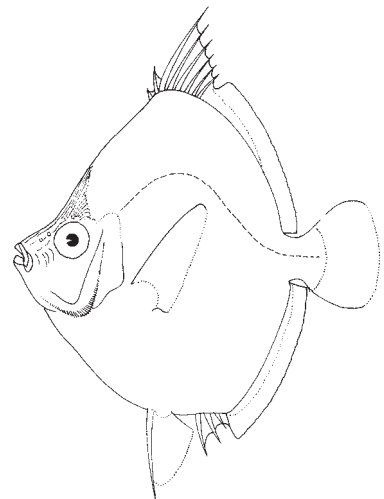
Diagnostic characters: Body very compressed, usually with bony plates on each side of back. Head elongate, the snout produced as a slender tube; mouth small and terminal; eyes lateral, large. **First dorsal fin with second spine long, may be jointed, other spines stout but short;** second dorsal and anal fins with short, slender rays. Scales, small, finely toothed giving the body a "sandpaper" feel. **Colour:** adults pinkish or reddish orange above, silvery or pinkish below; juveniles silvery, the back bluish black.



Habitat, biology, and fisheries: Gregarious; adults occur close to bottom, normally 50 to 500 m depth; juveniles epipelagic in oceanic waters. Adults feed on bottom and pelagic invertebrates; juveniles feed on pelagic invertebrates, mainly copepods. Taken by trawl fisheries. Chiefly used for fishmeal and oil.

Similar families occurring in the area

Caproidae, Oreosomatidae and Zeidae: all have deep, compressed bodies but large jaws and relatively short snouts.





Caproidae

Key to the species of Macroramphosidae occurring in the area

- 1a. Spinous and soft dorsal-fins separated by a distinct gap; longest dorsal-fin spine without a distinct joint ***Macroramphosus scolopax***
- 1b. Spinous and soft dorsal-fins nearly contiguous, not separated by a distinct gap; longest dorsal-fin spine with a distinct joint ***Notopogon macrosolen***

List of species occurring in the area

The symbol  is given when species accounts are included.

 *Macroramphosus scolopax* (Linnaeus, 1758).

 *Notopogon macrosolen* Barnhard, 1925.

References

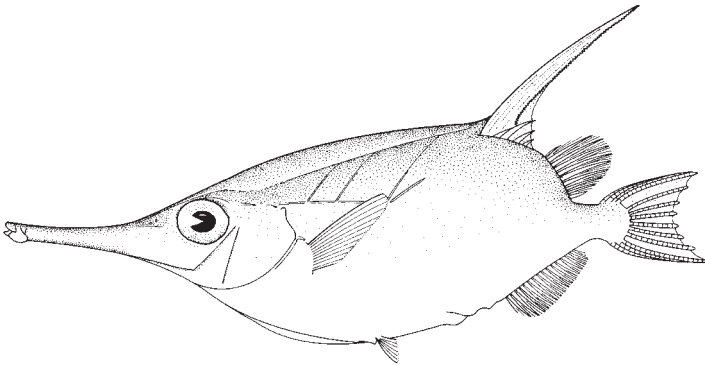
Ehrich, S. 1986. Macroramphosidae. In P.J.P. Whitehead, M.-L. Bauchot, J.-C. Hureau, J. Nielsen & E. Tortonese, eds. *Fishes of the northeastern Atlantic and the Mediterranean*. Paris, UNESCO, Vol. II. 627 pp.

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***Macroramphosus scolopax* (Linnaeus, 1758)**

En – Longspine snipefish; **Fr** – Bécasse de mer; **Sp** – Trompetero.

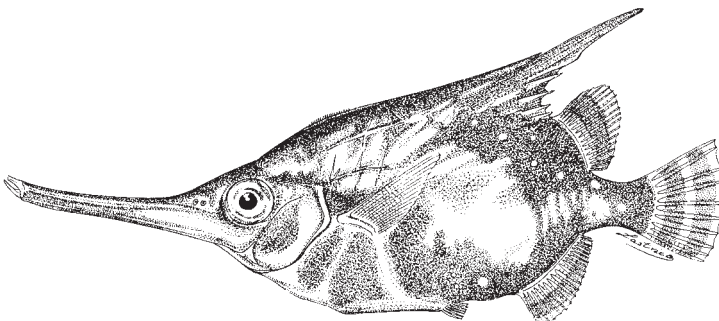
Maximum size to about 20 cm, common to 14 cm. Adults occur close to bottom, normally 50 to 150 m depth, but may exceed 500 m depth; juveniles to about 10 cm total length are epipelagic in oceanic waters. Adults feed on bottom and pelagic invertebrates; juveniles feed on pelagic invertebrates, mainly copepods. Taken by trawl fisheries, usually between 100 and 370 m depth; of increasing commercial importance in recent years. The catch reported for the area in 1998 totaled about 443 tonnes (Russian Federation only), but actual catches are doubtless larger. Taken mainly in bottom trawls. Chiefly used for fishmeal and oil. Present throughout the temperate latitudes in the area, including off-lying islands; northward extending into the Mediterranean and along the Atlantic coast of Europe up to Norway. Elsewhere, along the east coast of the United States off the Greater Antilles, in the southwestern Atlantic, the southwestern Indian Ocean and western Pacific; probably worldwide. The slender form (*M. gracilis* (Lowe, 1839)) is often recognized as a distinct species. This issue has not been fully resolved and awaits further analysis.



***Notopogon macrosolen* Barnhard, 1925**

En – Longspine bellowsfish; **Fr** – Bécasse de mer tachetée; **Sp** – Trompetero manchado.

Maximum size to 33 cm. Usually caught at depths between 200 and 500 m. Found primarily off southern Namibia.



New Index

A

- AULOSTOMIDAE** 2239
 African freshwater pipefish 2233
AULOSTOMIDAE 2230,2241
Aulostomus chinensis maculatus 2239
Aulostomus chinensis strigosus 2239
Aulostomus strigosus 2239

B

- Back-finned pipefish 2233
 Bluespotted cornetfish 2244
 Broadnosed pipefish 2238
 Bécasse de mer 2247
 Bécasse de mer tachetée 2247

C

- Caballito de mar 2235
CAPROIDAE 2245
 Corneta 2244
 Corneta colorada 2243
 Cornetfish 2244
 Cornetfishes 2241
 Cornette rouge 2243
 Cornette tachetée 2244
Cosmocampus retropinnis 2233

E

- East Atlantic pipefish 2236
Enneacampus ansorgii 2233
Enneacampus kaupi 2234

F

- FISTULARIIDAE** 2241
Fistularia petimba 2241,2243
Fistularia serrata 2243
Fistularia tabacaria 2241,2244
Fistularia villosa 2243
FISTULARIIDAE 2230,2239
 Flutemouths 2241

G

- GASTEROSTEIFORMES** 2230
 Greater pipefish 2237

H

- Hippocampe à long bec 2235

- Hippocampe à nez court 2235
Hippocampus 2230
Hippocampus algiricus 2234
Hippocampus guttulatus 2235
Hippocampus hippocampus 2235

L

- Long-snouted freshwater pipefish 2234
 Long-snouted seahorse 2235
 Longspine bellowsfish 2247
 Longspine snipefish 2247

M

- MACRORAMPHOSIDAE** 2245,2247
Macroramphosus scolopax 2247
Microphis brachyurus aculeatus 2236
Minyichthys sentus 2236

N

- Nerophis lumbriciformis* 2237
Nerophis ophidion 2237
Notopogon macrosolen 2247

O

- OREOSOMATIDAE** 2245

P

- Pipefishes 2230

R

- Red cornetfish 2243

S

- SYNGNATHIDAE** 2230
 Sargassum pipefish 2238
 Seahorses 2230
 Short-snouted seahorse 2235
 Short-tail pipefish 2236
 Snipefishes 2245
 Straightnose pipefish 2237
SYNGNATHIDAE 2239,2241
Syngnathus acus 2237
Syngnathus pelagicus 2238
Syngnathus typhle 2238

T

- Trompeta pinctada 2239
 Trompète tachetée 2239

Trompetero	2247
Trompetero manchado	2247
Trumpetfish	2239
Trumpetfishes	2239

W

West African seahorse	2234
Worm pipefish	2237

Z

ZEIDAE	2245
-------------------------	------

A

<i>acus</i> , <i>Syngnathus</i>	2237
<i>algericus</i> , <i>Hippocampus</i>	2234
<i>ansorgii</i> , <i>Enneacampus</i>	2233

B

<i>brachyurus aculeatus</i> , <i>Microphis</i>	2236
--	------

C

<i>chinensis maculatus</i> , <i>Aulostomus</i>	2239
<i>chinensis strigosus</i> , <i>Aulostomus</i>	2239

G

<i>guttulatus</i> , <i>Hippocampus</i>	2235
--	------

H

<i>hippocampus</i> , <i>Hippocampus</i>	2235
---	------

K

<i>kaupi</i> , <i>Enneacampus</i>	2234
---	------

L

<i>lumbriciformis</i> , <i>Nerophis</i>	2237
---	------

M

<i>macrosolen</i> , <i>Notopogon</i>	2247
<i>maculatus</i> , <i>Aulostomus chinensis</i>	2239

O

<i>ophidion</i> , <i>Nerophis</i>	2237
---	------

P

<i>pelagicus</i> , <i>Syngnathus</i>	2238
<i>petimba</i> , <i>Fistularia</i>	2241,2243

R

<i>retropinnis</i> , <i>Cosmocampus</i>	2233
---	------

S

<i>sentus</i> , <i>Minyichthys</i>	2236
<i>serrata</i> , <i>Fistularia</i>	2243
<i>strigosus</i> , <i>Aulostomus</i>	2239
<i>strigosus</i> , <i>Aulostomus chinensis</i>	2239

T

<i>tabacaria</i> , <i>Fistularia</i>	2241,2244
<i>typhle</i> , <i>Syngnathus</i>	2238

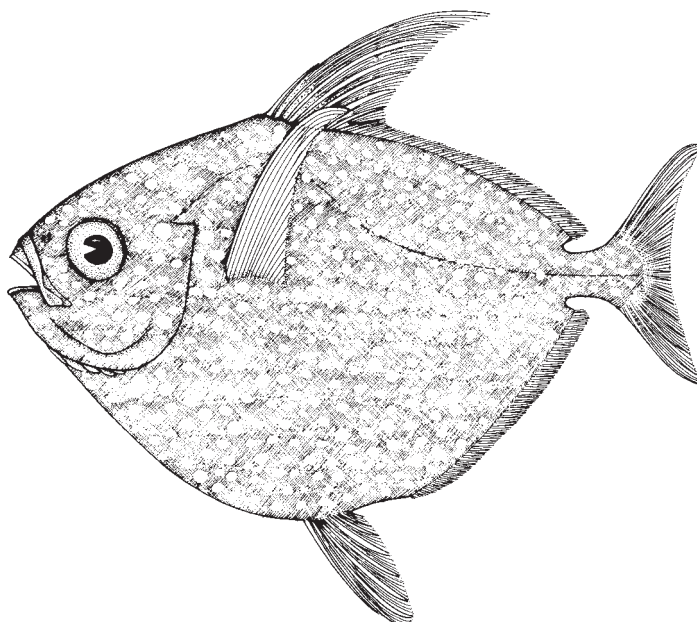
V

<i>villosa</i> , <i>Fistularia</i>	2243
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Order LAMPRIDIFORMES**LAMPRIDAE****Opahs**

by J.E. Olney, Virginia Institute of Marine Science, Gloucester Point, VA, USA

D **Diagnostic characters:** A large, deep, compressed, oval-shaped and brightly coloured fish. Mouth small and toothless. **Dorsal and anal fins long and single, both retractable into deep grooves, the first with a high anterior lobe;** caudal fin moderately forked; **pectoral fins long and sickle-shaped, placed high on sides,** their bases horizontal; pelvic fins large and placed on ventral margin of body, posterior to pectoral-fin origin. Body covered with very small, smooth scales. Lateral line strongly arched over pectoral-fin base. Total vertebrae 46 to 50; dorsal-fin rays, 48 to 52; anal-fin rays, 33 to 42. In lampridids (and all lampridiforms), the anterior palatamaxillary ligament and the palatine prong are absent; as a result, the maxilla is free to extend, along with the premaxilla, well away from the ethmo-vomerine region during jaw protrusion. Other anatomical features of lampridids (and all lampridiforms): first dorsal-fin pterygiophore inserts anterior to first neural spine; elongate ascending processes of premaxilla and a large rostral cartilage insert into a frontal vault or cradle; mesethmoid posterior to lateral ethmoids. In lampridids, the foramen magnum is bounded laterally by exoccipital condyles. **Colour:** fresh intact opah are a uniform solid golden orange to vermilion with small oval white spots but much of the body colour quickly changes to steel blue or bottle green after death.



Habitat, biology, and fisheries: Found from the surface to depths of about 200 m; apparently solitary, mainly an inhabitant of warm water, but wandering far north in summer months; uses its pectoral fins for burst swimming, employing large muscles attached to its shoulder girdle for thrust. *Lampris guttatus* is a solitary, wandering predator and powerful swimmer, consuming molluscs, crustaceans, and small fish, sometimes in large quantities. A marketable bycatch of tuna and swordfish longline fisheries bringing high prices because of its excellent tasting pink flesh. No catch statistics are available from the area but about 200 000 fish have been recorded in the Hawaiian long-line fishery (1994–2011).

Similar families occurring in the area

None. No other large marine fish has the typical body shape, colour and wing-like pectoral fins of *Lampris guttatus*.

List of species occurring in the area

Lampris guttatus Brunnich 1788. To at least 163 cm fork length and 89 kg; average about 100 cm. The IGFA all-tackle game fish record is 73.93 kg; worldwide in tropical and temperate waters; probably scattered occurrence throughout the area. A second species, *L. immaculata*, is widely distributed in cold and temperate waters of the southern hemisphere and does not occur in the area. A field study in Hawaii has suggested there may be a third, undescribed spotted species in that region.

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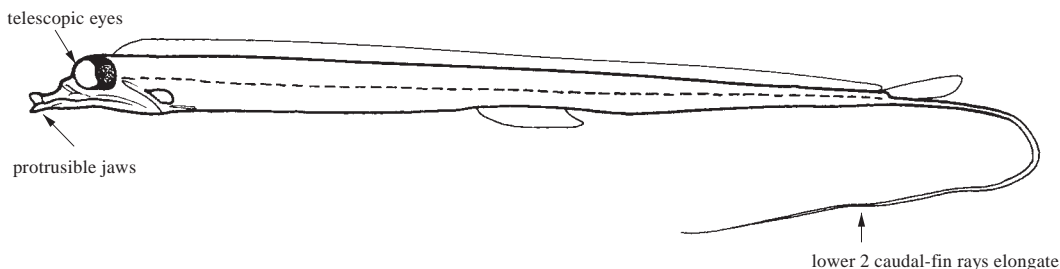
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STYLEPHORIDAE

Tube-eyes

by J.E. Olney, Virginia Institute of Marine Science, Gloucester Point, VA, USA

Diagnostic characters: Small to moderate-sized lampridiform fishes (usually under 30 cm); body slender, elongate, somewhat compressed. **Eyes conspicuous, telescopic, directed forward and somewhat upward. Jaws highly protrusible, mouth small and tubular** (head tilted backward when jaws protruded, with a membranous pouch stretching from head to mouth, and volume of mouth cavity increasing dramatically); teeth absent. Dorsal-fin base long, extending from nape to caudal fin; first 2 dorsal-fin elements elongate, especially in small specimens; total dorsal-fin soft rays 115 to 124. Anal-fin base short, inserted at midbody; total anal-fin soft rays 14 to 17. **Caudal fin highly modified into 2 separate parts; lower-most 2 caudal-fin soft rays extremely elongate, forming a projection that equals or exceeds body length in undamaged specimens;** upper caudal-fin lobe with 5 or 6 short rays. Pectoral fins with 10 or 11 soft rays; fin base obliquely rotated. Pelvic fins inserted below pectoral-fin base, with 1 soft ray, often broken and inconspicuous. Total vertebrae about 53; first 2 vertebrae highly reduced; second vertebra without neural spine and with neural arch m-shaped. **Colour:** body silver; head darkly pigmented; dorsal fin, anal fin, and upper caudal-fin lobe may be tinted red.



Habitat, biology, and fisheries: The only known species in this family, *Stylephorus chordatus*, is meso- or bathypelagic (captured at depths of 300 to 800 m) and rare. It feeds on small crustaceans, and is thought to capture prey while swimming in a vertical, head-up position. Worldwide in tropical and temperate waters; presumably found throughout the area. Little is known of its habits or reproduction. There is no fishery for the species.

Similar families occurring in the area

None. *S. chordatus* is easily distinguished by the conspicuous telescopic eyes, protrusible jaws, and the highly modified caudal fin with extremely elongate lower fin rays.

List of species occurring in the area

Note: A single species in the family.

Stylephorus chordatus Shaw, 1791. To 32 cm, excluding elongate caudal filament. Circumglobal.

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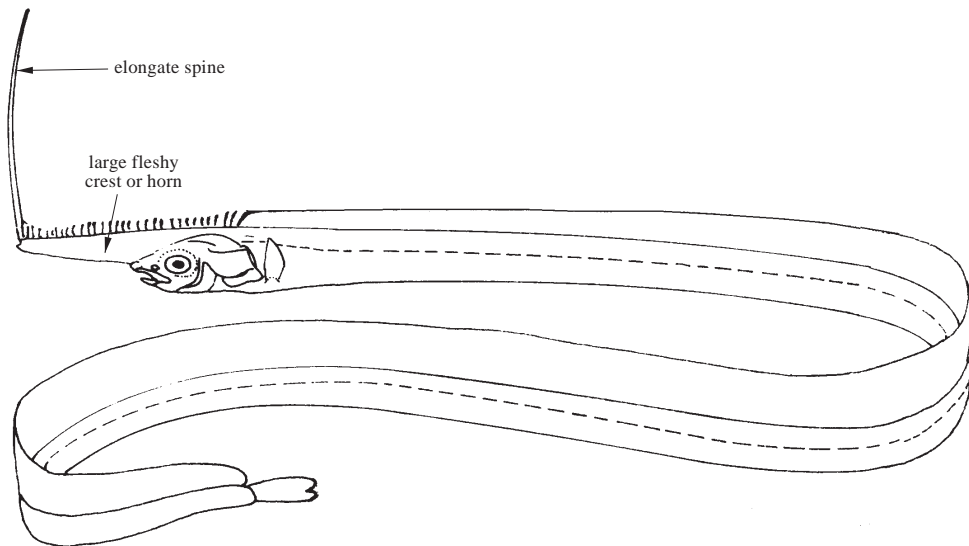
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LOPHOTIDAE

Crestfishes

by J.E. Olney, Virginia Institute of Marine Science, Gloucester Point, VA, USA

Diagnostic characters: Large, ribbon-like lampridiform fishes (to 2 m); body elongate and compressed. **Head bears a large, fleshy crest or horn that extends forward to tip of jaw in *Lophotus*, and protrudes far forward of jaw in *Eumecichthys*; crest or horn bears an elongate spine and supports multiple dorsal-fin soft rays.** Upper jaw protrusible; small conical teeth present on jaws and vomer. Dorsal fin long, with 2 spines (first spine short, second spine elongate) inserting well forward of eye; total dorsal-fin soft rays 204 to 390. Anal fin short, posteriorly placed; total anal-fin soft rays 5 to 20. Caudal fin somewhat reduced, with 12 to 17 soft rays. Pectoral fins with 13 to 17 soft rays, its base almost horizontal. Pelvic fins absent or small, with 3 to 6 soft rays, inserted posterior to pectoral-fin base. **Scales absent, except for tubular lateral-line scales.** Total vertebrae, 124 to 200 (56 thoracic in *Eumecichthys*). In lophotids (and all lampridiforms), the anterior palatamaxillary ligament and palatine prong are absent, as a result, maxilla is free to extend, along with the premaxilla, well away from the ethmo-vomerine region during jaw protrusion. Other anatomical features of lophotids (and all lampridiforms): first dorsal-fin pterygiophore inserts anterior to first neural spine; elongate ascending processes of premaxilla and a large rostral cartilage insert into a frontal vault or cradle; mesethmoid posterior to lateral ethmoids. In lophotids (and radiicephalids), the supraoccipital bears an anteriorly directed process that is well developed and stout in lophotids, projects over the frontal arch, and supports the fleshy crest on the head. **Colour:** body silver with multiple dark vertical bands in *Eumecichthys*; body blue dorsally, grading to silver ventrally in *Lophotus*, lacking vertical bands, and having multiple white or silver spots; dorsal fin, pectoral fins, pelvic fins (when present), and caudal fin reddish in lophotids (and most other lampridiforms).

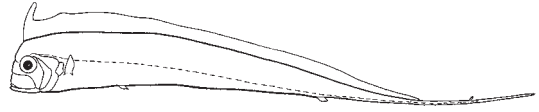


Habitat, biology, and fisheries: Lophotids are rare mesopelagic fishes that occur in most oceans. *Lophotus* consumes squids and small fishes. Eggs and larvae have been described, but little else is known of their habits and reproductive ecology. As in the Radiicephalidae, lophotids possess a tubular gland that overlies the hind gut, and discharges a black ink-like fluid through a vent near the anus in an alarm response. No fishery exists for them.

Remarks: There has been considerable taxonomic confusion on the named species of *Lophotus*. A recent molecular and meristic study provided evidence for the validity of 3 species, 2 species in the Pacific Ocean and 1 Atlantic species, *L. lacepede*.

Similar families occurring in the area

Radiicephalidae: fewer dorsal-fin elements (152 to 160 versus 206 to 392); no conspicuous cranial crest or horn; anus situated near caudal fin (situated at midbody in lophotids).



Radiicephalidae

Key to the species of Lophotidae occurring in the area

- 1a. Crest on top of head extends forward to the tip of jaw (Fig. 1); dorsal fin with fewer than 300 rays ***Lophotus lacepede***
- 1b. Crest on top of head protrudes far forward of the jaw (Fig. 2); dorsal fin with more than 300 rays ***Eumecichthys fiski***

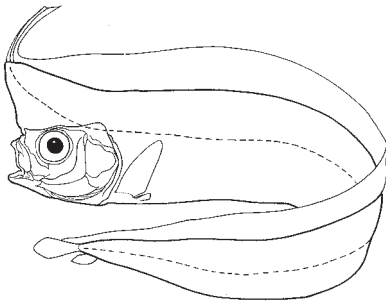


Fig. 1 *Lophotus lacepede*

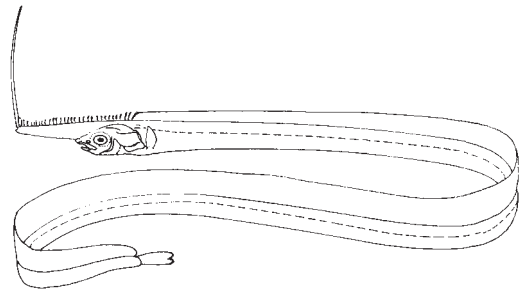


Fig. 2 *Eumecichthys fiski*

List of species occurring in the area

Eumecichthys fiski (Günther, 1890). To 130 cm. Mesopelagic in most oceans.

Lophotus lacepede Bosc, 1817. To 200 cm. Mesopelagic in the Atlantic ocean.

References

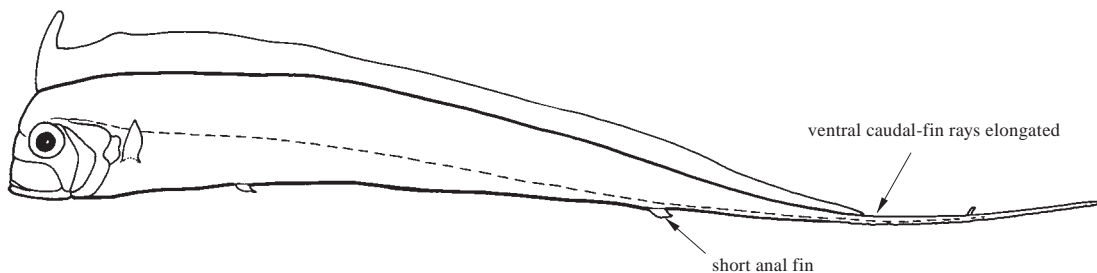
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RADIICEPHALIDAE

Tapertails

by J.E. Olney, Virginia Institute of Marine Science, Gloucester Point, VA, USA

Diagnostic characters: Small to moderate-sized lampridiform fishes; body slender, elongate, compressed, its depth gradually decreasing from the head to caudal peduncle. Upper jaw highly protrusible; jaw teeth absent; 1 to several teeth on roof of mouth. Dorsal fin long, its first rays inserting over eye; anterior dorsal-fin rays somewhat elongate; total dorsal-fin soft rays 150 to 160. Anal fin short, inconspicuous, posteriorly placed near caudal peduncle; total anal-fin soft rays 6 or 7. Caudal fin highly modified into separate parts; **ventral caudal-fin soft rays (these total approximately 6 or 7) elongate, forming a caudal projection that may equal the body length in undamaged specimens;** upper caudal-fin lobe with 4 or 5 short rays. Pectoral fins with 9 or 10 soft rays; fin base obliquely rotated. Pelvic fins with 9 soft rays in small specimens, often damaged or inconspicuous in adults; pelvic fins inserted well posterior to pectoral-fin base. **Scales absent except for tubular lateral-line scales.** Total vertebrae 114 to 121 (36 to 39 thoracic, 77 to 79 abdominal); **fourth, fifth, and sixth preural centra with elongate haemal spines that pierce ventral margin of body** (unique among fishes). In radiicephalids (and all lampridiforms), the anterior palatamaxillary ligament and the palatine prong are absent, as a result, the maxilla is free to extend, along with the premaxilla, well away from the ethmo-vomerine region during jaw protrusion. Other anatomical features of radiicephalids (and all lampridiforms): first dorsal-fin pterygiophore inserts anterior to first neural spine; elongate ascending processes of premaxilla and a large rostral cartilage insert into a frontal vault or cradle; mesethmoid posterior to lateral ethmoids. In radiicephalids (and lophotids), the supraoccipital bears an anteriorly directed process (a weak spine in radiicephalids, but broader and well-developed in lophotids). **Colour:** body silver; dorsal, pectoral and caudal fins may be tinted red.

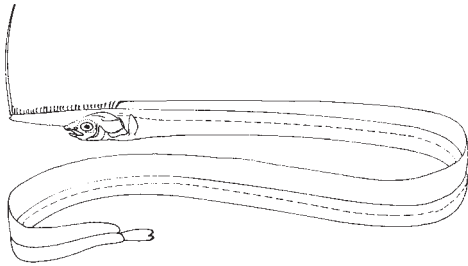


Habitat, biology, and fisheries: A single, very rare species, *Radiicephalus elongatus* is known from a few small, immature specimens captured by research nets in the area. Usually attains 60 to 75 cm in length. Meso- or bathypelagic; little is known of its habits or reproduction. Like the Lophotidae, it possesses a gland that discharges a black, ink-like fluid through a vent near the anus in an alarm response. There is no fishery for the species.

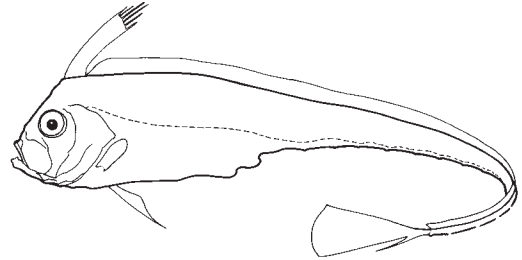
Similar families occurring in the area

Lophotidae: more dorsal-fin soft rays (206 to 392 versus 152 to 160); head with conspicuous flesh crest or horn; anus situated near caudal fin (situated at midbody in Radiicephalidae).

Trachipteridae: anal fin absent.



Lophotidae



Trachipteridae

List of species occurring in the area

A single species in the family.

Radiicephalus elongatus Osório, 1917. Usually under 80 cm. Mesopelagic in most oceans.

References

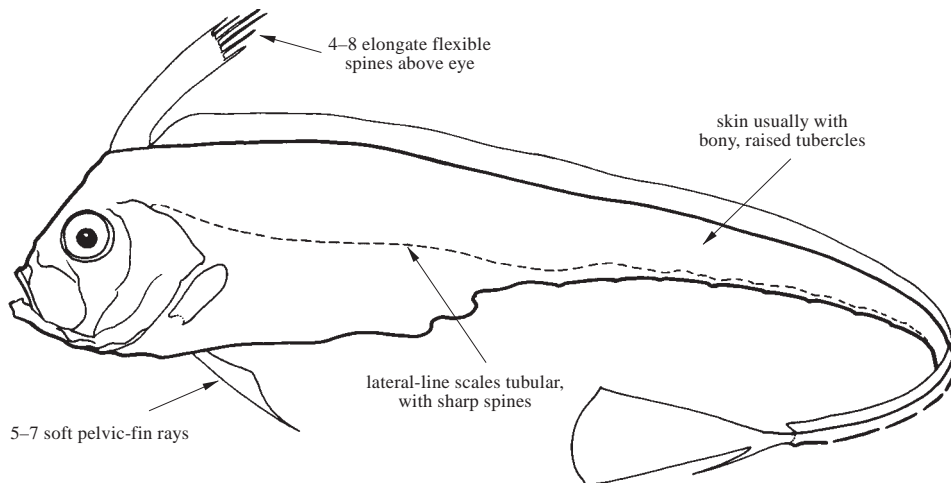
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TRACHIPTERIDAE

Ribbonfishes

by J.E. Olney, Virginia Institute of Marine Science, Gloucester Point, VA, USA

Diagnostic characters: Large lampridiform fishes (to 2 m); body elongate, ribbon-like, compressed. In most species, body depth gradually decreasing from head to caudal peduncle. Upper jaw highly protrusible, maxilla broad, pointed teeth on jaws, vomer, and palatines; bones of head and jaws thin and fragile. Dorsal fin very long, extending along entire body length to tail; **anterior dorsal-fin elements consisting of 4 to 8 elongate, flexible spines that insert above eye**; total dorsal-fin elements 120 to 190; dorsal-fin rays bear strong lateral spinules that tend to interlock with adjacent soft rays and strengthen the fin. Anal fin absent. Caudal fin with 2 lobes; upper lobe sometimes upturned, conspicuous, and fan-like; total caudal-fin soft rays usually 13 to 18; usually 5 to 9 soft rays in lower fin lobe, some of which are elongate; usually 5 to 7 soft rays in the upper fin lobe, all of which are elongate in *Zu*. **Pelvic fins with 5 to 7 soft rays; often elongate in juveniles; sometimes lost at metamorphosis. Skin usually covered with bony, raised, bump-like tubercles. Scales absent, except for lateral-line scales that are tubular and bear sharp spines.** (Scalloped ribbonfish, *Zu cristatus*, with distinctive scalloped or wavy ventral margin, and possessing small deciduous scales). Total vertebrae, 62 to 102; thoracic vertebrae, 18 to 40. In trachipterids (and all lampridiforms), the anterior palatamaxillary ligament and palatine prong are absent; as a result, the maxilla is free to extend, along with premaxilla, well away from the ethmo-vomerine region during jaw protrusion. Other anatomical features of the trachipterids (and all lampridiforms): first dorsal-fin pterygiophore inserts anterior to first neural spine; elongate ascending processes of premaxilla and a large rostral cartilage insert into a front vault or cradle; mesethmoid posterior to lateral ethmoids. In trachipterids (and regalecids), the dorsal-, caudal-, and pelvic-fin rays bear spinules that project laterally; in trachipterids, the parapophyses of each thoracic vertebra are well developed, but ribs are lacking. **Colour:** head and body usually silver with oblique dusky bars or with dark spots; fins deep crimson-red.

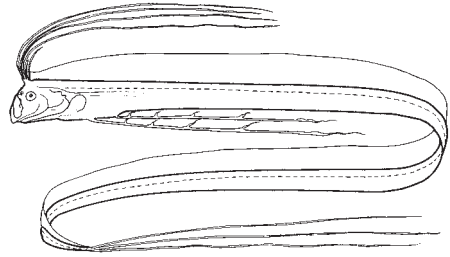


Habitat, biology, and fisheries: Trachipterids are rare mesopelagic fishes that occur in all oceans. They consume pelagic crustaceans, small fishes, and squids. Eggs free-floating, large, and red. Juveniles have been observed swimming in surface waters with their long anterior dorsal- and pelvic-fin rays trailing behind like the tentacles of jellyfish. Very little is known of their habits and reproductive ecology. There is no fishery for the group.

Remarks: Trachipterids are distributed worldwide in tropical and temperate waters. There are approximately ten species in 3 genera (*Trachipterus*, *Zu* and *Desmodema*), at least 4 of which (*T. arcticus*, *T. trachipterus*, *Desmodema polystictum* and *Zu cristatus*) may occur in the area. Ranges of vertebral counts reported for *T. arcticus* (99 to 102) and *T. trachipterus* (84 to 96) do not overlap. Thus, both species are currently recognized as valid taxa. The validity of a fifth Atlantic species (*T. trachyurus* Poey 1861) is currently unknown. The family is in need of revision.

Similar families occurring in the area

Regalecidae: also lacking anal fin, but with more dorsal-fin soft rays (260 to 412 versus 120 to 200), and attaining a far larger size. All other lampridiform families possess an anal fin.



Regalecidae

Key to the species of Trachipteridae occurring in the area

- 1a. Caudal fin without 2 lobes and not sharply upturned; no long spines or bony tubercles along ventral edge of tail; dorsal fin with 120 to 124 elements ***Desmodema polystictum***
- 1b. Caudal fin with 2 lobes, the upper lobe sharply upturned; ventral edge of tail bears long spiny plates or bony tubercles; dorsal fin usually with more than 124 elements → 2
- 2a. Posterior portion of lateral line runs along ventral edge of tail as a series of sharp spines that point in alternating directions; wavy or scalloped ventral body margin; dorsal fin usually with less than 150 elements (120 to 150) ***Zu cristatus***
- 2b. Posterior portion of lateral line runs well above the ventral edge of tail; lateral line spines project laterally, and do not point in alternating directions; ventral body margin straight; dorsal fin usually with more than 150 elements (145 to 190) → 3
- 3a. Total vertebrae, 84 to 96 ***Trachipterus arcticus***
- 3b. Total vertebrae, 99 to 102 ***Trachipterus arcticus***

List of species occurring in the area

Desmodema polystictum (Ogilby, 1898). To about 100 cm. Mesopleagic in all oceans.

Trachipterus arcticus (Brünnich, 1788). To about 250 cm. Mesopelagic in the North sea to South Africa.

Trachipterus trachipterus (Gmelin 1788) To about 250 cm. Mesopelagic in the Mediterranean to South Africa.

Zu cristatus (Bonelli, 1819). To about 120 cm. Mesopelagic in all oceans.

References

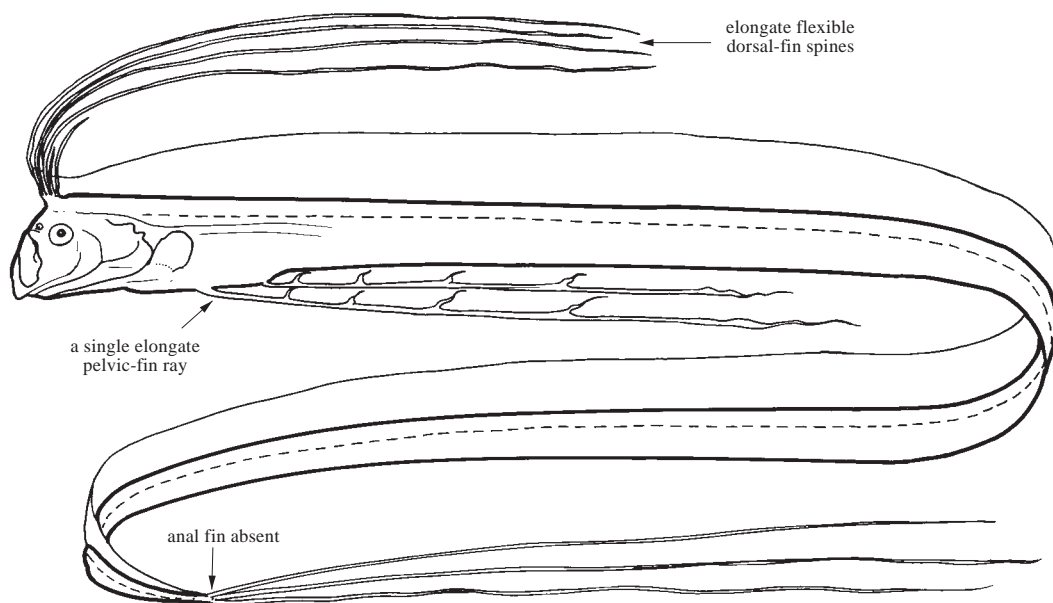
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REGALECIDAE

Oarfishes

by J.E. Olney, Virginia Institute of Marine Science, Gloucester Point, VA, USA

Diagnostic characters: Giant ribbon-like lampridiform fish to 8 m; body extremely elongate, compressed. Upper jaw highly protrusible, maxilla broad; teeth minute in both jaws; bones of head and jaws thin and fragile. Dorsal fin very long, extending along the entire body length to the tail; **first 8 to 10 dorsal-fin elements (and the single pelvic-fin ray) extremely elongate** flexible spines; total dorsal-fin elements 260 to 412. **Anal fin absent.** Caudal fin usually absent in large specimens; usually with 5 rays in small specimens, the middle 3 rays stout and elongate. Pelvic fins with 1 stout ray with fleshy tabs, and 1 small splint-like element. **Scales absent, except for tubular lateral-line scales.** Total vertebrae 143 to 170. In oarfishes (and all lampridiforms), the anterior palatomaxillary ligament and the palatine prong are absent; as a result, the maxilla is free to extend, along with the premaxilla, well away from the ethmo-vomerine region during jaw protrusion. Other anatomical features of oarfishes (and all lampridiforms): first dorsal-fin pterygiophore inserts anterior to first neural spine; elongate ascending processes of premaxilla and a large rostral cartilage insert into a frontal vault or cradle; mesethmoid posterior to lateral ethmoids. In regalecids (and trachipterids), the dorsal-, caudal-, and pelvic-fin rays bear spinules that project laterally; in oarfishes, the spinules are very weakly developed, and reduced to nubbins. **Colour:** body brilliant silver with oblique dusky bars; head blue; fins deep crimson red; elongate dorsal-fin elements and the single pelvic-fin ray are ornamented with fleshy tabs and crimson red.

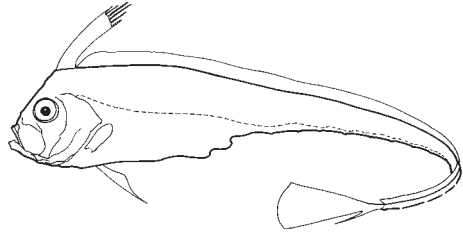


Habitat, biology, and fisheries: Regalecids are rare, mesopelagic fishes that occur in all oceans. Sightings at surface, or strandings on shore usually related to storm events. There are 2 monotypic genera (*Regalecus* and *Agrostichthys*) but only *R. glesne* occurs in the area. *R. glesne* is the longest of all bony fishes, and is thought to be responsible for many historical sightings of sea monsters. Regalecids are often observed in a vertical swimming position with the head up; feed on deep-sea shrimps (euphausiids), small fishes, and squids. Eggs free-floating, large, and red. Very little is known of their habits and reproductive ecology. There is no fishery for regalecids.

Remarks: There may be only a single species of *Regalecus* with worldwide distribution although some authors recognize other species.

Similar families occurring in the area

Trachipteridae: also lacking anal fin, but much smaller maximum size and with fewer dorsal-fin soft rays (166 to 190 *versus* 260 to 412). All other lampridiform families possess an anal fin.



Trachipteridae

List of species occurring in the area

Regalecus glesne Ascanius, 1772. To 17 m. Circumglobal.

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Order SCORPAENIFORMES

DACTYLOPTERIDAE

Flying gurnards

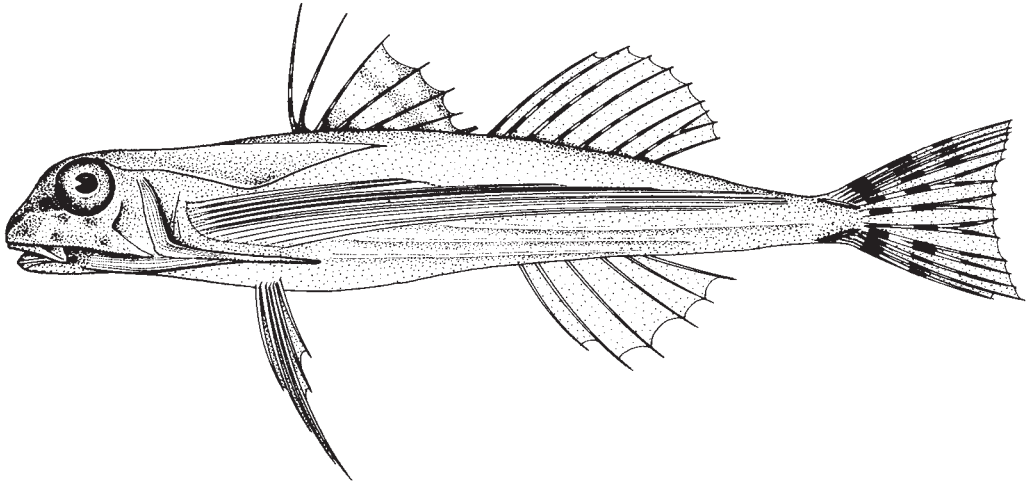
by W.F. Smith-Vaniz, Florida Museum of Natural History, University of Florida, Gainesville, FL, USA

A single species occurring in the area.

Dactylopterus volitans (Linnaeus, 1758)

Frequent synonyms / misidentifications: *Cephalacanthus volitans* (Linnaeus, 1758) / None.

FAO names: En – Flying gurnard; Fr – Grondin volant; Sp – Alón volador.

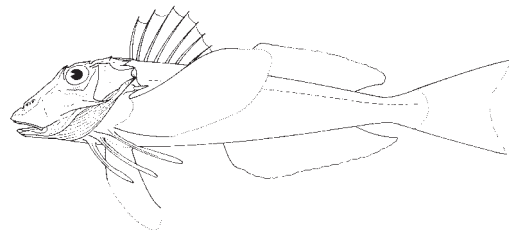


Diagnostic characters: A moderately elongate fish. **Head blunt, top and sides encased in a bony shield; a long, keeled spine extending posteriorly from the nape to below midbase of first dorsal fin; angle of preopercle also bearing a long spine**, with a serrate keel; jaws with a band of small nodular teeth. Spinous and soft dorsal fins separated by a deep notch; **anterior 2 dorsal-fin spine bases closely adjacent to each other, spines interconnected by only a basal membrane, and separated from remainder of spinous dorsal fin, followed by 8 soft rays**; anal fin with 6 soft rays; caudal fin emarginate, with 2 sharp keels on its base; bases of pectoral fins horizontal, the fins divided into 2 sections, an anterior short part of 6 soft rays and a posterior long part of 26 to 30 soft rays which reach the caudal-fin base in adults. Scales scute-like with sharp keels. **Colour:** variable with surroundings; often yellowish brown, with bright blue spots on pectoral fins.

Similar species occurring in the area

The bony head shield in combination with the long keeled spine on nape and the long serrated preopercular spine will readily distinguish this species from all others occurring in the area.

Triglidae: superficially similar in having large pectoral fins and the head encased in bony armour, but differ additionally in having the spinous dorsal fin entire, anal fin with 10 to 13 rays, and the 3 lowermost pectoral-fin rays free.



Triglidae

Size: Maximum: to at least 45 cm; common to 20 cm.

Habitat, biology, and fisheries: A benthic fish inhabiting sandy or muddy bottoms in coastal waters at depths to about 80 m; capable of “walking” on the bottom by alternately moving the pelvic fins while using the short pectoral-fin rays to scratch in the sand, probably in search of food. Erroneously reported in the literature as capable of leaping free of the surface and gliding for short distances, hence the common name. When the fish is alarmed, the pectoral fins are spread laterally. Feeds primarily on benthic crustaceans, especially crabs, clams, and small fishes. Not fished commercially. Separate statistics are not reported for this species. Adults are occasionally taken with seines in artisanal fisheries in some localities; young of about 5 cm are commonly taken at night (attracted by light); also taken as bycatch in trawls.

Distribution: The English Channel, Mediterranean Sea, Azores, Madeira, Canary, Cape Verde and St Helena islands, and from Portugal to Angola. Also broadly distributed in the western Atlantic, Bermuda and from Massachusetts to Argentina.



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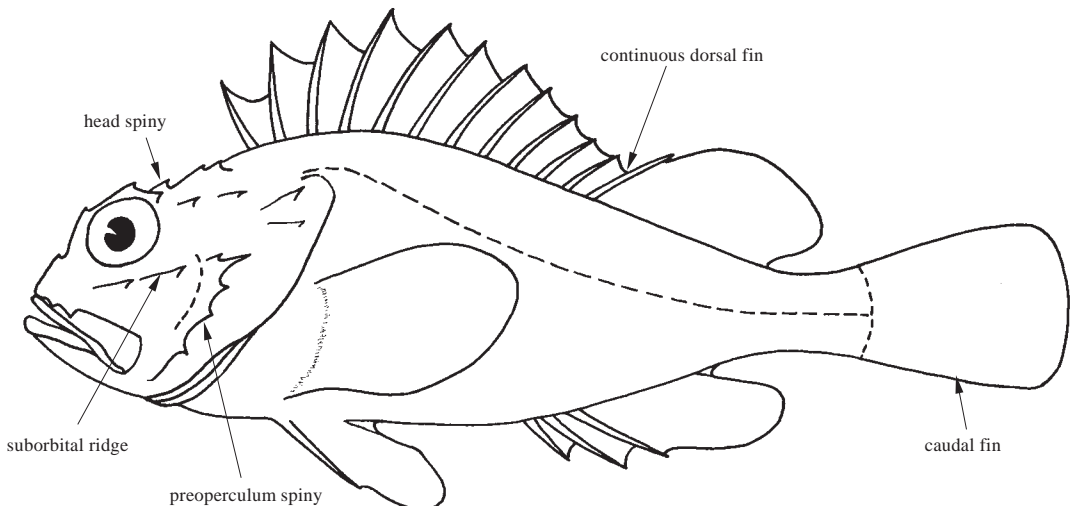
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SCORPAENIDAE

Scorpionfishes

by S.G. Poss (retired), Gulf Coast Research Laboratory, Ocean Springs, MS, USA

D **Diagnostic characters** (eastern Atlantic only): Fishes with relatively **large heads covered with spines** and with bodies robust or slightly compressed. Usually, small in size (most under 20 cm standard length) and with large eyes. **Ridge of bones ventral to eye typically bearing spines whose number, size, and position are often diagnostic. Ridge formed by third infraorbital (suborbital) bone extends posteriorly to attach to preopercle (sometimes only nearly so), thus forming a “suborbital stay”.** **Preoperculum usually with 3 to 5 prominent spines.** Pronounced spines also typically present on snout (nasal), before eye (preorbital), above eye (supraorbital, postorbital), between eyes (interorbital), on or near occiput (coronal, tympanic, nuchal, parietal), on side of head (pteric, opercular (2), upper and lower post-temporals, supracleithral), or immediately behind head (cleithral). Fleshy skin flaps or cirri often present, usually located on underside of head, associated with head spines (especially supraorbital), or sometimes scattered over head and body. **Dorsal fin continuous, with 12 or 13 spines and 9 to 12 soft rays**, the last double and borne on a single pterygiophore (spine base), appearing as two close set (double) rays that are often counted as one (or 1.5). Anal fins usually with 3 spines and 5 or 6 soft rays (last double). **Venom glands associated with fin spines.** Pectoral fins large, usually broad and fan-like, with 15 to 24 rays. Upper pectoral-fin rays (except typically uppermost 1 or 2) usually branched (unbranched in species of *Pontinus*). Lower pectoral-fin rays unbranched and often fleshy. Pelvic fins thoracic, with 1 spine and 3 to 5 soft rays. **Caudal fin usually rounded or truncate, but never forked.** Scales on sides usually ctenoid, with small spinules (ctenii) in posterior field and rough to touch, or cycloid (no ctenii, but secondarily smooth). Lateral line present, although sometimes incomplete, does not extend markedly over caudal fin, except for 1 or 2 last scales that are sometimes found just over its base (posterior margin of hypural bones). **Colour:** most inshore species are brown or brownish red and mottled or barred with dark pigments (typically melanin) over a light background. Some species have whitish guanine containing pigments scattered over body or allow algae to grow on body giving skin a greenish cast. Yellow and orange pigments (xanthophylls) present in many species, but these rapidly oxidize and are lost shortly after capture. Offshore species are mostly red, orange, or pink and white, often with darker red, brown, or black markings. Specimens of *Ectreposebastes imus* are dark maroon or nearly black.



Habitat, biology, and fisheries: Most are bottom-dwellers as adults and are found nearshore to the continental slope, either on rocky or soft bottoms. *Ectreposebastes imus* lives just off the bottom. *Trachyscorpia cristulata echinata* and *Idiastion kyphos* are deeper living, the former being found to depths of 2 360 m (*T. cristulata* to 2 500 outside of area). Some have highly restricted ranges. Most scorpionfishes feed primarily on benthic invertebrates and small fishes, although *Ectreposebastes imus* and *Setarches guentheri* feed primarily on pelagic or semi-pelagic invertebrates.

Most are of limited commercial importance, as they occur on rough bottoms and are relatively small. However, some species, particularly *Helicolenus dactylopterus*, *Pontinus kuhlii*, and some species of *Scorpaena* appear commonly in commercial trawl and longline catches, and are utilized commercially. *H. dactylopterus* is an important element of some trawl fisheries. Species of *Scorpaena* are frequently taken by hook-and-line by both recreational and commercial fishermen, appear commonly in local markets, and are prized by many for their tasty, delicate flesh.

Fin spines of all species have venom glands in grooves along their anterolateral margins. The amount of venom varies with the size of the glands, which varies greatly among species. The venom can be extremely painful, with most puncture wounds producing swelling. The venom causes muscle depolarization and has resulted in death from respiratory paralysis and greatly lowered blood pressure. Although the most dangerous species are found in the Indo-west Pacific, care should be taken to avoid being stuck by the spines, particularly when removing specimens from hooks or nets. The venom is proteinaceous and can be partially denatured by immersing the wound in hot water. Victims should be treated for shock and prompt medical care sought.

Similar families occurring in the area

Triglidae: also have a spiny head and suborbital stay, but bones of head form a nearly armored casing; have 2 dorsal fins rather than 1 continuous one; lowermost 3 pectoral-fin rays are free from each other and detached from remaining dorsal-fin rays.

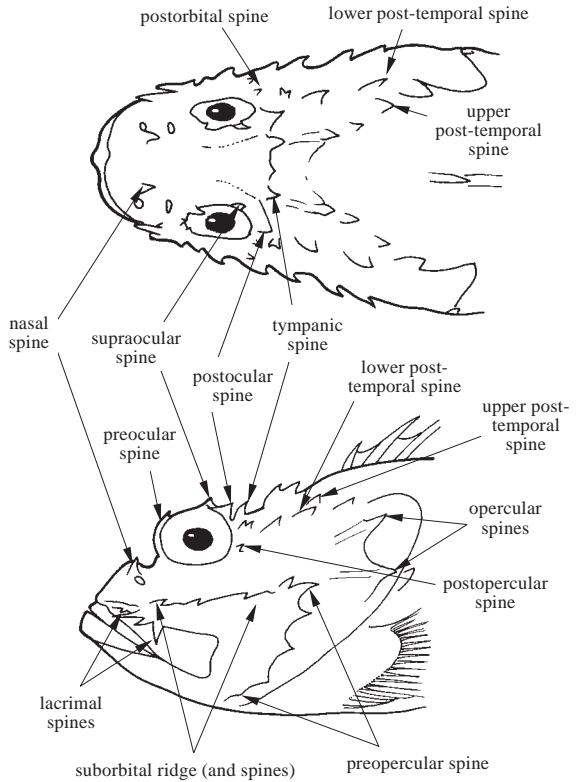
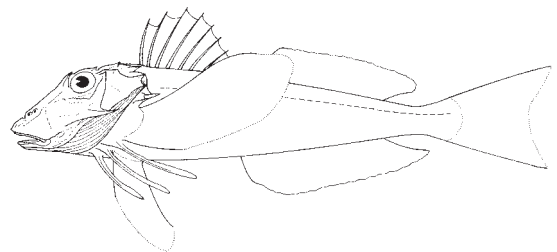


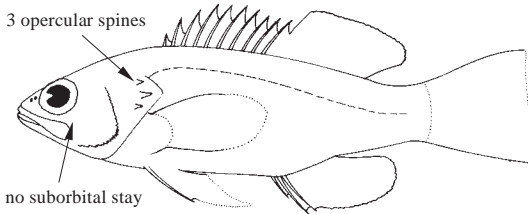
diagram of head spines used in the identification key
(after Eschmeyer, 1969)



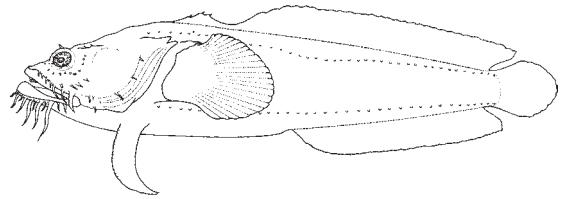
Triglidae

Serranidae: also have some spines on head, particularly 3 on opercle and sometimes including preopercular spines, a single continuous dorsal fin, and 3 anal spines. Serranids differ in usually having more compressed bodies and few other head spines and no suborbital stay.

Batrachoididae: also have greatly depressed heads, large mouths, and are covered by fleshy flaps, but differ in having no suborbital stay, gill openings restricted to the sides of the head (found only in a few Indo-Pacific scorpaenids), and pelvic fins well anterior to the pectoral fins.



Serranidae



Batrachoididae

Key to the species of Scorpaenidae occurring in the area

- 1a. Dorsal-fin spines 13 (*Scorpaenodes*) → 2
- 1b. Dorsal-fin spines 12 (very rarely or abnormally 13) → 4

- 2a. Head (tip of snout to posterior edge of operculum) 27 to 29.0% standard length (tip of snout to base of caudal fin); a pronounced dark spot on subopercle . . . *Scorpaenodes elongatus*
- 2b. Head 33 to 39% standard length; no dark spot on subopercle → 3

- 3a. Three spines on suborbital ridge; a small spine under main suborbital ridge . *Scorpaenodes insularis*
- 3b. Two spines on suborbital ridge; no spines below main suborbital ridge . . . *Scorpaenodes africanus*

- 4a. Soft dorsal-fin rays 11 or more (last double) → 5
- 4b. Soft dorsal-fin rays 10 or fewer (last double). → 6

- 5a. Pectoral-fin rays 19 or more, with deep incisions in fin membranes of rays in lower half of fin (Fig. 1); second preopercular spine from above longest (Fig. 2); suborbital ridge weak or absent, with 1 or no spines below eye; posteriormost suborbital bone (infraorbital 3) tapered, attaching to preoperculum narrowly (Fig. 3) *Helicolenus dactylopterus*
- 5b. Pectoral-fin rays 17 (16 or 18 should be expected), without deep incisions in fin membranes in lower half of fin (some division in *Idiastion*); first (uppermost) preopercular spine longest (excluding small supplemental spine at base of first; some specimens of *Ectreposebastes* with second spine just longer than first); suborbital ridge with many spinous points on 3 or 4 spined ridges below eye; posteriormost suborbital bone broadly attached to preoperculum *Neomerinthe folgori*

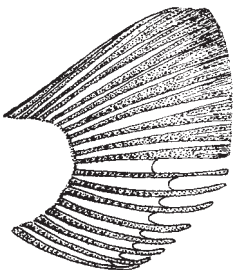


Fig. 1 pectoral fin

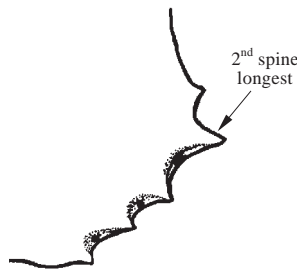


Fig. 2 preopercular spines

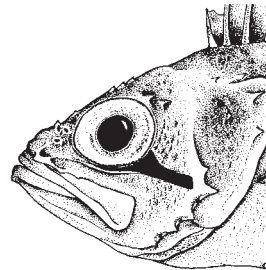


Fig. 3 *Helicolenus dactylopterus* (head)

- 6a. Lateral line forms a continuous channel and roofed by thin scales (Fig. 4a); scales on body minute, cycloid (smooth to touch and without spinules (ctenii) in posterior field) → 7
- 6b. Lateral line typically formed of relatively independent tubed scales (Fig. 4b); scales on body ctenoid (rough to touch, with spinules in posterior field) or, if cycloid, large → 8

- 7a. Pectoral fin with 18 to 20 rays; anal fin with 6.5 rays; top of head with scales; anteriormost preorbital spine on lacrimal much shorter than more posterior 2 lacrimal spines (Fig. 5a); pyloric caecae pale; swimbladder absent or rudimentary *Ectreposebastes imus*
- 7b. Pectoral fin with 21 to 24 rays; anal fin with 5.5 soft rays; top of head without scales; anteriormost preorbital spines on lacrimal about equal in length to more posterior 2 lacrimal spines (Fig. 5b); pyloric caecae grey or black; swimbladder well developed *Setarches guentheri*

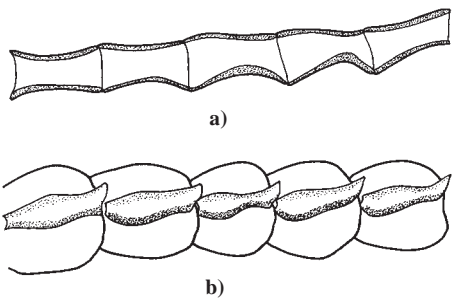


Fig. 4 lateral line

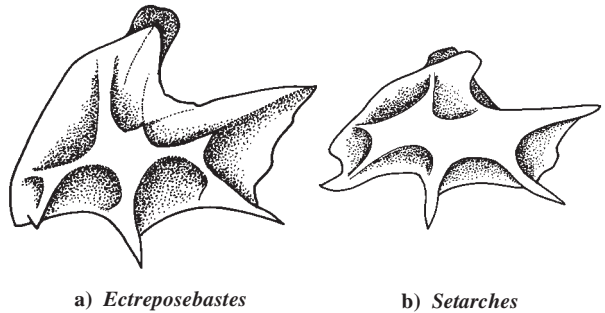


Fig. 5 preorbital spine

- 8a. Pectoral fin with longest rays at or near upper part of fin and rays becoming progressively shorter ventrally (Fig. 6a); pectoral fin with 20 or more rays *Trachyscorpia cristulata*
- 8b. Pectoral fin rounded or slightly wedge-shaped, with longest rays at or near middle of fin (Fig. 6b); pectoral fin with usually fewer than 20 rays → 9

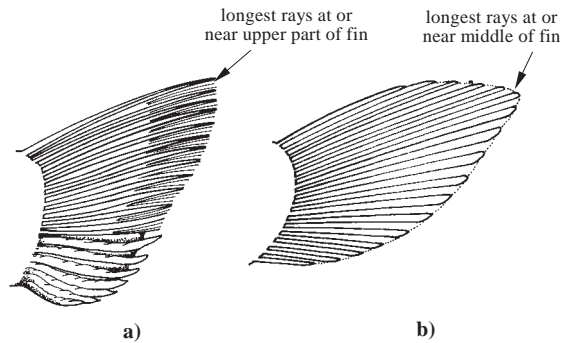


Fig. 6 pectoral fin

- 9a. All pectoral-fin rays unbranched at all sizes; gill rakers and rudiments on first arch usually 17 to 22. → 10
- 9b. Some branched pectoral-fin rays in upper half of fin, except in very small specimens (under 3 to 4 cm standard length); gill rakers and rudiments on first gill arch 18 or fewer. → 13

- 10a. Second and/or third dorsal-fin spines elongate relative to other dorsal-fin spines in specimens above 15 cm standard length; (lengths of second and third spines only very slightly more elongate in specimens less than 12 cm and thus juveniles are extremely difficult to identify) → 11
- 10b. Second and/or third dorsal-fin spine not especially elongate relative to other dorsal-fin spines at any size → 12

11a. Thirty-three to 50 scales behind head to base of caudal fin in lateral rows . . . **Pontinus accraensis**

11b. Sixty to 65 scales in lateral row behind head to base of caudal fin **Pontinus kuhlii**

12a. Spots on body, when present, not numerous and confined primarily above lateral line and anteriorly on body (but with large spots or blotches on membranes of spinous part of dorsal fin); 40 to 47 scales in lateral row between supracleithral spine (near rear of head) and base of caudal fin; caudal fin dusky but not distinctly spotted (in juvenile specimens of *P. accraensis* the caudal fin is spotted, particularly along dorsal edge) **Pontinus leda**

12b. Numerous relatively large, distinct dark spots and white specks scattered over entire body; 50 to 52 scales in lateral row between supracleithral spine (near rear of head) and base of caudal fin; caudal fin with distinct spots (St Helena) **Pontinus nigropunctatus**

13a. Vertebrae 25; head spines, especially those on suborbital ridge, predominantly with multiple points; second preopercular spine tiny or absent; usually 7 or more spines on suborbital ridge ventral to eye (excluding preoperculum); body deep (38 to 39% standard length) behind head giving appearance of a hunched back; occipital pit absent; uppermost unbranched pectoral-fin ray near middle of fin elongate and extending well past fin margin formed by other rays (Fig. 7) . . . **Idiastion kyphos**

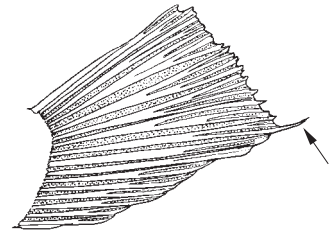


Fig. 7 pectoral fin

13b. Vertebrae 24 (except in very rare, abnormal individuals, where one may see a partially bifurcate centrum); head spines rarely with multiple points; second preopercular spine always present, although often notably smaller than uppermost first spine; usually 4 or fewer spines on suborbital ridge ventral to eye (excluding preoperculum); body depth usually less than 36% standard length, except commonly in *S. notata* and *S. porcus*; occipital pit often present, although sometimes shallow; uppermost unbranched pectoral-fin ray not elongate and extending beyond posterior margin of other fin rays (**Scorpaena**) → 14

14a. Pit or depression in occiput shallow or absent (Fig. 8a) . . . → 15

14b. A deep pit or depression in occiput (Fig. 8b) (somewhat intermediate in *Scorpaena elongata*) → 18

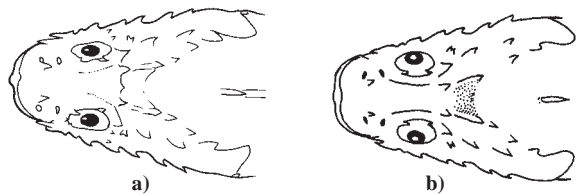


Fig. 8

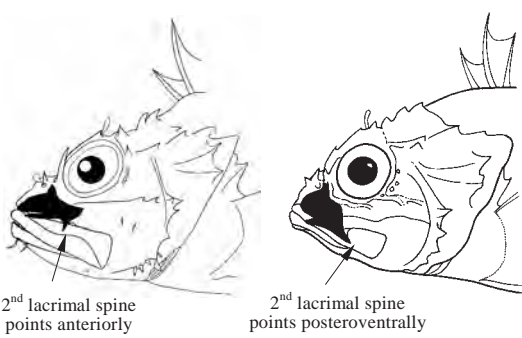
15a. Chest (area anterior to pelvic fin) naked, without scales; membranes between dorsal spines 2 to 4 deeply incised more than half length of spine and nearly to base of fin in some specimens **Scorpaena normani**

15b. Chest with scales (sometimes deeply embedded and difficult to see); membranes between dorsal spines 2 to 4 incised about half length of spines or less → 16

16a. Suborbital ridge smooth, without spines; a shallow occipital pit; pectoral-fin rays 20 **Scorpaena ascensionis**

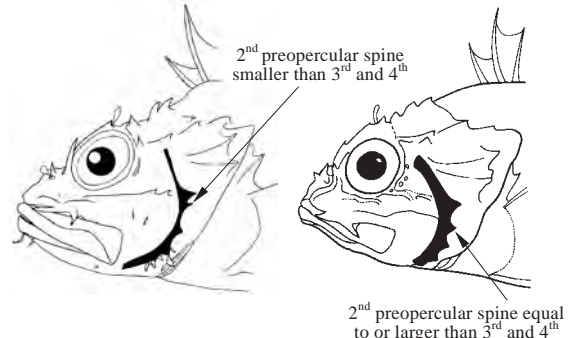
16b. Suborbital ridge with 1 or 2 small spines; no occipital pit; pectoral-fin rays 15 to 18 → 17

- 17a. Second lacrimal (preorbital) spine points anteriorly (Fig. 9a); second preopercular spine from above small, smaller than third and fourth below (Fig. 10a); 66 to 69 scales in longitudinal row above lateral line; no white specks in axil (inner surface) of pectoral fin ***Scorpaena canariensis***
- 17b. Second lacrimal (preorbital) spine points posteroventrally (Fig. 9b); second preopercular spine from above small, large, equal to or larger than third and fourth below (Fig. 10b); 52 to 56 scales in longitudinal row above lateral line; white specks in axil of pectoral fin ***Scorpaena maderensis***



2nd lacrimal spine points anteriorly 2nd lacrimal spine points posteroventrally
 a) *Scorpaena canariensis* b) *Scorpaena maderensis*

Fig. 9

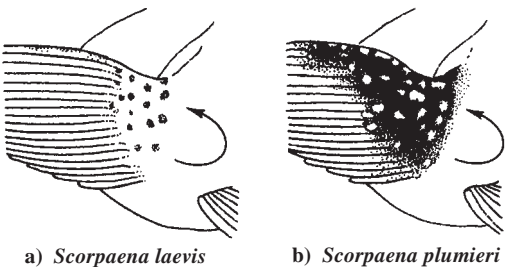


2nd preopercular spine smaller than 3rd and 4th 2nd preopercular spine equal to or larger than 3rd and 4th
 a) *Scorpaena canariensis* b) *Scorpaena maderensis*

Fig. 10

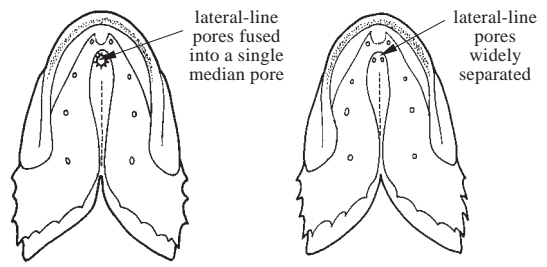
- 18a. Base of pectoral fin and chest scaled; scales on flank cycloid → 19
- 18b. Base of pectoral fin naked, without scales (or with a few small deeply embedded scales); scales on flank ctenoid (or emarginate in *S. porcus*) → 21
- 19a. Fewer than 50 scales in lateral row behind supracleithral spine to base of caudal fin → 20
- 19b. More than 60 scales in lateral row behind supracleithral spine to base of caudal fin ***Scorpaena mellissii***
- 20a. Medial surface of pectoral fin and pectoral axil with large brown spots on a relatively pallid background (Fig. 11a) ***Scorpaena laevis***
- 20b. Medial surface of pectoral fin and pectoral axil black, with large white spots (Fig. 11b) ***Scorpaena plumieri***

- 21a. Lateral-line pores immediately posterior to symphysis of lower jaw fused into a single median pore that is usually readily visible (Fig. 12a) → 22
- 21b. Lateral-line pores immediately posterior to symphysis of lower jaw widely separate, although at times minute (*S. scrofa*) and difficult to locate (Fig. 12b) → 25



a) *Scorpaena laevis* b) *Scorpaena plumieri*

Fig. 11 pectoral fin



a) *Scorpaena loppei* b) *Scorpaena scrofa*

Fig. 12

- 22a. Maxilla with a ridge that runs along its length (Fig. 13) *Scorpaena loppei*
- 22b. Maxilla without ridge running along its length → 23

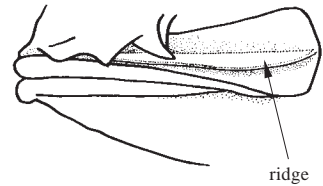
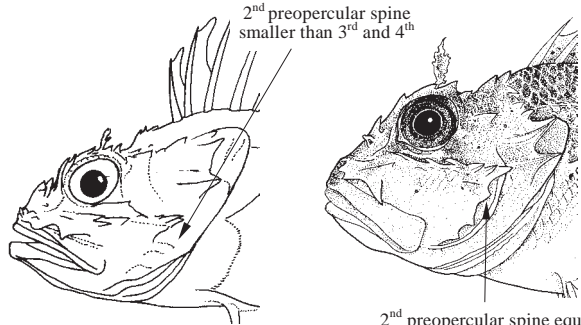


Fig. 13

- 23a. A distinct, large spot on spinous dorsal fin between spines 6 and 9 (although sometimes more restricted); pectoral fin, soft part of dorsal fin and anal fin without numerous small, but distinct spots; spots when present on caudal fin confined primarily to fin rays → 24

- 23b. No distinct, large spot on spinous dorsal fin between spines 6 and 9; pectoral fin, soft part of dorsal fin, and anal fin with numerous small, but distinct spots; spots on caudal fin confined primarily to fin membranes *Scorpaena azorica*

- 24a. Dorsal soft rays usually 9 (last double); posteriormost lacrimal (preorbital) spine points ventrally or slightly to rear (not present or less distinct in juveniles) (Fig. 14a) *Scorpaena angolensis*



- 24b. Dorsal soft rays 10 (last double); posterior lacrimal spines strongly curved to rear (Fig. 14b) (may be less distinct or absent in juveniles) *Scorpaena annobonae*
(Annobon Island only)

a) *Scorpaena angolensis* b) *Scorpaena annobonae*
Fig. 14

- 25a. Scales on body emarginate, without distinct ctenii (small spines at posterior margin of scale); more than 64 scales in lateral row (counted from immediately behind supracleithral spine to base of caudal fin) *Scorpaena porcus*

- 25b. Scales on body ctenoid; fewer than 51 scales in lateral row (counted from immediately behind supracleithral spine to base of caudal fin) → 26

- 26a. Numerous cutaneous flaps and cirri on ventral side of head *Scorpaena scrofa*

- 26b. Ventral surface of head without flaps or cirri → 27

- 27a. Spinous part of dorsal fin without a black spot; pectoral-fin rays usually 19 (sometimes 18) *Scorpaena elongata*

- 27b. Spinous part of dorsal fin with a distinct black spot; pectoral-fin rays usually 17 or 18, rarely 19 → 28

- 28a. More than 20 rows of scales anterior to anus at ventral midline; orbit diameter smaller than snout (ratio of snout/orbit 0.8 to 1.2), except in small specimens *Scorpaena stephanica*

- 28b. Fewer than 20 rows of scales anterior to anus at ventral midline; orbit diameter slightly larger than snout (ratio of snout/orbit 0.9 or less) *Scorpaena notata*

List of species occurring in area

The symbol  is given when species accounts are included.

Note: Specimens identifiable as *Scorpaena stephanica* and possibly *S. angolensis* may include undescribed species. Specimens of the rare scorpionfish, *Idiastion kyphos* from the eastern Atlantic remain tentatively identified as this species following previous authors. However, they likely represent an undescribed species for which insufficient material exists for formal description. Undescribed species may also exist in the genus *Pontinus*, some species of which can be extremely difficult to identify, especially at smaller sizes. Two rare species have restricted ranges that occur just north of the fishing area. It is possible that they may be eventually added to this list. *Scorpaenodes arenai* Torchio, 1962, a rare Mediterranean species, has been reported from the Strait of Messina and more recently off the Azores. Likewise, a species of *Phenacoscorpius*, possibly *P. nebris*, is known from a single specimen taken at the Azores (Mandrytsa, 1992). *Trachyscorpia eschmeyeri* Whitley 1970 is found just south of the fishing area, entering southern Namibia. This deepwater species may be also found eventually to occur in the fishing area.

-  *Ectreposebastes imus* Garman, 1899.
-  *Helicolenus dactylopterus* (Delaroche, 1809).
-  *Idiastion kyphos* Eschmeyer, 1965.
-  *Neomerinthe folgori* (Postel and Roux, 1964).
-  *Pontinus accraensis* Norman, 1935.
-  *Pontinus kuhlii* (Bowdich, 1825).
-  *Pontinus leda* Eschmeyer, 1969.
-  *Pontinus nigropunctatus* (Günther, 1868).
-  *Scorpaena angolensis* Norman, 1935.
-  *Scorpaena annobonae* Eschmeyer, 1969.
-  *Scorpaena ascensionis* Eschmeyer, 1971.
-  *Scorpaena azorica* Eschmeyer, 1969.
-  *Scorpaena canariensis* (Sauvage, 1878).
-  *Scorpaena elongata* Cadenat, 1943.
-  *Scorpaena laevis* Troschel, 1866.
-  *Scorpaena loppei* Cadenat, 1943.
-  *Scorpaena maderensis* Valenciennes, 1833.
-  *Scorpaena mellissii* Günther, 1868.
-  *Scorpaena normani* Cadenat, 1943.
-  *Scorpaena notata* Rafinesque, 1810.
-  *Scorpaena plumieri* Bloch, 1789.
-  *Scorpaena porcus* Linnaeus, 1758.
-  *Scorpaena scrofa* Linnaeus, 1758.
-  *Scorpaena stephanica* Cadenat, 1943.
-  *Scorpaenodes africanus* Pfaff, 1933.
-  *Scorpaenodes elongatus* Cadenat, 1950.
-  *Scorpaenodes insularis* Eschmeyer, 1971.
-  *Setarches guentheri* Johnson, 1862.
-  *Trachyscorpia cristulata echinata* (Köhler, 1896).

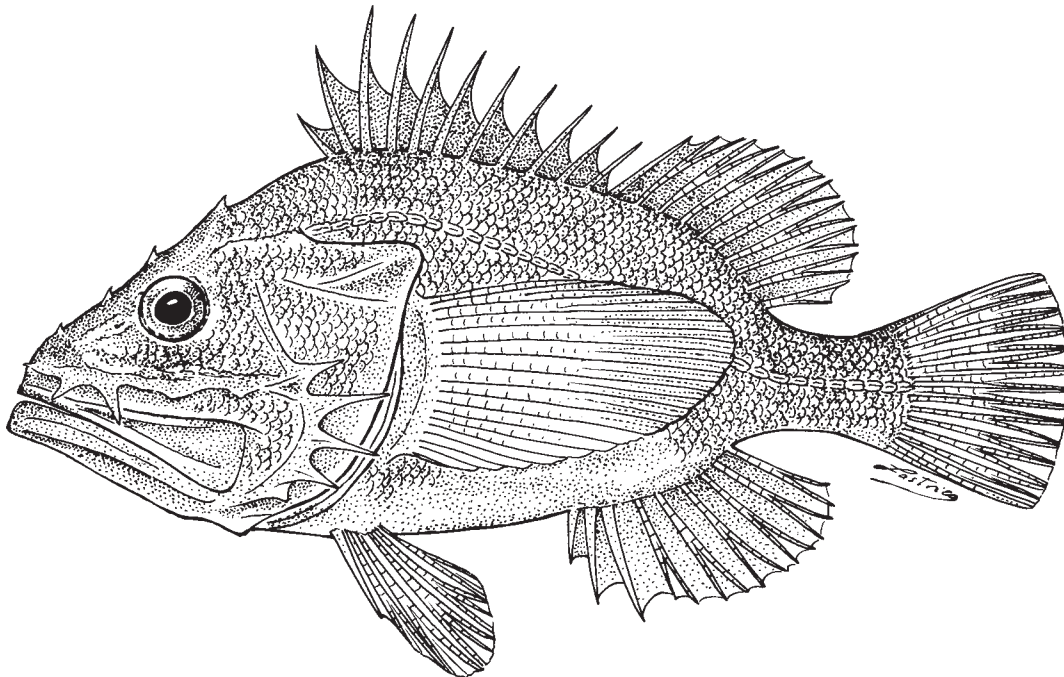
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***Ectreposebastes imus* Garman, 1899**

Frequent synonyms / misidentifications: None / *Ectreposebastes niger* Fourmanoir, 1971.

FAO names: En – Midwater scorpionfish; Fr – Rascasse profonde; Sp – Rascacio profundo.



Diagnostic characters: **Bones of head thin and cavernous.** Interorbit broad, width 10 to 15% standard length. Three lacrimal (preorbital) spines point ventrally over the upper jaw, the first much smaller than the posterior two, points anteriorly; the second points primarily down, although sometimes slightly forward as well as down; the third points back as well as down. Five preopercular spines, **the second or third longest.** No postorbital bone. No fleshy appendages on head or body. **Pectoral-fin rays 18 to 20. Three anal spines. Top of head with scales. Lateral-line scales form a continuous thinly covered trough. Colour:** head and body maroon, nearly black. Young are typically black.

Size: This species reaches 17.1 cm standard length.

Habitat, biology, and fisheries: The black scorpionfish is taken in trawls and midwater nets. Although sometimes caught with commercial gear, this species is not abundant and its small size precludes its importance in fisheries. It is known to feed on amphipods and midwater shrimps of the genus *Sergestes*. Remarks on the development of larvae were given by Eschmeyer and Collette (1966) who reported them from midwater hauls.

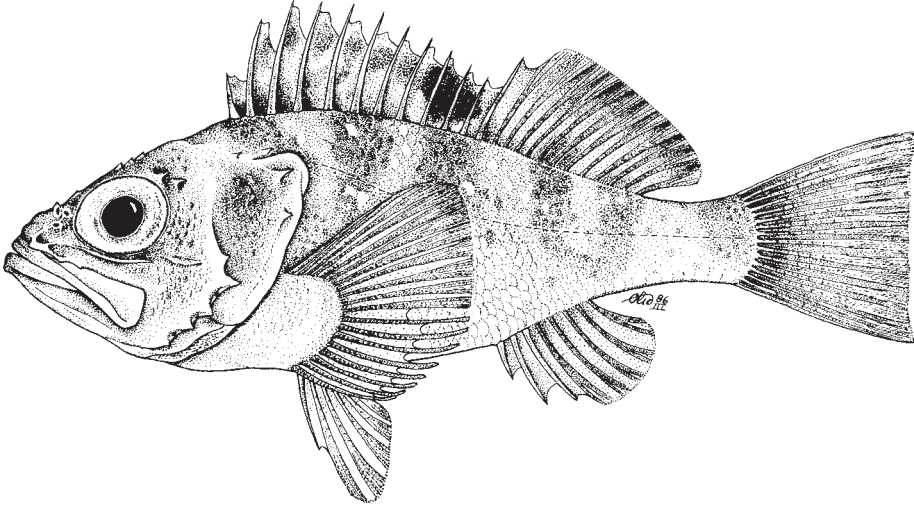
Distribution: Within the area, the black scorpionfish has been reported from Guinea southward in the Gulf of Guinea to Gabon at depths from 150 to 800 m. This species also occurs in the western Atlantic. Elsewhere, it is broadly distributed in the western and eastern Pacific to 850 m.



***Helicolenus dactylopterus* (Delaroche, 1809)**

Frequent synonyms / misidentifications: *Sebastes imperialis* Cuvier, 1829; *S. maculatus* Cuvier, 1829; *S. imperialis* Valenciennes, 1843; *Helicolenus maderensis* Good and Bean, 1896 / None.

FAO names: En – Blackbelly rosefish; Fr – Sébaste chèvre; Sp – Gallineta.



Diagnostic characters: Lacrimal (preorbital) bone without spines. Second suborbital with 1 or no spines. Connection of third infraorbital (suborbital) bone to preoperculum (stay) relatively narrow, tapered and directed somewhat ventrally relative to anterior ramus of bone (Fig. 3). Supplemental preopercular spine at base of uppermost preopercular spine absent. **Dorsal soft rays 11.5 to 12.5.** Chest, cheeks, and maxilla usually with scales. Scales ctenoid in about 55 to 80 vertical rows (counted from immediately behind supracleithral spine to base of caudal fin). **Colour:** pinkish red on dorsum and white to cream-coloured on ventrum. Five or six red vertical bars on flanks with black, pigmented blotch or spot usually present at end of spinous dorsal fin. Markings may be diffuse or dusky.

Size: This species is reported to attain 44 cm total length, but more commonly reaches only to about 25 cm standard length.

Habitat, biology, and fisheries: This benthic species forms an important element of some local trawl fisheries. It is commonly collected over mud and sandy mud bottoms, primarily over the continental slope and shelf. Several distinct populations of this species occur in the Atlantic. Within the fishing area, specimens from the Gulf of Guinea have slightly higher mean pectoral-fin ray and (19.3 versus 19.0) total gill raker counts (35.4 versus 20.1) than do specimens from off Mauritania and more northerly localities in the Mediterranean and Atlantic. It feeds on both pelagic and benthic species, including crustaceans, cephalopods, echinoderms, and fishes. Reproduction occurs from November to December in the southern part of its range and in February and March in the Mediterranean. Both the larvae and juveniles are pelagic.

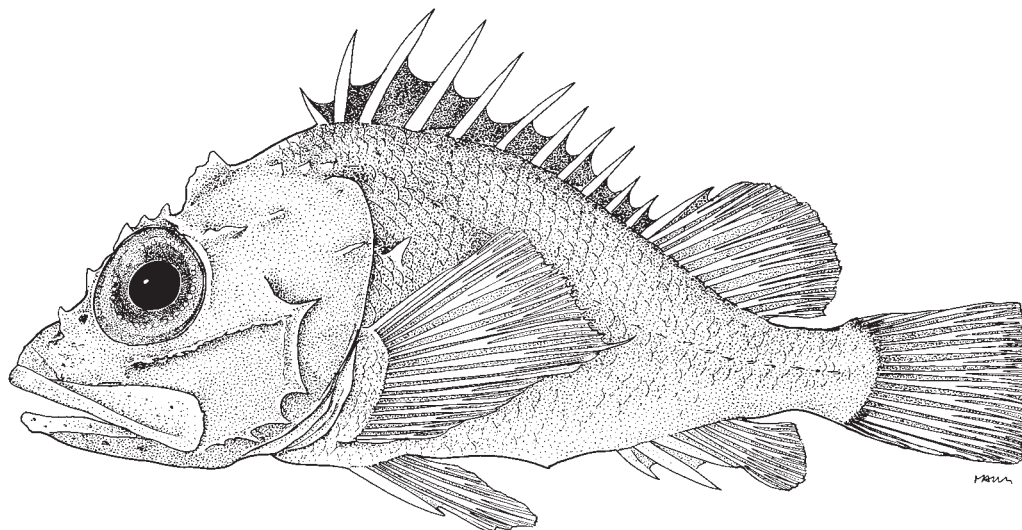
Distribution: This species is widely distributed and several subspecies are recognized (Eschmeyer, 1969). One subspecies, *Helicolenus dactylopterus lahillei*, is found off Argentina and Uruguay. *H. dactylopterus dactylopterus* is found in the northwest Atlantic from Nova Scotia to Venezuela. In the northeast Atlantic it ranges from Norway and Ireland southward into the Mediterranean, and the Azores, throughout the fishing area to South African waters. *H. dactylopterus angolensis* is found off western Africa (Barsukov, 1979), but this subspecies is not recognized by some authors (Eschmeyer and Dempster, 1990). Within the fishing area this species occurs from Morocco southward through the Gulf of Guinea to Angola (17°S) at depths between 200 and 960 m.



***Idiastion kyphos* Eschmeyer, 1965**

Frequent synonyms / misidentifications: None / None.

FAO names: En – Sharpcheek scorpionfish.



Diagnostic characters: Spines on head notably pungent, many with multiple points. Upper posttemporal spine absent. Numerous (usually about 7 or more) small spines nearly linearly arranged on suborbital ridge below eye. Second preopercular spine tiny or absent. Body relatively deep (38% standard length), giving the appearance of a relatively hunched back immediately behind head. Scales ctenoid. Lateral-line scales 23 or 24. Swimbladder present. Pectoral fin wedge-shaped, with 17 to 19 rays, the lowermost branched ray near middle of fin longest and extending posteriorly from margin of fin. Vertebrae 25. **Colour:** pallid in preservative, probably orange or red in life.

Size: This species attains a size of at least 10.5 cm standard length.

Habitat, biology, and fisheries: Little is known of the biology of this species other than it has been taken in shrimp trawls at depths of between 439 and 622 m.

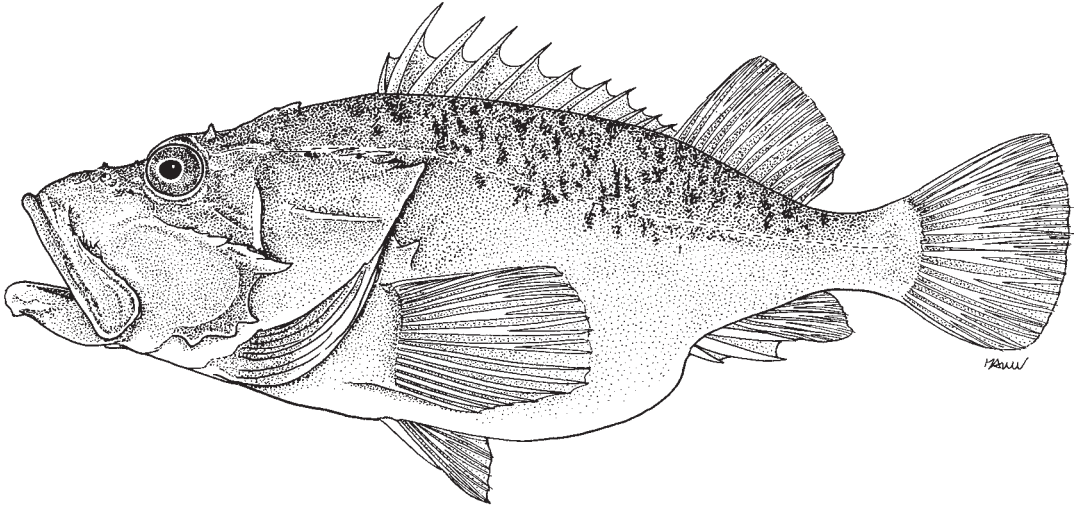
Distribution: A few specimens have been reported from the area (Angola). These probably represent a species distinct from *I. kyphos*, which was originally described from off Venezuela.



***Neomerinthe folgori* (Postel and Roux, 1964)**

Frequent synonyms / misidentifications: None / *Scorpaena* sp.

FAO names: En – Folgor's scorpionfish; Fr – Rascasse de Folgor; Sp – Rascacio de Folgor.



Diagnostic characters: Head large, with pronounced snout (about 15% in standard length). Suborbital bones with many small points arranged on long spinous ridges that generally correspond to the 3 or 4 spines seen in many other species. Pectoral fin with 17 rays (counts of 16 or 18 should be expected), some branched. Uppermost preopercular spine longest, second absent. Gill rakers including rudiments about 19. A slit behind last gill arch. Scales ctenoid, in about 85 vertical rows counted from immediately behind supracleithral spine to base of caudal fin. Cirri on body poorly developed. **Colour:** red in life, with dusky markings above opercle and on flank below dorsal fin. Species previously incorrectly figured with a dark subdistal bar on caudal fin. Belly pale.

Size: A relatively large species known only from limited material, reaching at least 34 cm standard length (40 cm total length).

Habitat, biology, and fisheries: This rare species is only incidentally taken by fishermen, probably because it lives over rocky bottoms that may be difficult to fish. The holotype was taken in a lobster trap.

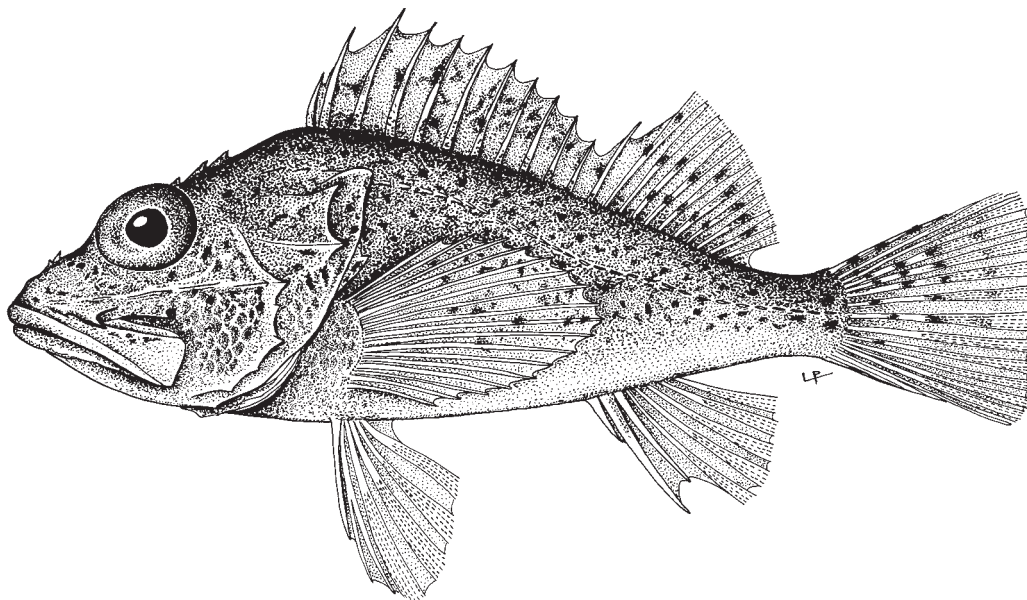
Distribution: This rare species has been taken at depths of 180 to 310 m off Mauritania, the Cape Verde Islands, Guinea Bissau, and northern Namibia.



***Pontinus accraensis* Norman, 1935**

Frequent synonyms / misidentifications: None / *Pontinus leda*.

FAO names: En – Ghanean rockfish; Fr – Rascasse de Accra; Sp – Racascio de Accra.



Diagnostic characters: All pectoral-fin rays (16 to 18) unbranched. Snout moderate (10 to 15% standard length, but usually 11 to 14), growing relatively longer with increasing size. Lacrimal with 2 spines over maxilla, first points down and slightly laterally, the second points posteroventrally. Suborbital ridge usually with 4 small spines. Scales ctenoid, 33 to 50 vertical rows, counted from immediately behind supracleithral spine to base of caudal fin. Lateral-line scales 24 to 26. Ratio of orbit diameter to second anal spine 0.9 to 1.2. Second and third dorsal spine elongate in specimens larger than about 13 to 15 cm. **Colour:** rose or pinkish red, lighter ventrally; with small, scattered dusky spots over head and body; often more distinct along lateral line. No large dark spots on membranes near base of spinous part of dorsal fin.

Size: This species has been reported to reach 18.4 cm standard length, but unconfirmed reports suggest it may grow much larger (to 40 cm total length or [doubtfully] 90 cm total length).

Habitat, biology, and fisheries: This benthic species occurs over trawlable mud or sand bottoms. It feeds on crustaceans and fishes.

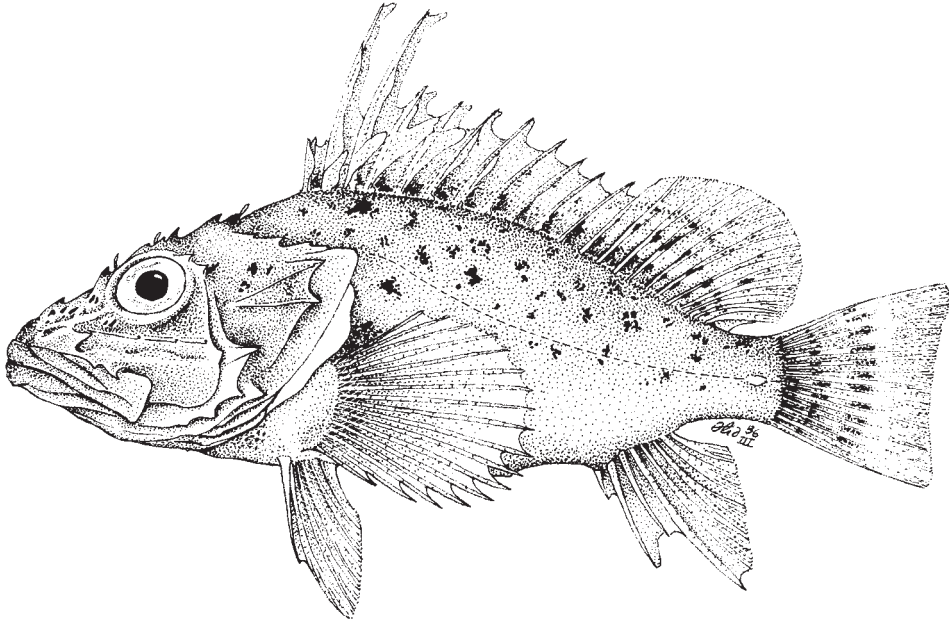
Distribution: This coastal species ranges from Mauritania south to Angola. It is found between 55 and 274 m.



Pontinus kuhlii (Bowdich, 1825)

Frequent synonyms / misidentifications: *Sebastes filifer* Valenciennes, 1840; *S. (Sebastichthys) bibroni* Sauvage, 1878 / None.

FAO names: **En** – Offshore rockfish; **Fr** – Rascasse de large; **Sp** – Rascacio de fuera.



Diagnostic characters: Second and/or third dorsal spines relatively elongate in specimens longer than about 14 cm standard length. Snout moderate to long (13 to 15% in standard length). Lacrimal with 2 spines both pointing posteroventrally over maxilla. Suborbital ridge with 3 or 4 spines. Second preopercular spine small or absent. All pectoral-fin rays unbranched, pectoral rays 17 or 18, but usually 17. Scales small, ctenoid, 60 to 65 vertical rows counted from immediately behind supracleithral spine to base of caudal fin. Lateral-line scales 25 to 27. **Colour:** red or reddish pink, with small, scattered irregular, reddish brown and yellow spots, sometimes most pronounced at base of dorsal fin. Yellow on cheek, behind orbit, and over operculum. Soft part of dorsal fin spotted.

Size: *P. kuhlii* is a large species reaching 52 cm total length, but with most under 31.5 cm standard length.

Habitat, biology, and fisheries: This species is taken by hook-and-line, bottom set longlines, and bottom trawls and can be abundant in localized fisheries. It feeds on invertebrates, primarily shrimp, and fishes.

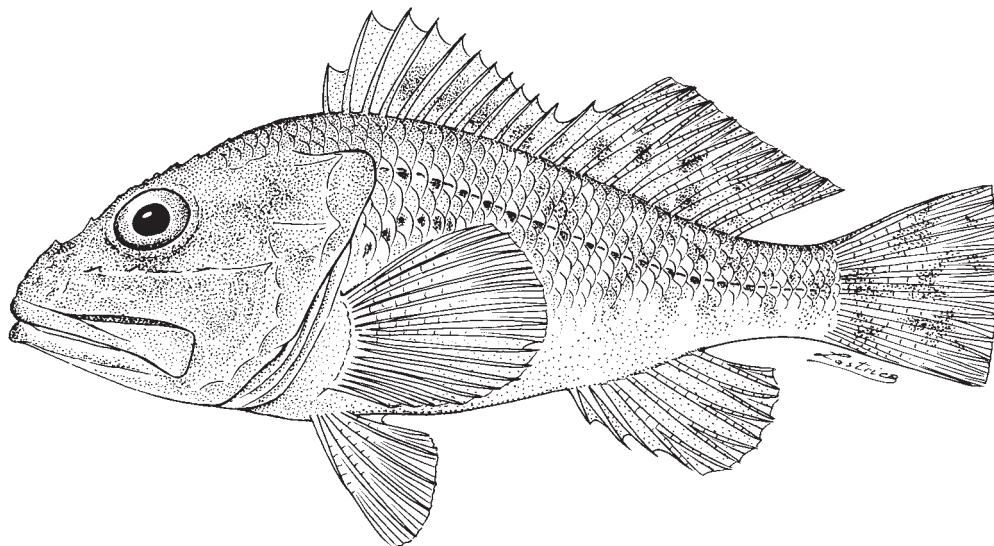
Distribution: This species has been taken at numerous localities within the fishing area (Canary Islands, Cape Verde Islands, Madeira, Mauritania, Morocco, and the Gulf of Guinea at São Tomé, and southward to northern Angola). Outside the area it occurs in the Gulf of Gascony, the Azores, at the Great Meteor Seamount, off Portugal, and in the Mediterranean Sea (eastward to Sicily). Specimen reported from the Congo and Angola may represent a closely related species. It appears to be restricted to hard bottoms and depths of 91 to 600 m.



Pontinus leda Eschmeyer, 1969

Frequent synonyms / misidentifications: None / *Pontinus accraensis*.

FAO names: En – Speckled deepwater scorpionfish; Fr – Rascasse tacheté; Sp – Rascacio rosado.



Diagnostic characters: Second and third dorsal-fin spines not elongate at any size. All 17 or 18 (usually 18) pectoral-fin rays unbranched. Snout relatively short, 10 to 13% standard length. Scales ctenoid, with 40 to 47 in vertical rows (counted from immediately behind supracleithral spine to base of caudal fin). Lateral-line scales 23-24+1-2. **Colour:** live coloration unknown, but probably predominantly red. In preservative relatively pallid, with scattered dusky smudges often present at base of dorsal fin and along lateral line. Few or no distinct dark spots on caudal fin.

Size: Museum material examined to date confirm that this species grows to at least 16.6 cm standard length. It has been reported to reach 27 cm total length (Bianchi *et al.*, 1993).

Habitat, biology, and fisheries: It is taken on mud or sand bottoms with trawls. Little else about its biology is known.

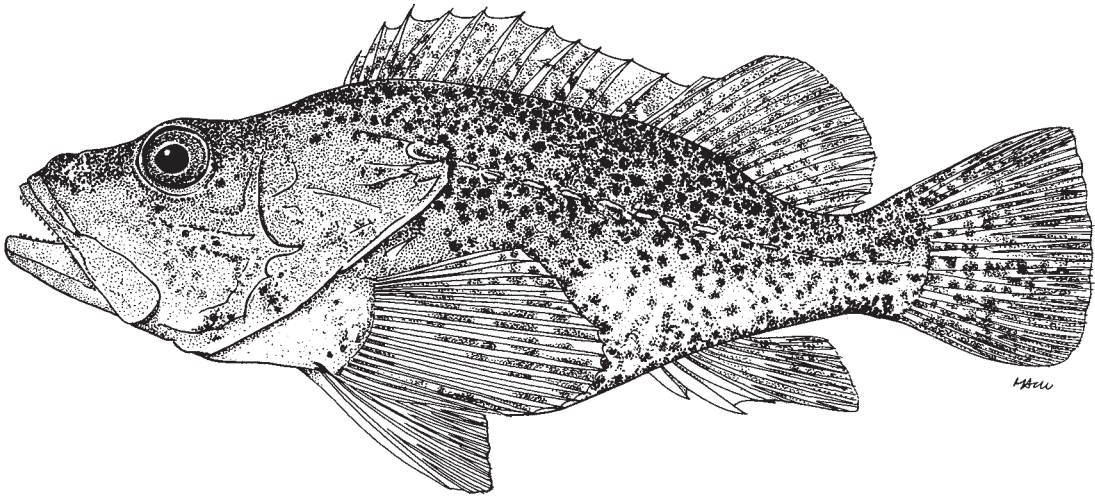
Distribution: This species has been reported from Guinea-Bissau and the Gulf of Guinea from Gabon southward to Namibia (18° 45'S) at depths of 92 to 400 m.



***Pontinus nigropunctatus* (Günther, 1868)**

Frequent synonyms / misidentifications: None / None.

FAO names: En – St Helena deepwater scorpionfish.



Diagnostic characters: Head large. Snout relatively elongate (14 to 15% standard length). **Second and third dorsal spines not notably elongate. All 18 pectoral-fin rays unbranched (counts of 17 or 19 should be expected). Scales ctenoid, 50 to 52 vertical rows (counted from immediately behind supracleithral spine to base of caudal fin). Lateral-line scales about 24 to 27. Colour: body rose red with numerous distinct brownish red spots and smaller scattered white specks, with ventrum lighter, more pinkish.** Body nearly white on belly and at base of pectoral fin. Head rose red and with small red spots, but without intense darker spots seen on body; nearly solid rose red on snout, but more pinkish and spotted in immediately posterior to the orbit and over cheek; eye yellow ventrally. Fins with red spots, especially over fin rays.

Size: A relatively large species, reaching 26 cm standard length.

Habitat, biology, and fisheries: Little is known of the biology of this apparently hard-bottom species. Its soft white flesh is said to be excellent eating.

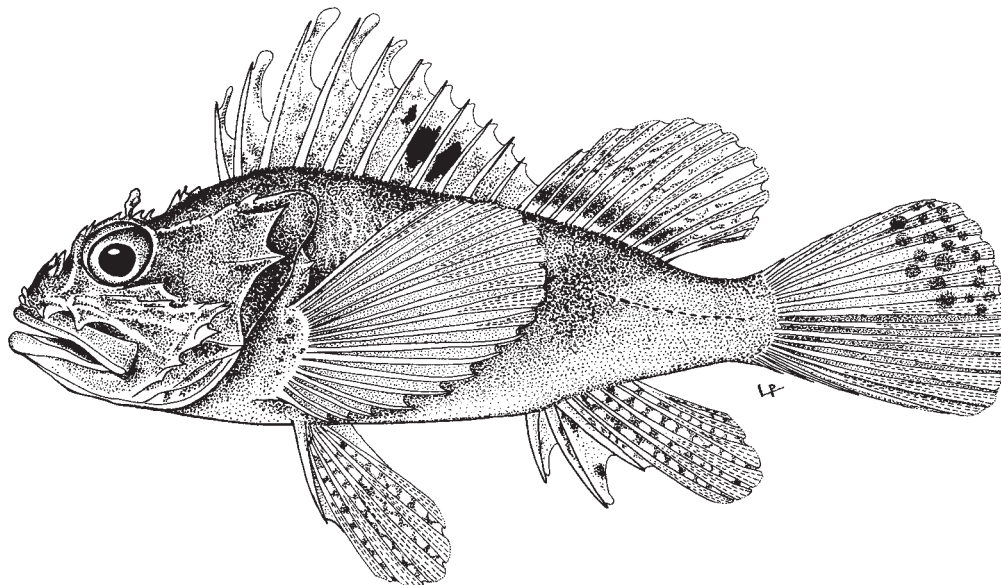
Distribution: So far, this species remains known only from St Helena and the nearby Bonapart seamount, where it is taken over hard bottoms between 91 and 146 m.



***Scorpaena angolensis* Norman, 1935**

Frequent synonyms / misidentifications: None / *Scorpaena scrofa*; *S. stephanica*.

FAO names: En – Angola rockfish; Fr – Racasse de l'Angola; Sp – Rascacio de Angola.



Diagnostic characters: Lacrimal with 3 spines that extend over maxilla (2 in young). Suborbital ridge nearly always without spines on lacrimal and 3 spines on second and third infraorbital bones. Occipital pit present. Chest and pectoral-fin base without scales. Lateral-line pores at symphysis of lower jaw confluent. Scales ctenoid, in about 40 to 46 vertical rows (counted from immediately behind supracleithral spine to base of caudal fin). Cirri on body well developed. **Colour:** red, with scattered, irregular red, brown, or nearly black spots and blotches, especially over interoperculum and operculum, body, and fins. Those on body form 3 dusky saddles, one at base of first 3 dorsal spines, a second broader, at base of dorsal spines 5 to 8, and a third below soft part of dorsal fin. The third saddle extends nearly to anal fin. Chest pinkish. **A large dark spot usually between dorsal spines 6 to 9.** Ventrals and pectoral fin with small irregular white spots and short streaks. Caudal fin with numerous rather regular, dark spots, primarily over fin rays.

Size: This species is reported to reach 25 cm total length.

Habitat, biology, and fisheries: This is a coastal species that lives on mud-sand bottoms, where it is commonly encountered in trawls.

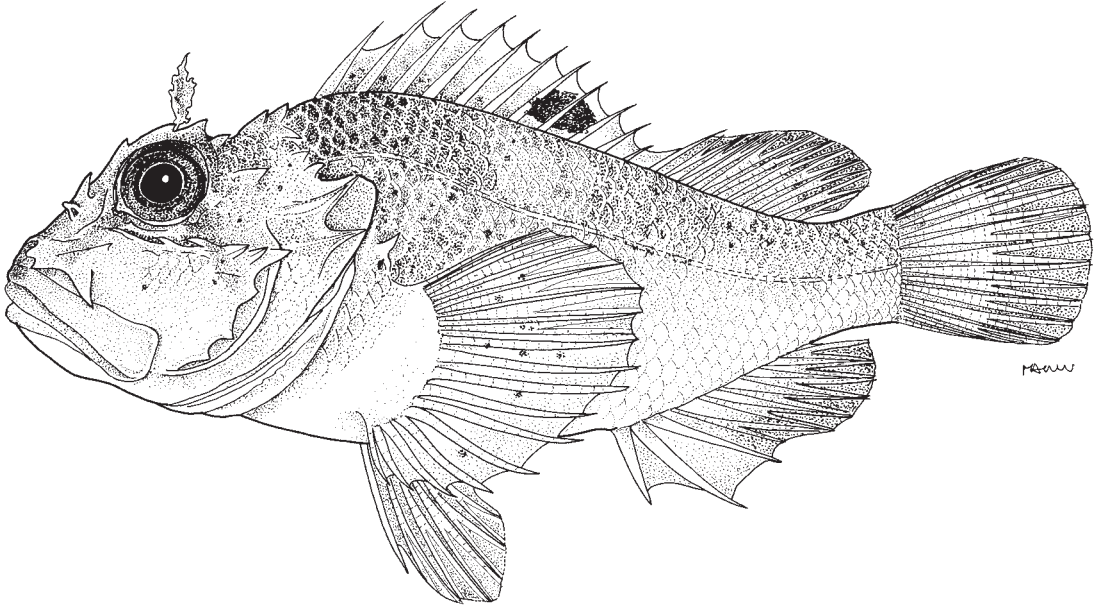
Distribution: This species ranges from Mauritania (Cap Blanc) to Angola. It also occurs at the Cape Verde Islands. It has been captured at depths of 37 to 229 m.



Scorpaena annobonae Eschmeyer, 1969

Frequent synonyms / misidentifications: None / None.

FAO names: En – Annobon scorpionfish.



Diagnostic characters: Pectoral fin with 18 rays (should expect 17 or 19) that extend to level of third anal spine. Lateral-line scales 23 or 24 (including one over base of caudal fin). Suborbital ridge with 3 spines, with ridge only on lacrimal (preorbital). No crest on maxilla. Pores at symphysis of lower jaw confluent and forming a single large pore. Occipital pit present. Chest and pectoral-fin base without scales. Scales ctenoid in 36 to 38 vertical rows counted from immediately behind supracleithral spine to base of caudal fin. **Colour:** a dark spot on spinous dorsal fin between spines 7 and 9.

Size: This is a small species, presently known to reach only about 4.5 cm standard length.

Habitat, biology, and fisheries: Nothing is known about the biology of this species, except as can be inferred from its morphology and locality of capture.

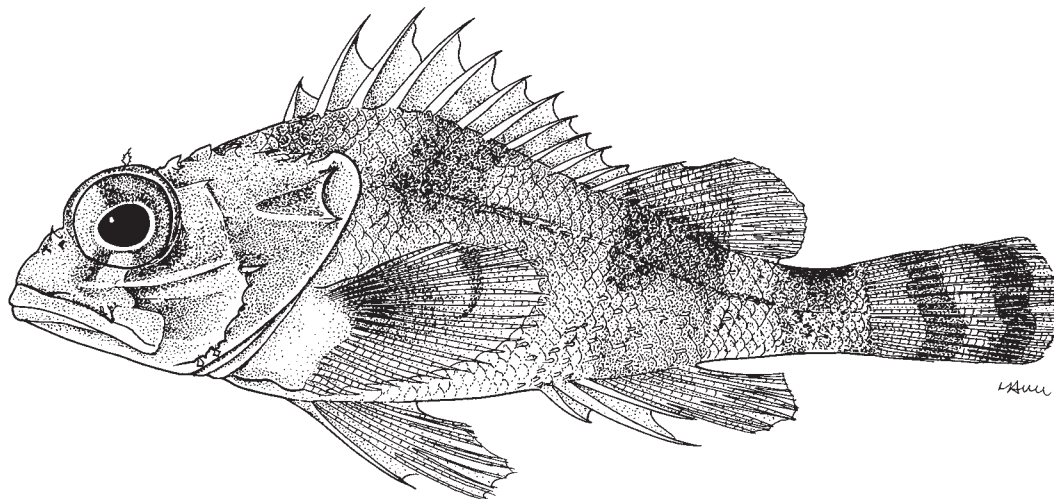
Distribution: This species remains known only from a single specimen taken at Annobon Island in the Gulf of Guinea, where it was trawled between 9 and 47 m.



Scorpaena ascensionis Eschmeyer, 1971

Frequent synonyms / misidentifications: None / None.

FAO names: En – Ascension scorpionfish.



Diagnostic characters: Lacrimal (preorbital) with 2 spines over maxilla, first points forward, the second posteroventrally. **Occiput with a shallow pit. No spinous points on the suborbital ridge. Pectoral-fin rays 20.** Gill rakers, including rudiments, 14 or 15. **Scales cycloid or slightly emarginate in about 58 to 62 vertical rows from (counted from immediately behind supracleithral spine to base of caudal fin). Cycloid scales on chest, pectoral-fin base, in postorbit, over opercle, and on cheek.** Lateral-line scales 28, including 2 extending onto base of caudal fin. Five preopercular spines, first relatively short, with rest much smaller. **Colour:** broad dark brown bars extend vertically across body and caudal fin. Pectoral-fin axil is pallid with a few brown spots.

Size: Reaches at least 3.75 cm standard length.

Habitat, biology, and fisheries: Nothing is known of the biology of this species.

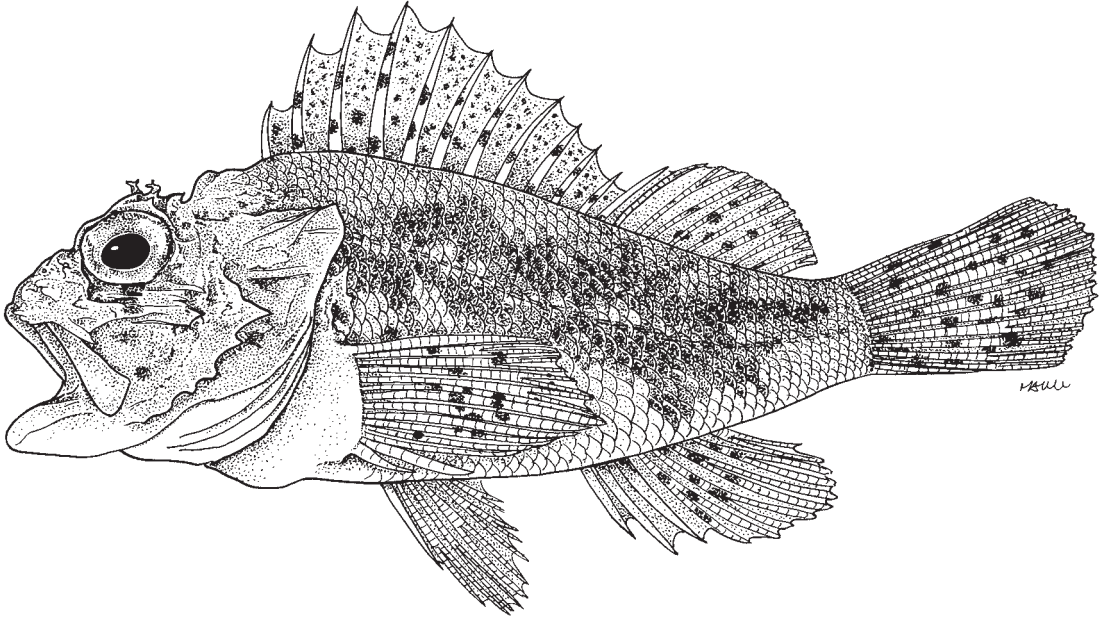
Distribution: This species is known only from Ascension Island near the middle of the southern Atlantic Ocean, where it occurs inshore at depths of 16 to 27 m.



***Scorpaena azorica* Eschmeyer, 1969**

Frequent synonyms / misidentifications: None / None.

FAO names: En – Azores scorpionfish.



Diagnostic characters: Dorsal rays XII, 9.5. Pectoral rays 18. Lacrimal with 4 or 5 spines over maxilla, first 3 small and point forward; fourth larger (sometimes double) and points back and down. Suborbital ridge with 3 spines, with none on preorbital, one below centre of eye, second at end of ridge above first spine, third between second spine and supplemental preopercular spine. **Occipital pit well developed. Scales on side ctenoid, 44 in lateral row (counted from immediately behind supracleithral spine to base of caudal fin).** Chest, pectoral-fin base and head naked, without scales. A large single pore at symphysis of lower jaw. Skin appendages and flaps poorly developed, with none on lower jaw. **Colour:** all fins with distinct brown spots, with pigment primarily confined to fin membranes.

Size: The species is known from only 2 specimens, the largest 9.8 cm standard length.

Habitat, biology, and fisheries: Nothing is known about the biology of this species.

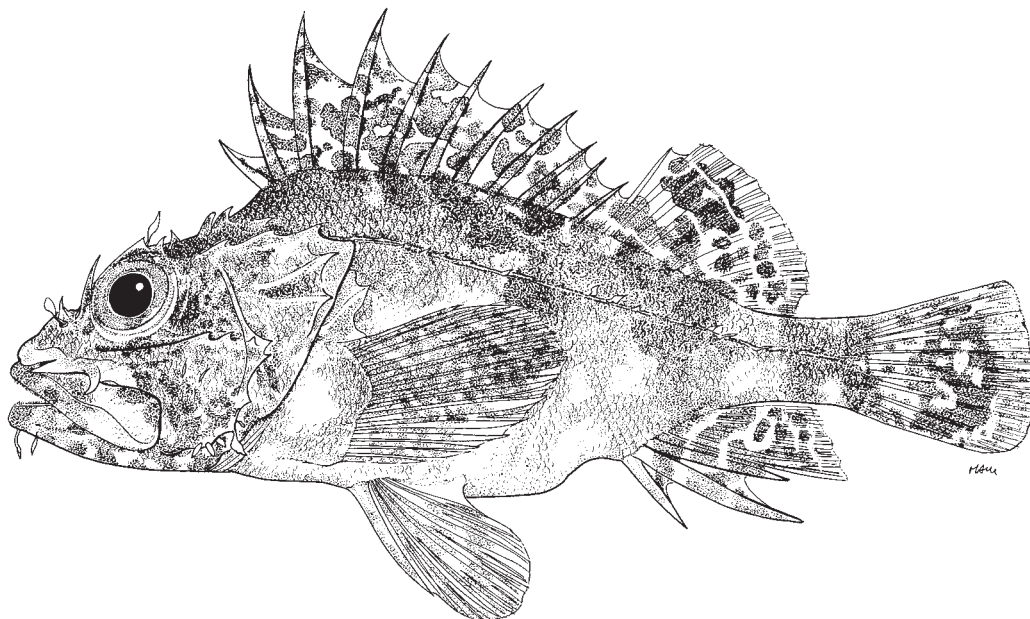
Distribution: The Azores scorpionfish is known from only 2 specimens, the holotype taken at the Azores and a second specimen captured in the fishing area off Western Sahara.



***Scorpaena canariensis* (Sauvage, 1878)**

Frequent synonyms / misidentifications: None / Sometimes confused with small specimens of *Pontinus kuhlii*.

FAO names: En – Canary scorpionfish.



Diagnostic characters: Two preorbital spines on lacrimal, with both pointing forward. Occipital pit absent. Pectoral-fin rays 16. Scales on body ctenoid, about 66 to 69 vertical rows (counted from immediately behind supracleithral spine to base of caudal fin). Chest scaled. **Colour:** body red or reddish orange, with reddish brown saddles, blotches, and spots on a pale background. Head more nearly uniform red or reddish orange, with a weak, cream-colored or nearly white bar at posterior of lacrimal radiating from orbit, a larger more prominent pale area over occiput that extends onto opercle as a prominent pale area. Several broad dark red or reddish brown saddles on body that extend below lateral line; one between occiput and upper part of body below third dorsal spine; another below dorsal spines 5 to 8 or 9 that extends below lateral line and punctuated by a pale spot at level of lateral line, another extends across soft dorsal fin and body, continuous with dark red area across anal fin; a fourth saddle over caudal peduncle. Dorsal fin with irregular reddish spots on a pale or translucent background. A broad, but irregular vertical dark bar over posterior third of caudal fin. White specks on inner surface of pectoral fin.

Size: This is a small species that only reaches 14 cm standard length.

Habitat, biology, and fisheries: Little is known about the biology of this species.

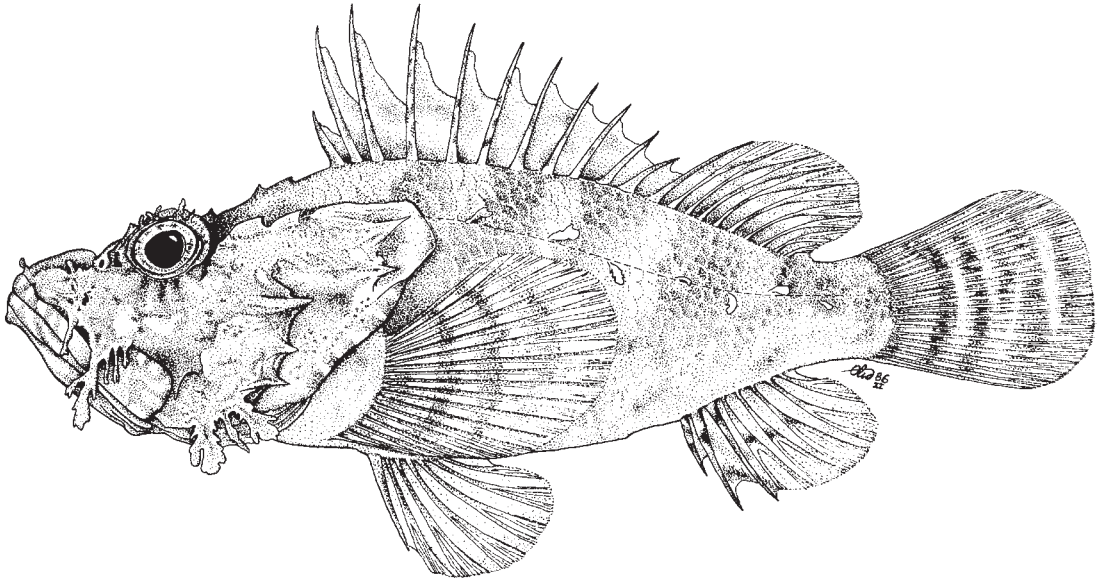
Distribution: This benthic species originally described from the Canary Islands has recently been observed at the Azores and the Madeira Islands.



Scorpaena elongata Cadenat, 1943

Frequent synonyms / misidentifications: None / None.

FAO names: En – Slender rockfish; Fr – Rascasse rose; Sp – Gallineta rosada.



Diagnostic characters: Interorbit with 2 ridges that end at margin of occipital pit. Pectoral-fin rays 18 to 20, usually 19. Pectoral-fin base and chest without scales. Scales on body ctenoid, in 45 to 50 vertical rows counted from immediately behind supracleithral spine to base of caudal fin. **Colour:** rose-red or pinkish red, sometimes with a yellowish cast on soft-dorsal, caudal and pectoral fins. Head usually more strongly coloured, sometimes with a brownish tint. Usually several larger, darker, rose-red blotches or spots on soft dorsal, anal, caudal and pectoral fins and on flanks, but **no dark spot on spinous dorsal fin**. Cirri on body, particularly those between anal fin and lateral line, white.

Size: One of the larger scorpionfishes, *Scorpaena elongata* is reported to reach 50 cm in total length, with specimens approaching 25 cm standard length relatively common.

Habitat, biology, and fisheries: This species is taken over trawlable sand or mud bottoms offshore. However, reports of this species on or near rocky areas have also been made. It feeds on crustaceans and fishes. Reproduction in the Mediterranean, where it supports a significant fishery, takes place in early August and September. It is sold fresh in markets, either whole or as fillets.

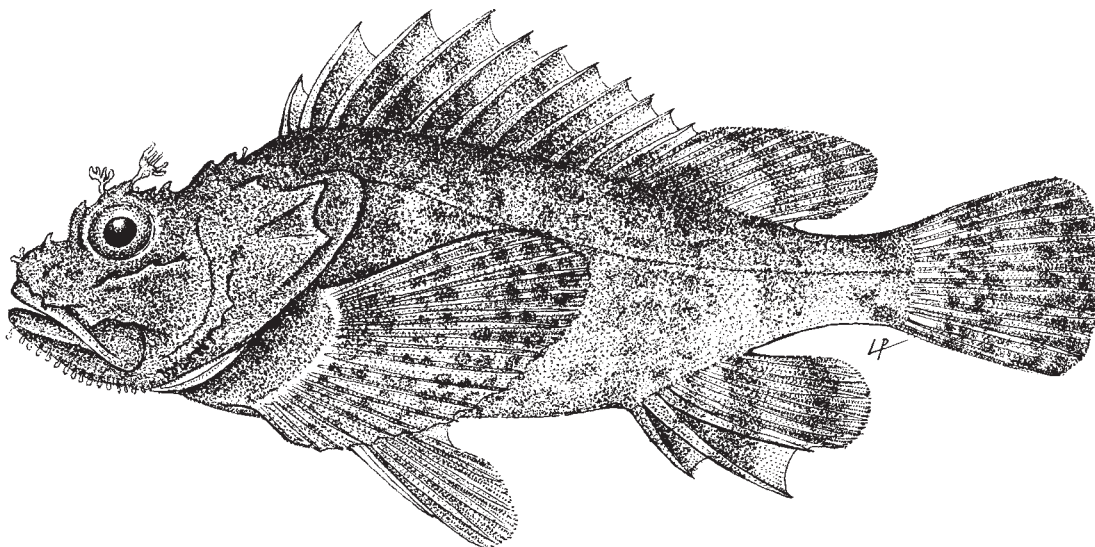
Distribution: This species is known from numerous localities in the western Mediterranean Sea, at the Azores, Morocco, Mauritania, Senegal, Sierra Leone, and Nigeria, with its southernmost capture at latitude 17°30'S off Namibia. It has been reported from depths of 75 to 800 m (most commonly 100 to 600 m).



Scorpaena laevis Troschel, 1866

Frequent synonyms / misidentifications: *Scorpaena senegalensis*, Steindachner, 1881 / *Scorpaena grandicornis* Cuvier, 1829; *S. plumieri*.

FAO names: En – Senegalese rockfish.



Diagnostic characters: Orbit set high on head. Interorbit wide (6 to 9% standard length). A somewhat triangular pit at front of eye formed between eye and ascending process of lacrimal (preorbital). Scales cycloid, in 40 to 45 vertical rows counted from immediately behind supracleithral spine to base of caudal fin. **Colour:** variable and evidently related to habitat. They may be relatively pallid at more insular localities to mainly brown in coastal areas. Dorsal fin brown and variously mottled, sometimes with a black spot between spines 6 to 8. Medial surface of pectoral fin with large brown spots on a pallid background, sometimes with small pale spots or streaks.

Size: This species grows to 35 cm standard length, but more typically under 20 cm.

Habitat, biology, and fisheries: This species is common in shallow rocky habitats. It has been reported to feed on octopus, and presumably also eats other invertebrates and fishes. It appears in catches of local fisheries throughout its range.

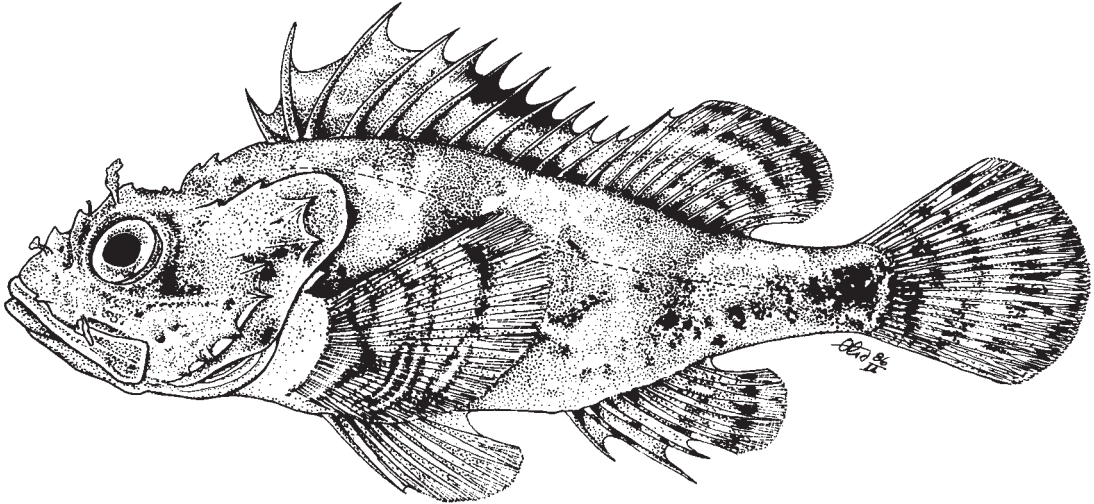
Distribution: This species is widely distributed in the fishing area. It has been collected at the Canary Islands, Madeira, Cape Verde Islands, Mauritania (near Cape Timiris, 19°30'N) and the Gulf of Guinea south to Pointe Noire, Congo. Eschmeyer (1969) reported it is common around the islands of São Tomé, Annobón, and Fernando Póo, but subsequently questioned these records (Eschmeyer and Dempster, 1990). Outside the area it has also been reported from the Azores. Depths of capture range from 15 to 90 m.



Scorpaena loppei Cadenat, 1943

Frequent synonyms / misidentifications: None / None.

FAO names: En – Cadenat's scorpionfish; Fr – Racasse de Cadenat; Sp – Rascacio de Cadenat.



Diagnostic characters: A prominent crest on maxilla (Fig. 13). Suborbital ridge with 4 spines, first on lateral face of lacrimal (preorbital). Anteriormost lateral-line pores at sides of symphysis of lower jaw joined, forming a single pore. Scales weakly ctenoid in about 35 to 40 vertical scale rows counted from immediately behind supracleithral spine to base of caudal fin. **Colour:** in preservative body with dark patches below spinous dorsal fin, between soft-dorsal fin and anal fin, and over posterior half of caudal peduncle. **A dark spot on dorsal fin between spines 6 to 10. Other fins dusky.** Live coloration unknown.

Size: A small species that is reported to 15 cm total length (Eschmeyer and Dempster, 1990), but most are less than 10 cm standard length.

Habitat, biology, and fisheries: Hureau and Litvinenko (1986) report this species feeds mainly on crustaceans.

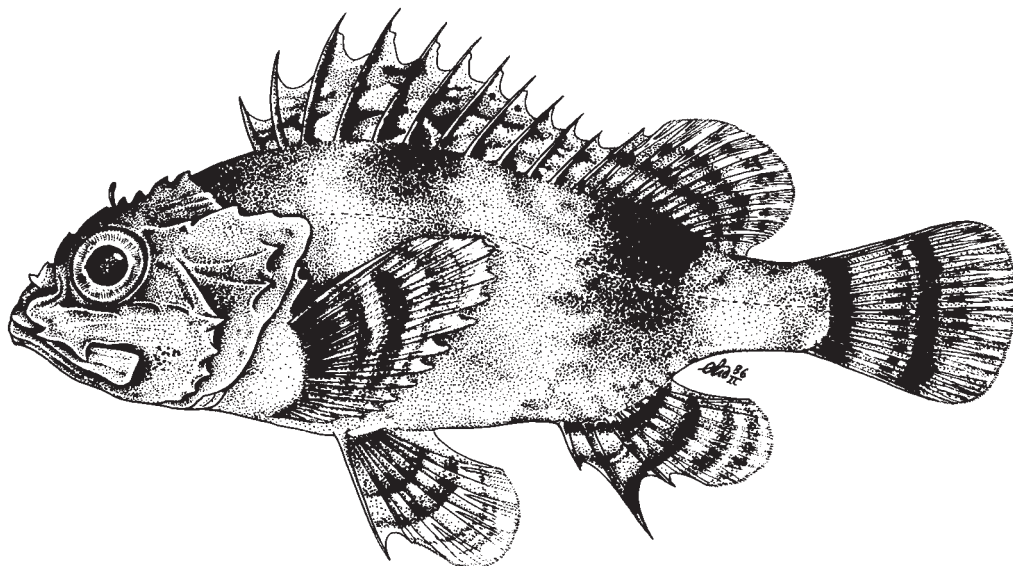
Distribution: This species enters the fishing area at its northern extremity. It is found in the Mediterranean, the Adriatic, eastward to Greece, Cyprus, and Israel. In the Atlantic it ranges from the Gulf of Gascogne (Bay of Biscay) and Morocco to the Western Sahara at the Rio de Oro. It has been reported to occur at depths of between 80 and 300 m.



Scorpaena maderensis Valenciennes, 1833

Frequent synonyms / misidentifications: *Scorpaena madurensis* Valenciennes, 1833; *S. rubellio* Jordan and Gunn, 1898 / None.

FAO names: En – Madeira rockfish; Fr – Rascasse de Madère; Sp – Rascacio de Madeira.



Diagnostic characters: Two large preorbital spines on lacrimal, the latter points strong posteriorly. Suborbital ridge with 2 spinous points, one behind eye at end of long ridge, followed by a second at end of short ridge immediately anterior to preopercle. Cleithrum usually with 2 spines. No occipital pit. Pectoral-fin rays 15 to 18, usually 15 or 16. Lateral-line pores at symphysis of lower jaw small, but separate. Chest and pectoral-fin base scaled, but many scales deeply embedded. Scales weakly ctenoid or rarely cycloid in 52 to 56 vertical rows counted from immediately behind supracleithral spine to base of caudal fin. Cirri on head and body poorly developed. **Colour:** variable, but with conspicuous small white specks in axil of pectoral fin and on body near pectoral fin. Head red, red-orange, or reddish brown and mottled with white. Pectoral fin with elongate dark spots. **Dorsal fin with blotches of brown pigment, but no dark spot on spinous part of fin.**

Size: This species has been reported to reach 15 cm total length.

Habitat, biology, and fisheries: This is an inshore species, frequently encountered in tidepools.

Distribution: *Scorpaena maderensis* ranges throughout the Mediterranean and the Azores. One unconfirmed report exists from the Red Sea. In the fishing area it is found southward from Morocco to Mauritania and possibly Senegal (unconfirmed). Insular records include Madiera, the Canary Islands, and Cape Verde Islands. Nearly all records are from shallow water (to about 40 m), but its maximum depth is not well established, with one unconfirmed record of 725 to 744 m.

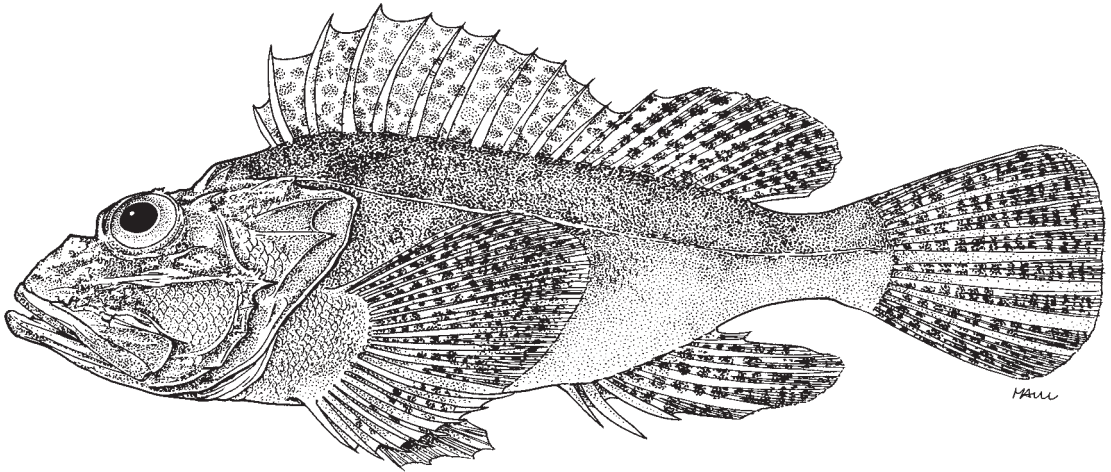
Remarks: Originally misspelled when proposed as *Scorpaena madurensis* by Valenciennes, who also used the spelling *maderensis*. Under ICZN Article 32 (c and d) it is to be corrected.



Scorpaena mellissii Günther, 1868

Frequent synonyms / misidentifications: None / None.

FAO names: En – Melliss's scorpionfish.



Diagnostic characters: Lacrimal with 3 preorbital spines, the first 2 relatively close together. Suborbital ridge with 1 or 2 indistinct spinous points and numerous secondary ridges. Spine on dorsal ramus of post-temporal. Occipital pit present. Chest and base of pectoral fin with scales. Scales cycloid, in 68 to 70 vertical rows counted from immediately behind supracleithral spine to base of caudal fin. **Colour:** body a nearly uniform brownish grey. Head with many brown spots. Dorsal, caudal, and pectoral rays also with brown spots.

Size: This species grows to about 20 cm standard length.

Habitat, biology, and fisheries: Almost nothing is known about the biology of this species.

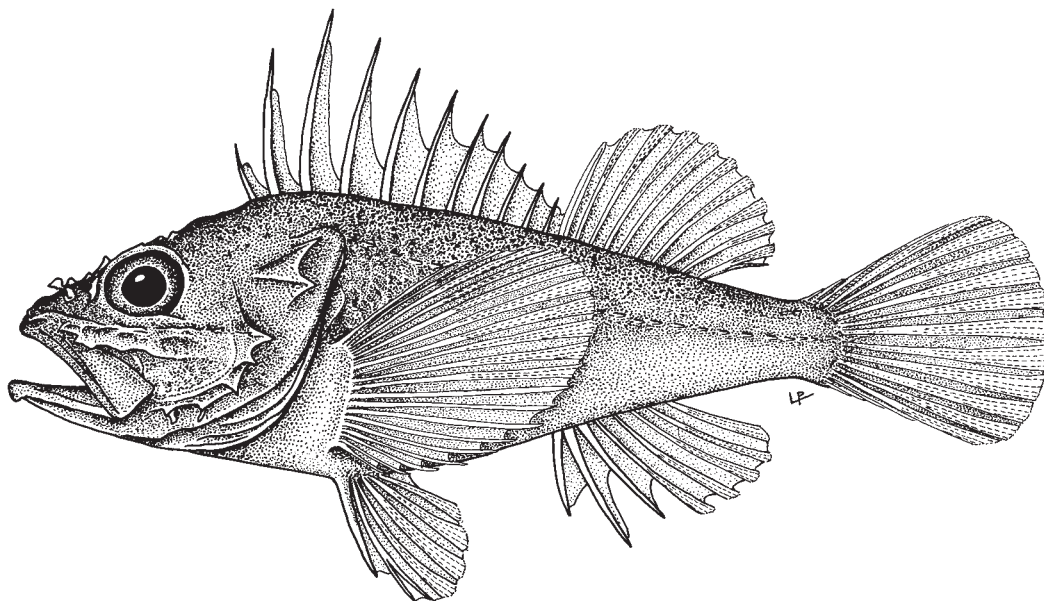
Distribution: This unusual species is found only at St Helena in the south central Atlantic at depths between 10 and 110 m.



Scorpaena normani Cadenat, 1943

Frequent synonyms / misidentifications: None / None.

FAO names: En – Norman's scorpionfish; Fr – Rascasse de Norman; Sp – Rascacio de Norman.



Diagnostic characters: Membranes between anterior dorsal-fin spines deeply incised for more than half length of spine. Pectoral-fin rays 18 to 20, but almost always 19. Chest and base of pectoral fin without scales. No occipital pit, but with slight depressions anterior to parietal bones. Scales in 40 to 46 vertical rows counted from immediately behind supracleithral spine to base of caudal fin. Anteriormost mandibular lateral-line pores at symphysis of lower jaw separate. **Colour:** bright red in life, with dark spots over body. Pectoral fin with dark red spots.

Size: This species grows to about 15.5 cm in standard length.

Habitat, biology, and fisheries: This is a coastal species that lives on mud or sand bottoms, where it may be readily taken with bottom trawls and set longlines. It feeds on fishes (including *Cepola*) and shrimps (including *Philocheras bidens*).

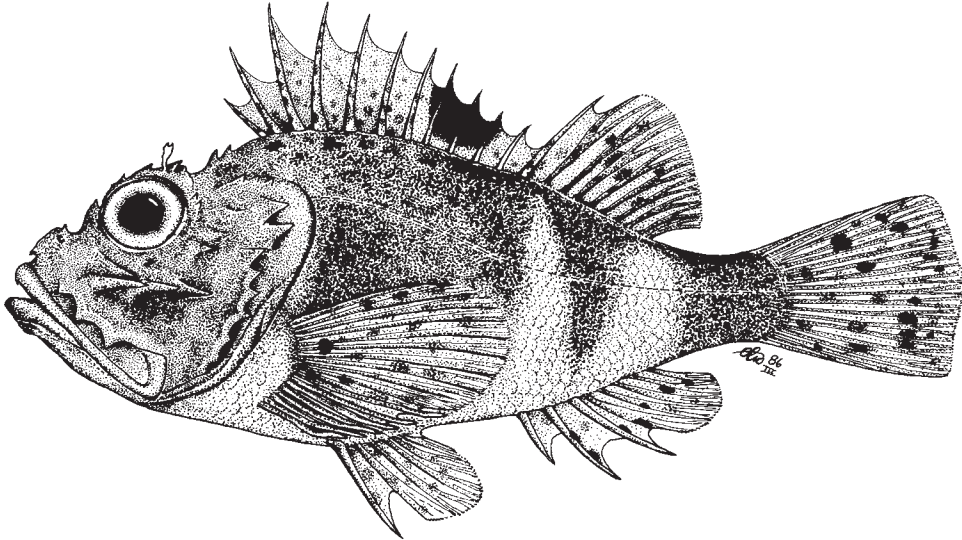
Distribution: This species ranges from Mauritania in the north, southward to Angola at depths of 45 to 300 m. It is most common in the Gulf of Guinea.



***Scorpaena notata* Rafinesque, 1810**

Frequent synonyms / misidentifications: *Scorpaena ustulata* Lowe, 1841; *S. teneriffea*, Jordan and Gunn, 1898; *S. notata afimbria* Slastenenko, 1935 / None.

FAO names: En – Small red scorpionfish; Fr – Rascasse pustuleue; Sp – Escórpora.



Diagnostic characters: Orbit diameter slightly greater than snout length. **Occipital pit present.** Lower jaw without cirri. **Anteriormost lateral-line pores on mandible close together, but not confluent.** Scales ctenoid in 43 to 46 vertical rows counted from immediately behind supracleithral spine to base of caudal fin. **Large scales present before anus (usually about 10, but fewer than 20).** Scales absent over chest and pectoral-fin base. **Colour:** head reddish brown with darker brown blotches. **A prominent black spot on spinous dorsal fin between spines 6 and 11.** Fins mottled, blotched or spotted with brown or dark red. Anal fin with dark bar or marks near middle of fin. Specimens from deeper water more reddish.

Size: This species commonly attains a size of 15 cm standard length and is reported to reach 24 cm total length.

Habitat, biology, and fisheries: This species is common in shallow inshore rocky areas throughout its range. It has been reported on sand, gravel, and rock substrata, where it feeds on crustaceans and small fishes. It spawns from May to June in the Mediterranean Sea. It is frequently seen in small quantities in both artisanal and commercial fisheries that use hooks-and-tackle, handlines, and nets, as well as trawls. It is sold both fresh and refrigerated.

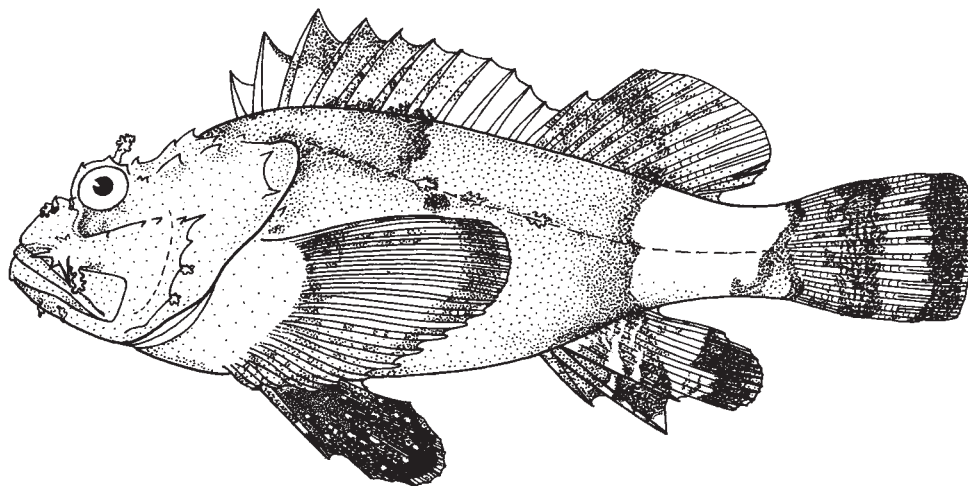
Distribution: This Mediterranean species is found in the northern part of the fishing area and at the Azores eastward to the Levant. Within the area it has been captured at Madeira, the Cape Verde Islands, Morocco, the Canary Islands, and southward to Senegal. Unconfirmed, but questionable, records from Angola exist. It is commonly found along the seashore in shallow water at smaller sizes, but at greater depths with age. Its bathymetric distribution ranges from 15 to 300 m, but is reported to 700 m by Blanc and Hureau (1975). It is commonly seen together with *S. porcus*.



***Scorpaena plumieri* Bloch, 1789**

Frequent synonyms / misidentifications: *Scorpaena bufo* Cuvier, 1829; *S. scrofina* Valenciennes, 1833; *Apistes exul* Gosse, 1851; *Scorpaena rascacio* Poey, 1860; *S. albofasciata* Metzelaar, 1919; *S. nuttingi* Evermann and Seale, 1924; *S. colonensis* Meek and Hildebrand, 1928; *S. ginsburgi* Gunter, 1942; *Holoscorpaena didymogramma* Fowler, 1944 / *Scorpaena brasiliensis*; *S. grandicornis* Cuvier, 1829; *S. agassizii*.

FAO names: En – Pacific spotted scorpionfish; Fr – Crapaud; Sp – Escorpión, Capo chaznete negro.



Diagnostic characters: A spiny headed, robust scorpionfish. Dorsal fin with 12 spines and 9.5 soft rays. Pectoral-fin rays 18 to 21. Lateral-line scales 22-24+1-3=23-25. Head large, 43 to 47% standard length. Interorbit broad, 8 to 10% standard length at its narrowest. **Lacrimal with 3 spines that extend over maxilla, first small; second and third larger.** Suborbital ridge with 3 or 4 spines. **Occipital pit well developed.** Scales cycloid, in about 42 to 47 vertical rows counted from immediately behind supracleithral spine to base of caudal fin. **Pectoral-fin base, cheek, and chest with cycloid scales that are mostly embedded.** **Colour:** predominantly olive-brown in life, with a variously shaped dark brown or black bar running from base of soft-rayed part of dorsal fin ventrally to anal-fin base. **Axil of pectoral fin black, with bright white spots on a black or nearly black background.**

Size: This species attains a size of 43 cm standard length, but is more commonly seen between 15 and 25 cm standard length.

Habitat, biology, and fisheries: Found inshore on rocky bottoms to depths of about 55 m. When alarmed, this species spreads its pectoral fins to reveal the intense spotting on its medial surface. Its venom is potent. The spotted scorpionfish feeds on fishes and invertebrates, primarily crustaceans. Where relatively abundant, it is taken in artisanal fisheries and caught with hook-and-line, traps, and bottom trawls, and marketed fresh. The flesh is white and flaky when cooked.

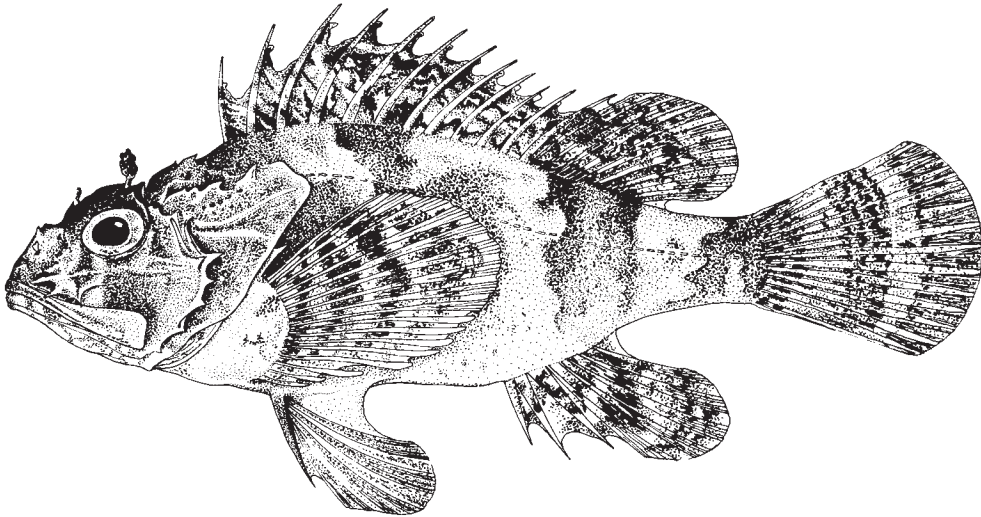
Distribution: Within the fishery area this species is known only from St Helena and Ascension Island. It is otherwise widely distributed in inshore waters of the western central Atlantic. Report of this species from the Azores has been questioned and no materials exist to substantiate its presence there. In the eastern Pacific, it is recognizable as a distinct subspecies, *Scorpaena plumieri mystes*.



***Scorpaena porcus* Linnaeus, 1758**

Frequent synonyms / misidentifications: *Scorpaena massiliensis* (Forsskål, 1775); *S. rascassa* Lacépède, 1801; *S. erythraea* Cuvier, 1829; *S. fasciata* Costa, 1842 / None.

FAO names: **En** – Black scorpionfish (AFS: Smallscaled scorpionfish); **Fr** – Rascasse brune; **Sp** – Rascacio.



Diagnostic characters: Lacrimal with usually 2 spines over maxilla that point at nearly right angle from each other, the second pointing ventrally and slightly anteriorly. Occipital pit well developed. Anteriormost mandibular lateral-line pores widely separated. Scales small, emarginate, without distinct ctenii, in 65 to 70 vertical scale rows counted from immediately behind supracleithral spine to base of caudal fin. Scales absent on chest and pectoral-fin base. Cirri well developed over entire head and body, but no cirri on lower jaw. **Colour:** primarily various shades of brown. Smaller specimens with a faint nearly black spot on spinous dorsal over spines 8 or 9; spot less distinct or absent in larger individuals. Usually 3 well marked dark bars over caudal fin, with one at base, another near middle, and the last over distal end. **Brown spots on lower sides of body and pectoral-fin axil.**

Size: This species has been reported to 25 cm total length, but typically reaches 14 cm standard length.

Habitat, biology, and fisheries: *S. porcus*, the type species of the genus, is predominantly nocturnal. It is common among algae, rocks, and pools of the intertidal and subtidal zones to 30 m. It feeds on crustaceans and other invertebrates and small fishes, including gobies and blennies. It has been reported as prey of the tuna *Thunnus thynnus* and as host of the leech *Trachelobdella lubrica*. In the Mediterranean it breeds from May to August and seasonal changes in metabolism have been reported. Pollution has been reported to affect egg development in the Black Sea.

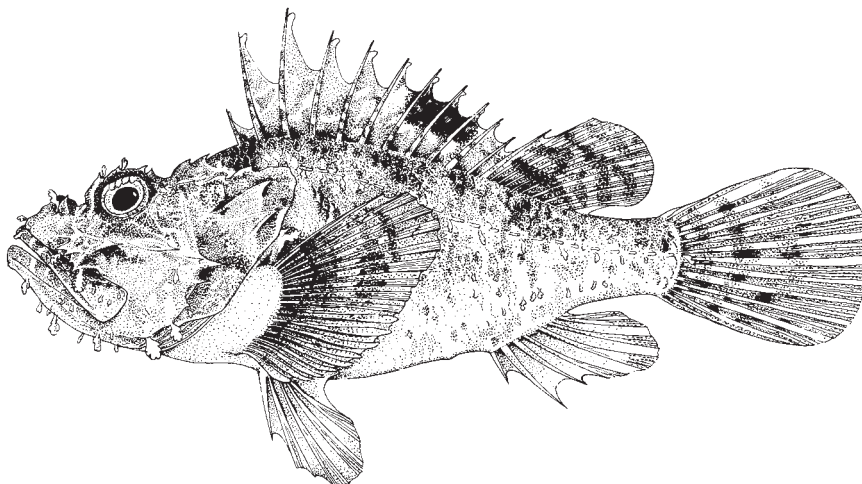
Distribution: This primarily Mediterranean species ranges into the Black Sea and northward along the coasts of Spain and Portugal, the Azores, southern Great Britain, and off Ireland. It has been reported from the Red Sea and the western Indian Ocean, but the provenance of these materials is uncertain. In the fishing area it ranges southward to the Canary Islands and Morocco, but is relatively rare in the southern portion of its range. The vast majority of records denote a shallow bathymetric distribution from the intertidal to about 30 m. However, Hureau and Litvineko (1986) reported it to 800 m.



***Scorpaena scrofa* Linnaeus, 1758**

Frequent synonyms / misidentifications: *Scorpaena barbata* Bonnaterra, 1788; *S. lutea* Risso, 1810; *S. natalensis* Regan, 1906 / None.

FAO names: **En** – Red scorpionfish (AFS: Orange scorpionfish); **Fr** – Rascasse rouge; **Sp** – Cabracho.



Diagnostic characters: Lacrimal with 3 or 4 spines over maxilla in adults (juveniles usually with only 2). Suborbital ridge with 2 to 4 spines, with that on lateral surface of lacrimal often absent. A moderate occipital pit. **Chest and base of pectoral fin without scales. Lateral-line pores behind symphysis of lower jaw separate, but small and difficult to see. Numerous cirri on lower jaw.** Scales on head cycloid and deeply embedded. Scales on body ctenoid in 42 to 48 vertical rows counted from immediately behind supracleithral spine to base of caudal fin. **Colour:** variable, with spots and blotches or mottles. Red, reddish orange, or reddish brown. Distal tips of pelvic fins usually dusky. Smaller specimens with weakly defined saddle-shaped patches along dorsal fin. A black spot sometimes present between spines 6 and 11, but often smaller and sometimes absent.

Size: This is a large species reported to reach 66 cm total length, but adults of 20 to 30 cm total length are far more common.

Habitat, biology, and fisheries: This species has been reported as common on rock, sand, and coral bottoms. It feeds on crustaceans, molluscs, and fishes. *S. scrofa* is host to the leech, *Trachelobdella lubrica*, the copepod, *Strabax monstrosus*, and its erythrocytes are infested by a hematozoan, *Haemogregarina scorpaenae*. Red scorpionfish form a semi-industrial fishery in Sicily and Cyprus and an artisanal fishery elsewhere. Bottom trawls, handlines, traps, and setlines are employed. It frequently appears in markets and is sold fresh or frozen.

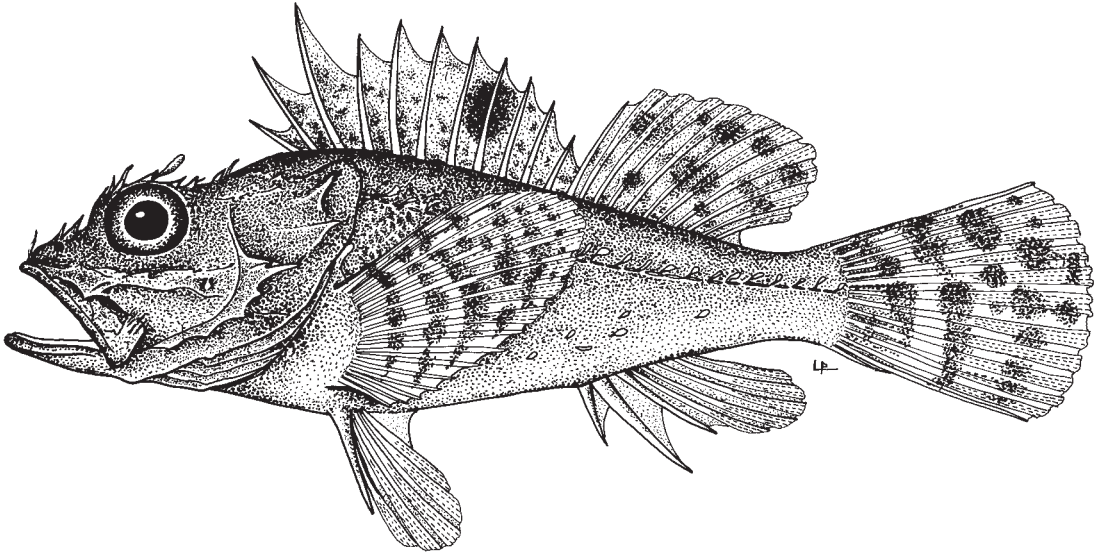
Distribution: This is a common coastal species in the Mediterranean Sea northward into the North Sea. In the fishing area this species ranges from Madeira, Morocco, the Canary Islands, Cape Verde Islands to Senegal from near shore to about 150 m, but has been reported to 500 m. One report from Ghana has been questioned. Representatives of a disjunct population identified as this species have been recorded from Algoa Bay South Africa. This population may be continuous on the coast of East Africa northward to Somalia. One unconfirmed record exists for Elat. Detailed comparisons of Mediterranean, South, and East African populations are needed.



Scorpaena stephanica Cadenat, 1943

Frequent synonyms / misidentifications: *Scorpaena gaillardae*, Roux, 1954 / *Scorpaena scrofa*.

FAO names: **En** – Spotted-fin rockfish; **Fr** – Rascasse à nageoires tachetées; **Sp** – Rascacio aleta manchada.



Diagnostic characters: No tentacles or cirri on lower jaw. Pores on lower jaw immediately behind symphysis; separate. Occipital pit present. Pectoral-fin rays 18 to 20, usually 19. Pectoral-fin base and chest without scales. Scales on belly small, more than 20 rows anterior to anus. Scales ctenoid, in 43 to 48 vertical rows counted from immediately behind supracleithral spine to base of caudal fin. **Colour:** dusky saddles on body below dorsal spines 1 to 3, another below dorsal spines 5 to 9, and another below soft part of dorsal fin that extends below lateral line. Small white streaks or spots sometimes present over pectoral fin, anterior part of caudal fin, and on body well below lateral line. **An irregular black patch between dorsal-fin spines 6 or 7 to 10 or 11.** Irregular dark blotches over ventrolateral surface of gill cover (branchiostegals, subopercle). Caudal, dorsal and pectoral fins with dusky spots; similar spots on anal fin either diffuse or absent.

Size: *Scorpaena stephanica* reaches 40 cm total length.

Habitat, biology, and fisheries: This species appears frequently in trawl fisheries or in bottom set longlines, usually as incidental bycatch. It is known to feed on fishes, but its diet probably also includes invertebrates.

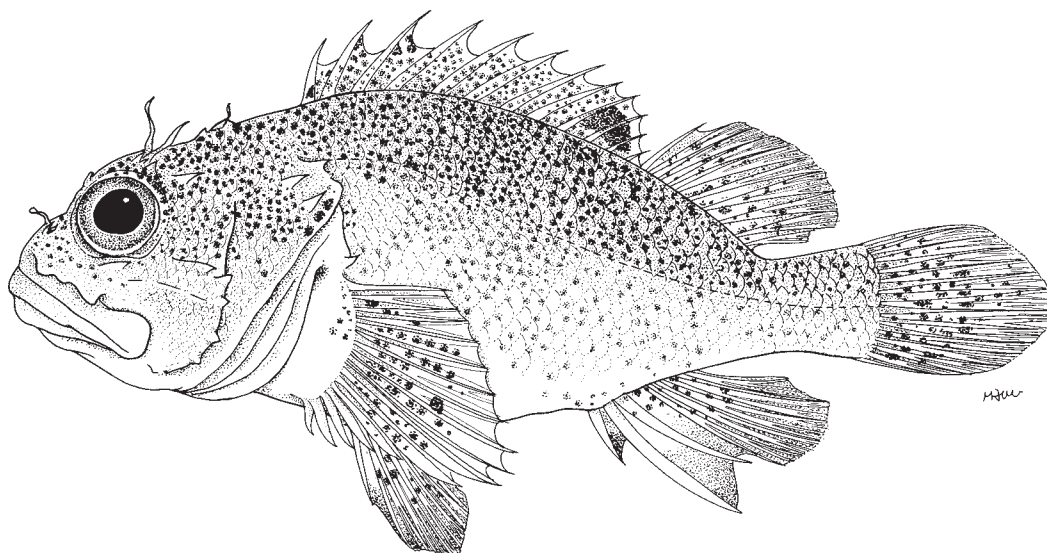
Distribution: Ranges from coastal waters off Mauritania to Angola at depths of 37 to 201 m.



***Scorpaenodes africanus* Pfaff, 1933**

Frequent synonyms / misidentifications: None / None.

FAO names: En – African speckled scorpionfish.



Diagnostic characters: Dorsal rays XIII, 8 to 9.5. Pectoral-fin rays 17 to 19. **Suborbital ridge with 2 spinous points, one below eye and another at posterior end of ridge, but none below ridge. Coronal spines usually absent. Orbit diameter larger than snout length (orbit diameter/standard length: 13 to 16). Body relatively deep, with ratio body depth/standard length: about 0.32 to 0.39.** Scales in about 45 vertical rows counted from immediately behind supracleithral spine to base of caudal fin. **Colour:** all fins with brown spots, not always well defined. **No pronounced spot over subopercle.** No large spots on caudal peduncle.

Size: The largest specimen of this species taken to date measures only 9 cm total length.

Habitat, biology, and fisheries: This species occurs in rocky habitats, but precise depths of capture remain unavailable.

Distribution: *Scorpaenodes africanus* is known from Senegal and Annobon Island. Unconfirmed records indicate that it exists more or less continuously in between and as far south as northern Angola.

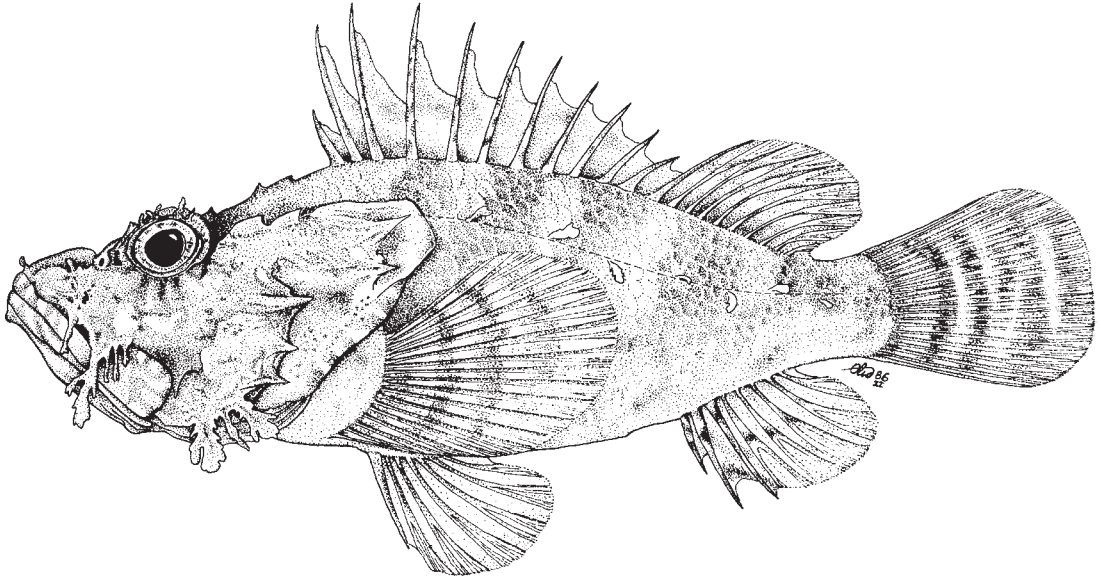
Remarks: This species should not be confused with *Hypomacrus africanus* Smith (1958), which by generic synonymy of Eschmeyer (1969), becomes a homonym. The latter species is a synonym of *Scorpaenodes albaiensis* (Evermann and Seale, 1907).



Scorpaenodes elongatus Cadenat, 1950

Frequent synonyms / misidentifications: None / None.

FAO names: En – African spotted scorpionfish.



Diagnostic characters: Dorsal rays XIII-XIV, 9.5 to 10. 5. Pectoral rays 18 or 19. Suborbital ridge with 4 spines and 1 or 2 additional spines below suborbital ridge. Interorbital spines present. Coronal spines present or absent. Orbit diameter slightly less than that of snout (orbit diameter to snout length: about 0.9; orbit diameter/standard length: about 0.11). **Head and body relatively elongate, with ratio body depth/standard length: about 0.30. Scales, cycloid, in 45 to 50 vertical rows counted from immediately behind supracleithral spine to base of caudal fin. Colour:** brown blotches and spots on a pale background. Soft-rayed part of dorsal fin, and caudal, anal, and pectoral fins with brown spots, but no conspicuous dark black spot at rear of spinous part of dorsal fin. **A pronounced spot over subopercle.** Two large, but irregular spots at rear of caudal peduncle and base of caudal fin.

Size: This species reaches 15 cm total length.

Habitat, biology, and fisheries: This species evidently occurs on rocky bottoms, but otherwise little else about it is known. It is not to be confused with *Scorpaena elongata*.

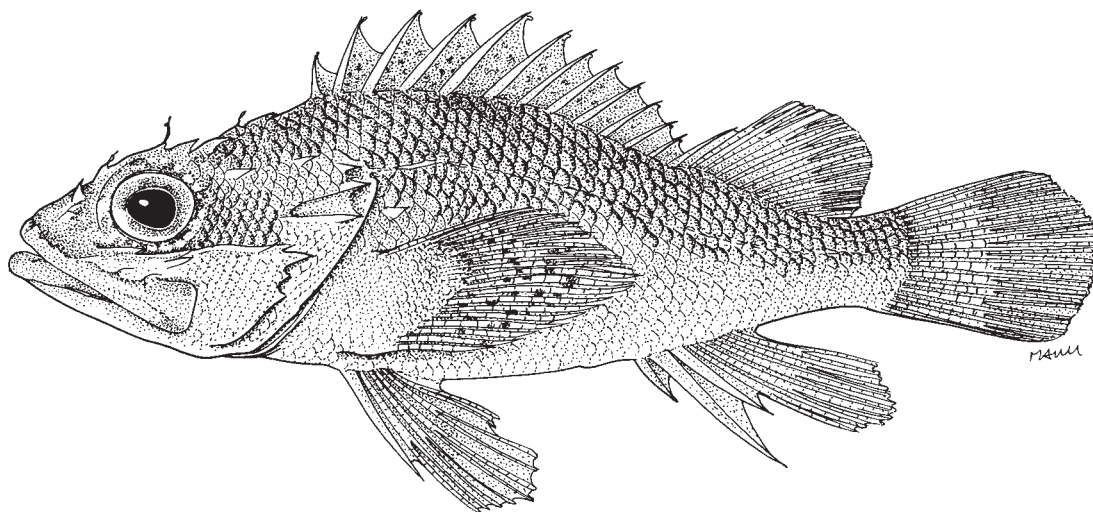
Distribution: The range of this species is restricted to coastal waters off Senegal.



***Scorpaenodes insularis* Eschmeyer, 1971**

Frequent synonyms / misidentifications: None / None.

FAO names: En – Insular scorpionfish.



Diagnostic characters: Three spines on the suborbital ridge, with a single spine below the main ridge. Coronal spine sometimes present. Spine on supracleithral bone. Three preopercular spines, those in position of fourth and fifth absent. Dorsal rays XIII, 10.5. Pectoral-fin rays 18 or 19. Scales weakly ctenoid in about 47 vertical rows counted from immediately behind supracleithral spine to base of caudal fin. Chest and pectoral-fin base scaled. Lateral-line scales 25. **Colour:** head dusky, body with brown patches and spots on an otherwise pale background. Dorsal and pectoral fins with faint brown spots.

Size: Like most species of *Scorpaenodes* this is a small species, so far known only from the 5.47 cm standard length holotype.

Habitat, biology, and fisheries: There are no reports regarding the biology of this species.

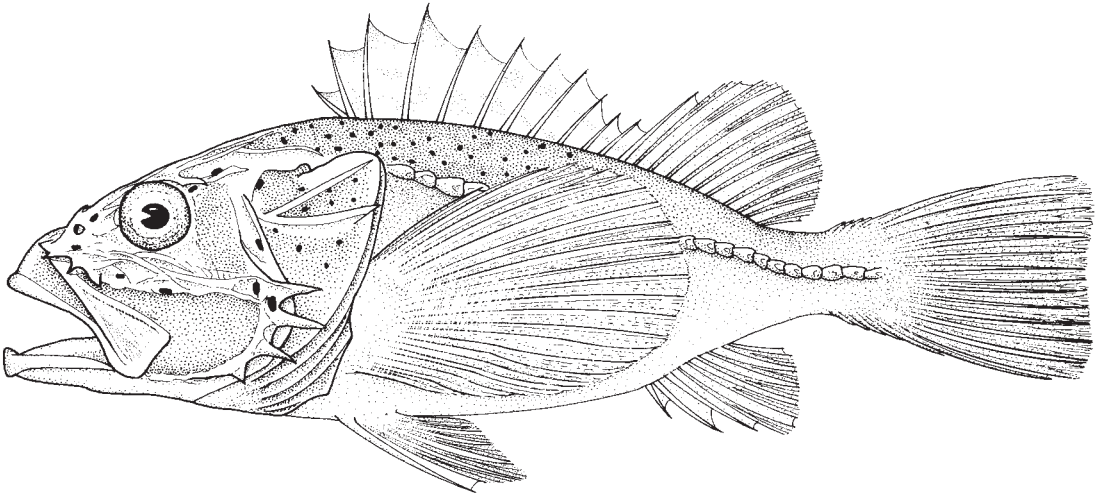
Distribution: The holotype was taken on a wreck in James Bay at St Helena Island; other records from Ascension Island and St Paul's Rocks.



***Setarches guentheri* Johnson, 1862**

Frequent synonyms / misidentifications: None / None.

FAO names: En – Channeled rockfish; Fr – Rascasse serran; Sp – Rascasio serrano.



Diagnostic characters: Three lacrimal (preorbital) spines, the first as long as posterior 2. Pectoral-fin rays 20 to 25. Interorbital width 7 to 9% standard length. Top of head without scales. Second preopercular spine subequal to or longer than first and third. Lateral line forming a continuous thinly-covered trough. No postorbital bone.

Size: Maximum standard length to about 25 cm, but usually less than 12.5 cm.

Habitat, biology, and fisheries: Although it occurs in large numbers at some localities, no commercial fishery exists for this deep-dwelling scorpionfish. It is taken most commonly at about 400 m, with bottom trawls and bottom-set longlines. Although probably primarily benthic, it feeds mostly on pelagic invertebrates (*Oplophorus*). Wounds from this species can be extremely painful.

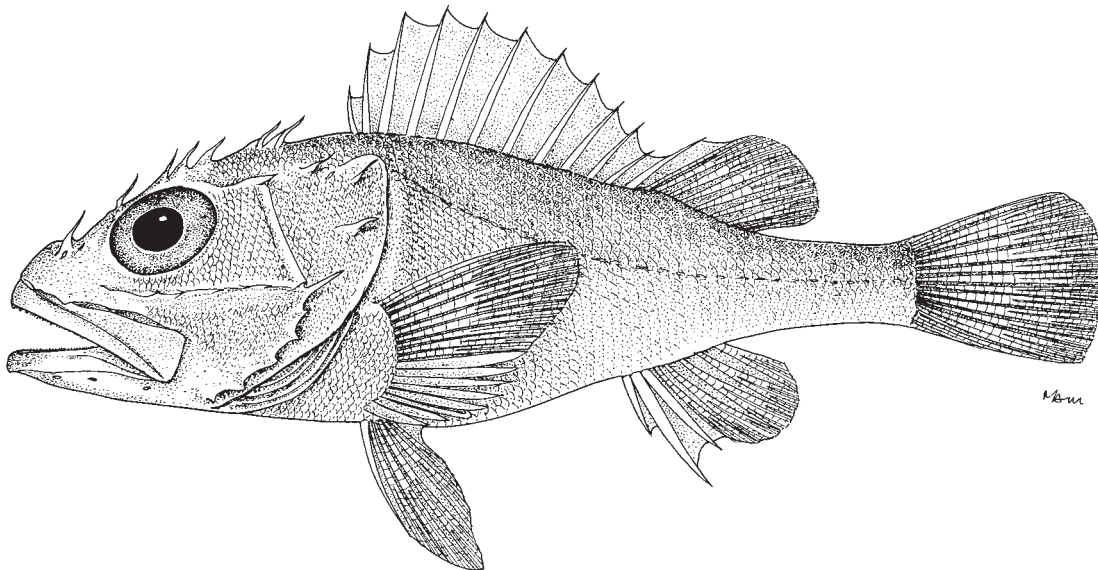
Distribution: The channeled rockfish is the most widely-ranging scorpionfish. It is found worldwide on continental slopes in tropical and warm temperate seas, as well as at insular localities at depths of 150 to 685 m. In the fishing area it has been reported from Morocco, Madeira, and the Canary Islands and from Senegal and the Cape Verde Islands to Angola. Its range in the fishing area will likely expand with additional collecting in deeper waters.



***Trachyscorpia cristulata echinata* (Köhler, 1896)**

Frequent synonyms / misidentifications: None / *Pontinus kuhlii*.

FAO names: En – Spiny scorpionfish; Fr – Racasse épineuse; Sp – Rascacio espinoso.



Diagnostic characters: Dorsal rays XII, 8.5 to 9.5. Head with numerous relatively elongate spines. A large number of small spines or spinules along suborbital ridge. Orbit large, longer than snout. Uppermost pectoral-fin rays longest (Fig. 5), with 20 to 23 fin rays. Scales ctenoid, in 60 to 65 vertical rows from immediately behind supracleithral spine to base of caudal fin. Scales also present on cheek, maxilla, base of pectoral fin, and chest. **Colour:** dorsum dusky as are fins. Hureau and Litvinenko (1986) report sexual dichromatism, with a dusky area on the spinous dorsal fin between spines 5 and 11 as black in males and brown in females.

Size: The largest reported specimen of *Trachyscorpia cristulata echinata* is 50 cm standard length, but most collected are less than 30 cm standard length.

Habitat, biology, and fisheries: This deep water species is trawled from over mud, sand bottoms of the continental slope. Little else is known of its biology.

Distribution: This species ranges from Ireland in the North Atlantic southward to Mauritania and Senegal at depths of 140 to 2 230 m. Its range extends into the Mediterranean Sea to the Balearic Islands and the coast of Algeria. The subspecies *T. c. cristulata* occurs in the Western Atlantic. Specimens from Peru and Australia/New Zealand probably represent 1 or 2 distinct species or subspecies.



PLATYCEPHALIDAE

Flatheads

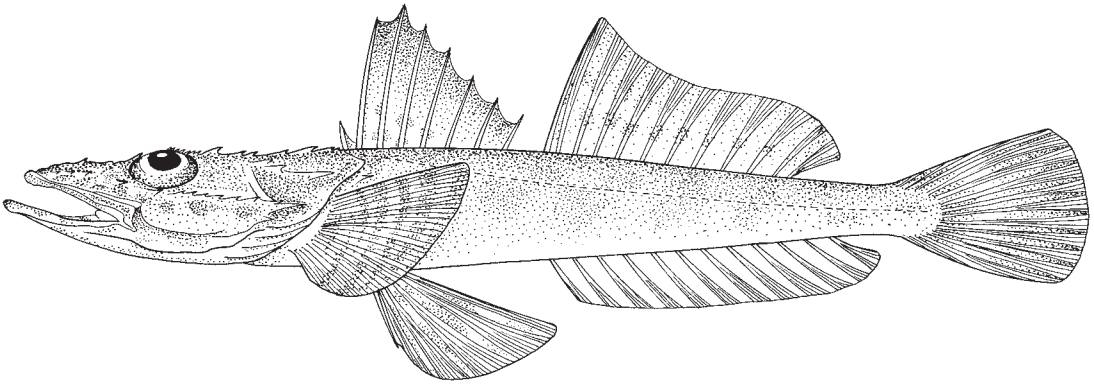
by L.W. Knapp, National Museum of Natural History, Smithsonian Institution, Washington DC, USA

A single species occurring in the area.

Solitas gruveli (Pellegrin, 1905)

Frequent synonyms / misidentifications: *Platycephalus gruveli* Pellegrin, 1905; *Grammoplites gruveli* Knapp, 1990; *Solitas gruveli* Imamura, 1996 / None.

FAO names: En – Guinea flathead; Fr – Platycephale de Guinée; Sp – Chato de Guinea.



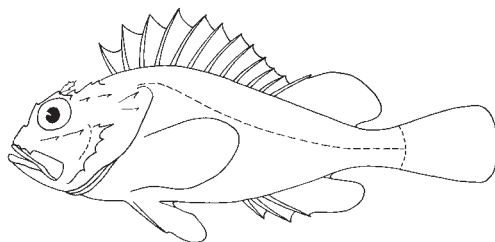
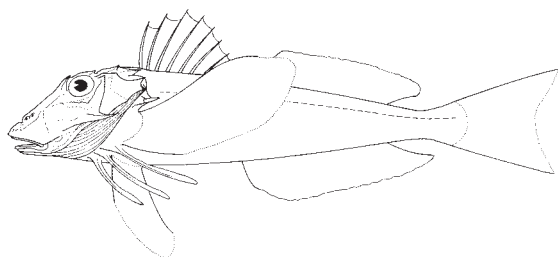
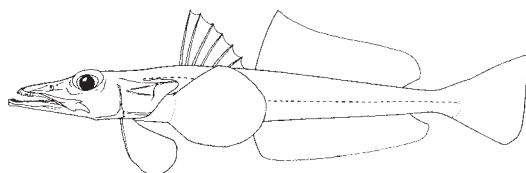
Diagnostic characters: Body elongate with head moderately depressed. Top of head with spines and bony ridges. Sensory tubules on cheek well developed. Preopercular spines 3; upper longest, not reaching opercular margin, with a stout accessory spine on base. Mouth large, lower jaw longer than upper. Jaws and roof of mouth (vomer and palatines) bearing small canine-like teeth. Supraorbital ridge smooth anteriorly, with about 4 to 7 serrations posteriorly. Preocular spine single. **Suborbital ridge bearing 1 spine in front of eye, 1 spine under mideye, and 3 to 7 spines behind eye. Two dorsal fins, well separated; spinous dorsal fin with 8 or 9 spines, first spine short and scarcely connected to the second.** Soft dorsal and anal fin usually with 12 rays. Pectoral-fin rays 20 to 22. Pelvic fins thoracic in position, **set far apart on sides of body**, with 1 spine and 5 soft rays. Lateral-line scales 51 or 52, **each with a backward-directed spine that extends beyond rear margin of scale.** Iris lappet **slightly bilobed.** Interopercular flap absent. Gill rakers short, **total on first arch 8 or 9.** Lateral-line scale pores with 2 openings to the exterior. Vertebrae 27. **Colour:** in life, olive-brown above, pinkish below. Spinous dorsal fin with a dark marginal band; rays of pectorals and soft dorsal fin with brown spots; pelvic fins with a median dark band; anal fin pale; caudal fin with a broad dark band at base and several narrow dark bands or mostly dusky on posterior half.

Similar families occurring in the area

Scorpaenidae: dorsal fin continuous and pelvic fins set closer together.

Triglidae: lower 3 pectoral-fin rays free from each other.

Percophidae: no spines on head or on lateral-line scales; lateral line low on body and behind pectoral fin.

**Scorpaenidae****Triglidae****Percophidae**

Size: Maximum to about 20 cm; common to 18 cm.

Habitat, biology, and fisheries: Inhabits soft bottoms of the continental shelf from 20 to 200 m depth. Feeds on crustaceans and small fishes. Relatively common throughout its range but of little commercial value. Separate statistics are not reported for this species. Caught primarily with bottom trawls. Marketed fresh and salted in limited quantities; also reduced to fishmeal (offshore fleets).

Distribution: Atlantic coast of Africa from Mauritania to Angola. The monotypic genus contains the only species of this Indo-Pacific family to be found in the Atlantic.

**References**

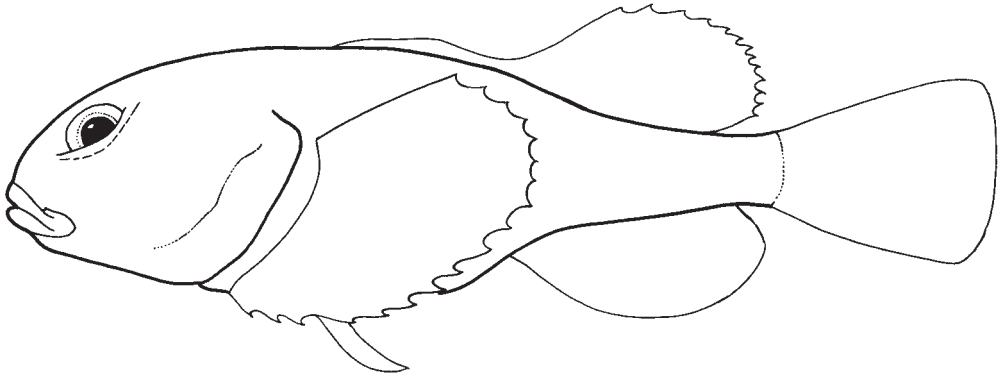
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PSYCHROLUTIDAE

Fathead sculpins

by J.S. Nelson (+), University of Alberta, Edmonton, Alberta, Canada

Diagnostic characters: Small to moderate fishes (to about 65 cm standard length, most under 35 cm); **body** moderately elongate, **tadpole-shaped**, stout and robust in cross-section behind head, tapering and compressed posteriorly. Head very large, smooth or with protruding spines or knobs on top and on preoperculum, cirri sometimes present. Interorbital space wide, only slightly less than to greater than exposed eye diameter. Eye large. Mouth large, terminal or nearly so. Teeth conical, generally reduced; premaxillae and dentary with several rows, prevomer with or without teeth; palatine without teeth. Branchiostegal rays 7. Gill rakers short spiny knobs. Dorsal fin continuous in species in area. Dorsal fin with 6 to 12 slender weak spines and 12 to 21 soft rays; anal fin with 9 to 17 rays; caudal fin rounded to truncate; **pelvic fins (thoracic, closely spaced, small, and slender) with 1 spine and 3 soft rays**; pectoral fins with 15 to 26 (usually 19 to 26) rays. **Skin loose in most species, covering the dorsal and anal fins in most species** making it difficult to count rays. **Body naked or variously with bony plates or prickles (cirri may be present or absent). Lateral line on trunk reduced, with 20 or fewer small pores. Bone covering cranial sensory canals in interorbital and suborbital areas reduced to well-developed but relatively narrow bony arches.** Postorbital bones 1 or 2. Vertebrae about 28 to 38. **Colour:** uniformly brown to grey or with irregular markings or spotted pattern of black, grey, brown, or white.



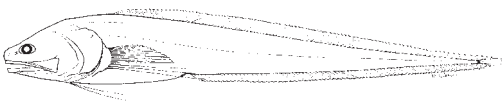
Habitat, biology, and fisheries: Mostly benthic, from inshore shallow water to depths of 2 800 m. Occurring primarily in cool waters of North Pacific and North Atlantic and scattered parts of Southern Hemisphere (e.g. off South America, South Africa, Australia, and New Zealand). Little is known of their biology, some have been found with gastropods in stomach. Trawled incidentally, of no commercial value.

Remarks: Fathead sculpins are poorly represented in the area. In addition to the following 3 species, *Cottunculus spinosus* Gilchrist, 1906, of uncertain status, and *Psychrolutes macrocephalus* (Gilchrist, 1904) are known from off South Africa.

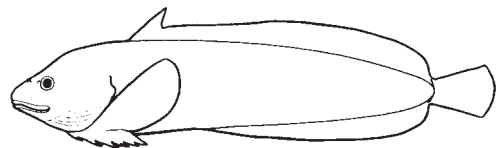
Similar families occurring in the area

Aphyonidae, Batrachoididae, Bythitidae and Ophidiidae: distinguished from Psychrolutidae in having pelvic fins in front of pectoral fins.

Liparidae: distinguished from Psychrolutidae in having pelvic fins modified into a sucking disc or in lacking these fins.



Ophidiidae



Liparidae

Key to the species of Psychrolutidae occurring in the area

- 1a.** Top of head with robust spines; total interorbital width distinctly less than 2 times diameter of exposed eye; vomerine teeth present in adults ***Cottunculus thomsonii***
- 1b.** Top of head smooth, soft, and without spines; total interorbital width more than 2 times diameter of exposed eye; vomerine teeth present or absent → **2**
- 2a.** Vomerine teeth present; pectoral rays 22 to 24 ***Ebinania costaecanariae***
- 2b.** Vomerine teeth absent; pectoral rays 19 to 22 ***Psychrolutes inermis***

List of species occurring in the area

Cottunculus thomsonii (Günther, 1882). To at least 36 cm standard length. North Atlantic Ocean, eastern side probably from Iceland and northern Scotland to Mauritania and Guinea-Bissau, and western side from Newfoundland and Davis Strait to South Carolina; depth 100 to 1 600 m.

Ebinania costaecanariae (Cervigón, 1961). To 39 cm total length. Off west Africa from Mauritania, Guinea-Bissau, Gabon, to northwestern South Africa, off northern coast of Spain; depth 318 to 921 m.

Psychrolutes inermis (Vaillant, 1888). To at least 36 cm standard length. Off Mauritania, Gabon, western South Africa, Mozambique Channel; depth about 930 to 1 550 m.

References

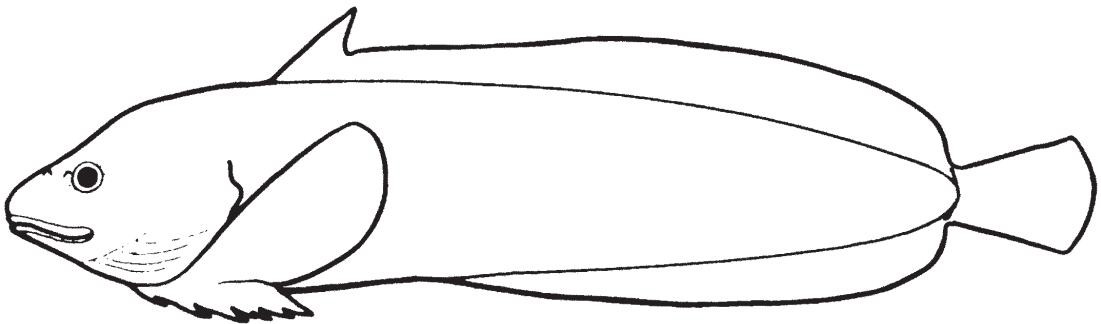
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LIPARIDAE

Snailfishes

by D.L. Stein, Department of Fisheries and Wildlife, Oregon State University, Corvallis, OR, USA

Diagnostic characters: Small to medium-sized fishes (to about 80 cm, but dwarf species are known, having adult females about 2 cm in length). Characterized by a **tadpole-like appearance**, elongate soft body. Head rounded, eye generally small, snout short. **One nostril on each side of head, often tubular, easily mistaken for a sensory pore. Third suborbital bone prolonged as a rod (the suborbital stay) reaching the posterior margin of the preopercle.** Mouth small to moderately large, teeth usually small, simple, arranged variously: many oblique rows forming bands, uniserial, biserial, or triserial. Cephalic sensory canals and pores very well developed, often prominent; lateral-line canal and pores absent; in many species, lateral line represented by naked neuromasts (visible as small well-spaced dots); these may also be scattered over body. Branchiostegal rays 6. Gill opening mostly or completely above pectoral fin upper ray, opercular flap soft, not bearing spines. Dorsal and anal fins single, confluent or almost confluent with weakly developed caudal fin; **pectoral fins frequently divided by a deep notch, lower rays extended, often filamentous. Pelvic fins absent, but may appear to be present as lower lobe of pectoral fin** (in the majority of species, pelvic fins are modified to form a ventral sucking disc evolved from the pelvic fins; this may be reduced or lost in deep-sea and pelagic forms as in the eastern central Atlantic species). **Scales absent; skin soft and frequently separated from the body by a layer of gelatinous tissue** that may have a buoyancy function; a swimbladder is absent. Vertebrae always more than 30. **Colour:** colour in life unknown for species in region; deep-water species usually black or brown, but may be pink or reddish. Snout, fin margins, and caudal fin often darker than body.



Habitat, biology, and fisheries: Snailfishes are a large and morphologically diverse family of marine fishes having a worldwide distribution, including at least 400 species in about 30 currently recognized genera. Many taxa are uncommon or rare, and new species are frequently described. Especially abundant and diverse in cold temperate and polar waters of both hemispheres, but also tropical and subtropical at depths below 500 m; representatives known from intertidal and estuarine environments to 8 000 m. In the eastern central Atlantic, in deep cold waters below 500 m. Many more species will probably be described from poorly sampled regions, especially the deep sea. Most snailfishes are benthic or benthopelagic, but there are at least 5 pelagic genera including 30 or more species. Food consists usually of small benthic organisms, such as crustaceans and annelids, but several deep-sea genera are predators on nekton. All species are apparently oviparous, but it would not be surprising to discover ovoviviparous species, considering the low to very low fecundity (as few as 6 ripe eggs at one time in 1 species). Eggs are correspondingly large (to almost 10 mm diameter); some species lay their eggs in the gill cavities of spider crabs, scallops, and possibly other invertebrates. Parental care seems likely but has not been demonstrated. Some shallow-water species have planktonic larvae, but deep-water species probably have direct development (eggs hatch as juveniles rather than as larvae) with no planktonic stage, a characteristic likely to have influenced the high diversity and endemism demonstrated by the family. Liparids have no commercial value or use.

Remarks: Because liparids are soft-bodied and scaleless, they are easily damaged, often making identification more difficult or impossible; even specimens in perfect condition can be extremely difficult to identify. Characters of particular importance include fin-ray and vertebral counts, length of head and fin rays, body depth and other measurements relative to standard length or head length. Other important characters or character suites include teeth (shape, number, and arrangement in the jaws), pyloric caeca (number, colour, and shape); gill opening (length and position); cephalic sensory canal system (number, size, position, and presence or absence of pores); and pectoral-fin rays (number, spacing, lengths, and development). Characteristics of the pectoral girdle are particularly useful and important (number and shape of radials, shape of scapula and coracoid, and presence or absence of foramina), but examination of these requires dissection, clearing, and staining to show bone or cartilage.

Similar families occurring in the area

Ophidiidae: have scales (although they may be modified or imbricated) and are often (but not always) distinguished by the presence of pelvic fins, and (in some species) opercular spines.

Parabrotulidae: lack pelvic fins but also lack cephalic sensory pores; dorsal-fin origin far posterior (at least 22 vertebrae anterior to its origin).

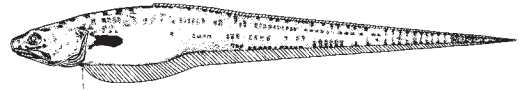


Ophidiidae



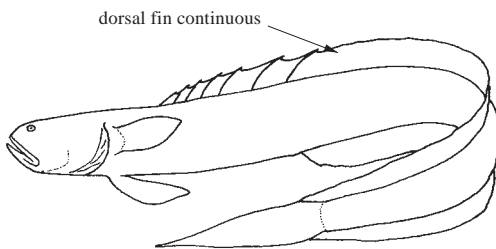
Parabrotulidae

Carapidae: more elongate; anal-fin origin anterior to that of the dorsal fin; swimbladder present.

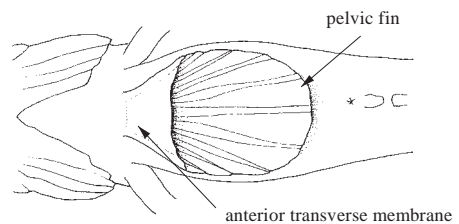


Carapidae

Gobiidae: some of which have a continuous dorsal fin but have branched dorsal-fin rays; either pelvic fins joined by a membrane at the base or a ventral sucking disc clearly composed of fin rays and membranes rather than disc-like (liparids known from the eastern central Atlantic lack discs and pelvic fins).



Gobiidae



underside of body before anus

Zoarcidae: some of which appear similar and lack pelvic fins, but have the caudal fin completely confluent with the dorsal and anal fins; usually much more elongate.




Zoarcidae


All of the above families lack the liparids' suborbital stay and loose skin separated from the body by a gelatinous or watery layer.


Key to the species of Liparidae occurring in the area


- 1a. Ventral sucking disc absent → 2
- 1b. Ventral sucking disc present ***Careproctus albescens***
- 2a. Mouth oblique, teeth in many oblique rows; skin yellowish brown; anus just behind gill opening; maximum body depth about 14% standard length; upper pectoral-fin ray at or above rear of mouth, upper lobe appears unconnected to lower lobe, intermediate rays absent or rudimentary; pectoral radials 2+0+1 (3); caudal-fin rays unknown ***Paraliparis edwardsi***
- 2b. Mouth horizontal, teeth uniserial; colour blackish grey; anus almost directly below gill opening; maximum body depth 17 to 22% standard length; upper pectoral-fin ray on horizontal with lower margin of orbit; fin deeply notched, notch rays short, not rudimentary; anteriormost pectoral-fin ray distinctly behind rear of maxilla; pectoral radials 2+1+1 (4); caudal-fin rays 8 ***Paraliparis copei wilsoni***

List of species occurring in the area

The symbol  is given when species accounts are included.

 *Careproctus albescens* Barnard, 1927. Maximum length to 206 mm SL. Known from 20°31'S to 34°21'S (Angola to Cape Point, western South Africa) at depths between 610–1 463 m; but almost all published records are from 24° to 27°S.

 *Paraliparis copei wilsoni* Richards, 1966.

 *Paraliparis edwardsi* (Vaillant, 1888).

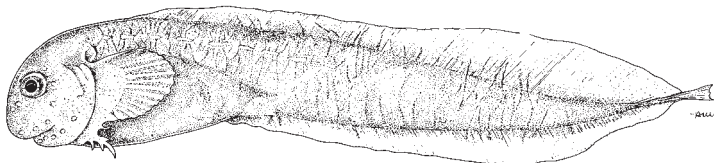
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***Paraliparis copei wilsoni* Richards, 1966**

En – Wilson's paraliparis.

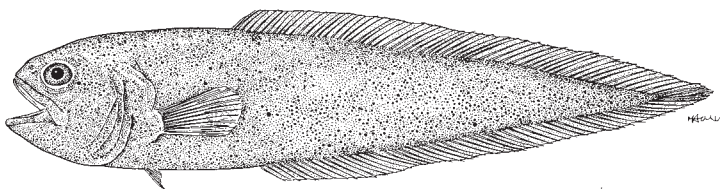
Moderately large snailfish (to about 30 cm) found on the middle to deep continental slope in the Gulf of Guinea (Gabon), off west and southwest Africa, near Meteor Seamount, and along the Walvis Ridge at depths from 885 to 1 850 m. Nothing is known about its life history. The most frequently collected member of the family in the region. Eastern South Atlantic (off Gabon, west Africa, 4°08'S, 10°08'E to 35°03'S, 24°04'E).



***Paraliparis edwardsi* (Vaillant, 1888)**

En – Edwards' paraliparis.

Small snailfish, reaching at least 8.2 cm standard length. Collected only once (the holotype), and in poor condition. The original description and subsequent additions to it are incomplete owing to the damaged specimen. Nothing is known about its biology. Known from one specimen from off Morocco at 1 319 m.



PERISTEDIIDAE

Armoured searobins

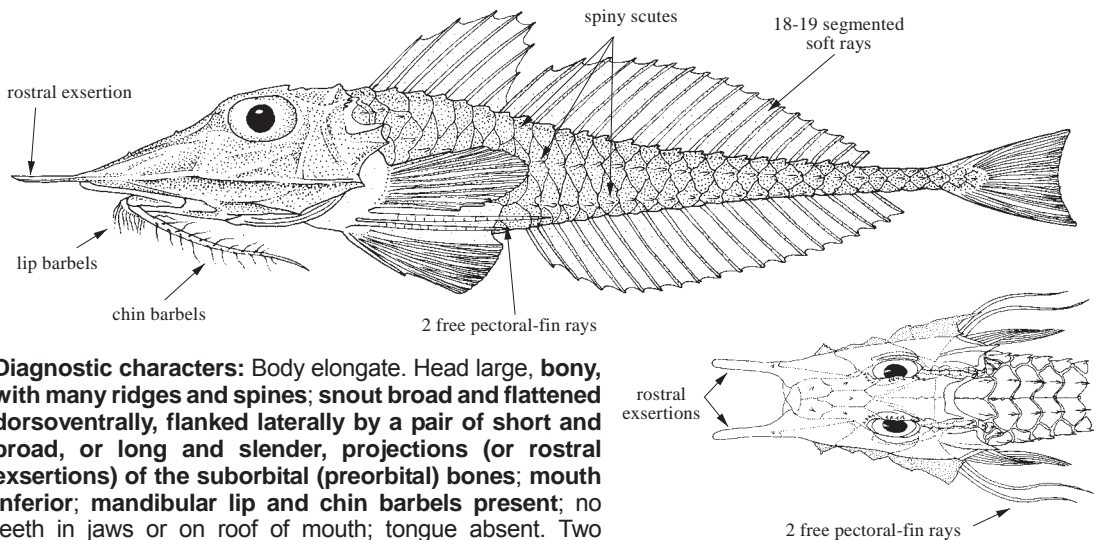
by W.J. Richards, National Marine Fisheries Service, Miami, FL and G.C. Miller, Kingsland, GA, USA

A single species occurring in the area.

Peristedion cataphractum (Linnaeus, 1758)

Frequent synonyms / misidentifications: None / None.

FAO names: En – African armoured searobin; Fr – Malarmat africain; Sp – Malarmado africano.

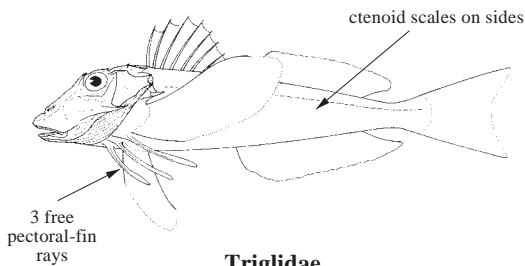


Diagnostic characters: Body elongate. Head large, **bony, with many ridges and spines; snout broad and flattened dorsoventrally, flanked laterally by a pair of short and broad, or long and slender, projections (or rostral exsertions) of the suborbital (preorbital) bones; mouth inferior; mandibular lip and chin barbels present; no teeth in jaws or on roof of mouth; tongue absent.** Two separate dorsal fins, the first with 7 spines and the second 18 or 19 segmented soft rays; **pectoral fins with the 2 lowermost rays detached from the other fin rays.** **Body without scales but enclosed by 4 rows of spinous scutes on each side.** Swimbladder single-lobed. **Colour:** red above, pale below.

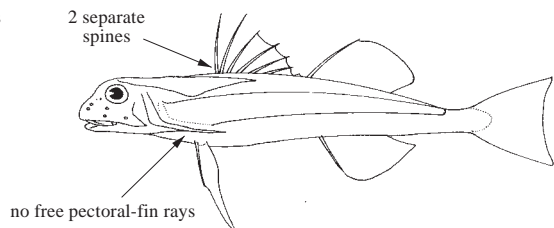
Similar families occurring in the area

Triglidae: head bony but body covered with many rows of ctenoid scales, but not bony scutes; 3 free lower pectoral-fin rays, not 2.

Dactylopteridae: head bony but body covered with many rows of ctenoid scales, but not bony scutes; head blunt with no projecting spines; lower pectoral-fin rays not divided to base; anterior 2 dorsal-fin spines separate from remainder of fin.



Triglidae



Dactylopteridae

Size: Maximum to about 25 cm; common to 20 cm.

Habitat, biology, and fisheries: Inhabits mud and rock bottoms, from 50 to 500 m depth. Continental shelf and upper slope throughout its range. Rather abundant in some localities. Separate statistics are not reported for this species. Taken in bottom trawls. Mainly used for fishmeal by offshore trawlers.

Distribution: Southernmost tip of British Isles to Angola, including the Mediterranean Sea.

Remarks: W.J. Richards and G.C. Miller are investigating whether or not the Gulf of Guinea population represents a separate species *Peristedion macronema* as proposed by Cadenat (1951). Miller and Richards (1990) regarded it as a synonym of *P. cataphractum*, but have yet to revisit the question.



References

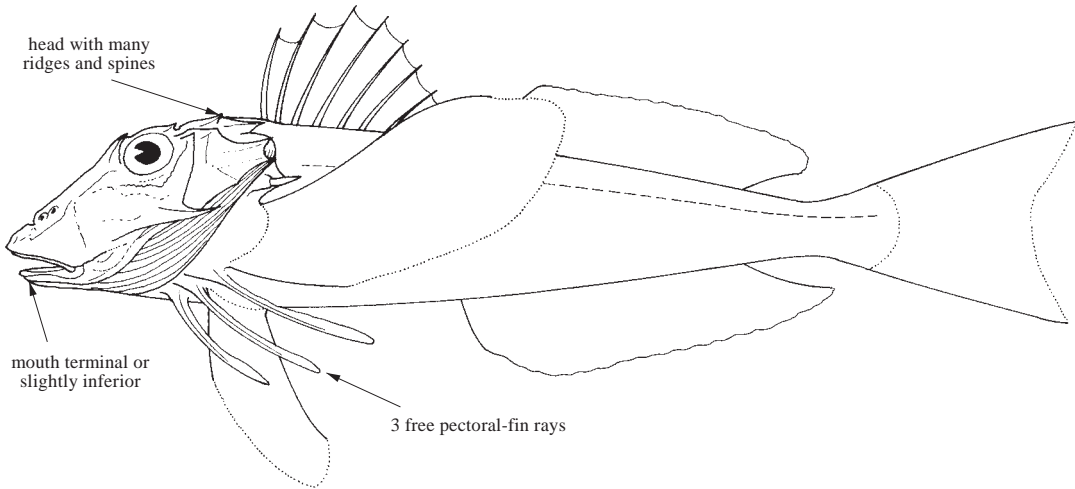
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TRIGLIDAE

Gurnards

by W.J. Richards, National Marine Fisheries Service, Miami, FL, USA

Diagnostic characters: Body elongate. Head large, bony, with many ridges and spines but **without barbels**; bony spines projecting forward on snout in some species; **mouth terminal to slightly inferior**, villiform teeth present in both jaws. Two separate dorsal fins, the first with 8 to 11 spines, the second with 13 to 19 segmented soft rays; anal fin with 13 to 19 segmented soft rays; pectoral fins short to long, **with the 3 lowermost rays free, detached from the remaining fin rays**. **Body with scales and with sharp spines or scutes along bases of dorsal fins**. Bony scutes are lacking elsewhere, but some species have enlarged, scute-like lateral-line scales. Swimbladder bilobed in most species. **Colour:** variable, but predominantly red with some grey or dusky, belly usually pale; first dorsal fin often with a black spot or blotch; pectoral fins usually with some distinctive markings, often a patch of vibrant blues with black or white spots.



Habitat, biology, and fisheries: Gurnards are small to medium-sized benthic fishes (to about 45 cm in total length) inhabiting the continental and insular shelves of tropical and warm temperate seas usually to depths of 200 m, rarely deeper to 700 m. They occur on sandy or muddy substrates, rubble or reef-type bottom, using the free rays of their pectoral fins for support and for search of food. Although most species are not the object of a special fishery, they often enter bottom-trawl catches, sometimes in rather large quantities. The majority of the species are not considered desirable as foodfish, but some of the larger ones are used as food. Their flesh is tasty and firm.

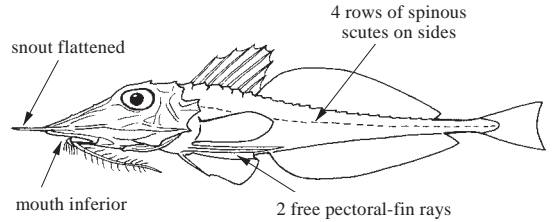
Remarks: *Trigla macrodactylus* Günther, 1889 is based on a small juvenile (11.4 mm standard length) collected off Sierra Leone by the 'H.M.S.Challenger'. The type specimen is in the British Natural History Museum (cat. No. 1889.7.20.63) and based on meristic characters it could be either *Chelidonichthys gabonensis*, *Lepidotrigla cadmani* or *L. carolae*. The specimen is in poor condition. It is unlikely that the adult form is unknown considering the extensive collecting in the Gulf of Guinea. Günther recorded 13 anal rays and the same number are shown on the illustration, but I counted 14 in my examination of the type. Radiographs fail to reveal any differentiation of vertebral numbers, but there are 32 myomeres. The unusual feature is the elongate second upper pectoral ray. Young *Peristedion* have elongate pectoral rays, but this specimen clearly has 3 free pectoral rays rather than 2, though young *Peristedion* do not have the free rays separated at this size. Young stages are known for a few eastern Atlantic species, but this species will remain an enigma until early life stages can be determined for Gulf of Guinea species or some other character or method can be found.

Similar families occurring in the area

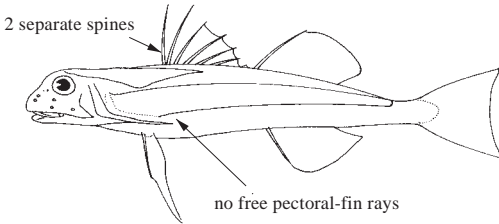
Peristediidae: mouth inferior, teeth absent; mandibular, lip and chin barbels always present; only the 2 lowermost rays of pectoral fins free (the 3 lowermost rays free in Triglidae); body scaleless but covered by rows of bony scutes on each side.

Dactylopteridae: anterior 2 dorsal-fin spines separated from remainder of fin; body covered with scales; pectoral fins without free rays.

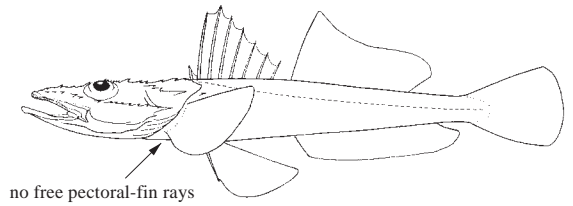
Platycephalidae: lower 3 pectoral-fin rays not free from each other.



Peristediidae



Dactylopteridae



Platycephalidae

Key to the genera and selected species of Triglidae occurring in the area

- 1a. Swimbladder thin-walled with extrinsic muscle bands extending laterally on each side, cleithral spine very long and strong (greater than 15% standard length) ***Trigla tyra***
- 1b. Swimbladder with thick strong walls and with intrinsic muscle bands extending laterally along each side, cleithral spine short and weak (less than 12% standard length) → 2

- 2a. Head with a deep occipital groove (fissure posterodorsal of eye); body scales large, usually less than 60 along lateral line ***Lepidotrigla***
- 2b. Head lacking occipital groove; body scales small, usually more than 60 on lateral line ***Chelidonichthys***

Key to the (former or current) species of *Chelidonichthys* occurring in the area

- 1a. Lateral-line canal with extensive branches extending transversely over sides of the body ***Chelidonichthys lastoviza***
- 1b. Lateral-line canal normal, no extensive branches → 2

- 2a. Lateral-line scales with spinate median keels or transversely expanded → 3
- 2b. Lateral-line scales normal without spinate median keels or transverse expansions → 4

- 3a. Lateral-line scales with spinate median keel ***Eutrigla gurnardus***
- 3b. Lateral-line scales expanded into transverse plates without median spines → 7

- 4a. Breast and belly scaled, approximately 8 to 12 scale rows above lateral line, body scales not embedded and slightly deciduous → 5
- 4b. Breast naked, belly partially scaled (about 60%), approximately 15 scale rows above lateral line, body scales embedded and firmly attached → 6

- 5a. Breast, interpelvic area, and belly fully scaled, 5 to 8 gill rakers, 15 to 17 dorsal soft rays, 14 to 16 anal rays, 33 or 34 vertebrae *Chelidonichthys gabonensis*
- 5b. Breast with small patch of scales, interpelvic area scaleless, 11 or 12 gill rakers, 17 to 19 dorsal soft rays, 17 or 18 anal rays, 36 vertebrae *Chelidonichthys queketti*

- 6a. Total gill rakers on first gill arch (not including rudiments) 7 to 11 *Chelidonichthys lucerna*
- 6b. Total gill rakers on first gill arch (not including rudiments) 15 to 19 *Chelidonichthys capensis*

- 7a. First dorsal fin with the second spine elongated as a long filament; first dorsal spine smooth anteriorly; lateral-line scales moderately large and high, distance between top of lateral-line scale and dorsal-fin base 100% of total height of lateral-line scale *Chelidonichthys obscurus*
- 7b. First dorsal fin with second spine not greatly elongate; first dorsal spine serrate anteriorly; lateral-line scales large and extremely high, distance between top of lateral-line scale and dorsal-fin base 25% to 50% of total height of lateral-line scale *Chelidonichthys cuculus*


Key to the species of *Lepidotrigla* occurring in the area














- 1a. Breast naked; dorsal and anal soft rays each 14 to 16, modally 15; vertebrae 30 to 32, modally 31, first dorsal-fin spine serrate anteriorly → 2
- 1b. Breast scaled; dorsal and anal soft rays each 13 to 15, modally 14; vertebrae 29 to 31, modally 30, first dorsal-fin spine smooth anteriorly (specimens >10 cm standard length) *Lepidotrigla cadmani*

- 2a. Cleithral spine long (13.2 to 16.0% standard length); all body scales strongly attached and ctenoid → 3
- 2b. Cleithral spine short (9.1 to 12.7% standard length); body scales, loosely attached, scales cycloid on belly and lower flanks, ctenoid above and immediately below lateral-line scales *Lepidotrigla carolae*

- 3a. Spines present on the supraorbital and on the edge of the nuchal ridge, vertical diameter of eye less than the distance to the lower edge of the orbital base of the mandible, adherent scales distinctly ctenoid and higher than broad *Lepidotrigla cavillone*
- 3b. Orbital and nuchal spines absent, vertical diameter of eye equal to or greater than the distance from the lower edge to the orbital base of the mandible, less adherent scales that are weakly ctenoid and broader than high *Lepidotrigla dieuzeidei*

List of species occurring in the area

The symbol  is given when species accounts are included.

-  *Chelidonichthys capensis* (Cuvier in Cuvier and Valenciennes, 1829).
-  *Chelidonichthys cuculus* (Linnaeus, 1758).
-  *Chelidonichthys gabonensis* (Poll and Roux, 1955).
-  *Chelidonichthys lastoviza* (Bonnaterre, 1788).
-  *Chelidonichthys lucerna* (Linnaeus, 1758).
-  *Chelidonichthys obscurus* (Walbaum, 1792).
-  *Chelidonichthys queketti* (Regan, 1904).
-  *Eutrigla gurnardus* (Linnaeus, 1758).
-  *Lepidotrigla cadmani* Regan, 1915.
-  *Lepidotrigla carolae* Richards, 1968.
-  *Lepidotrigla cavillone* (Lacépède, 1801).
-  *Lepidotrigla dieuzeidei* Blanc and Hureau, 1973.
-  *Trigla lyra* Linnaeus, 1758.
Trigla macrodactylus Günther, 1889. Identity unknown, see Remarks.

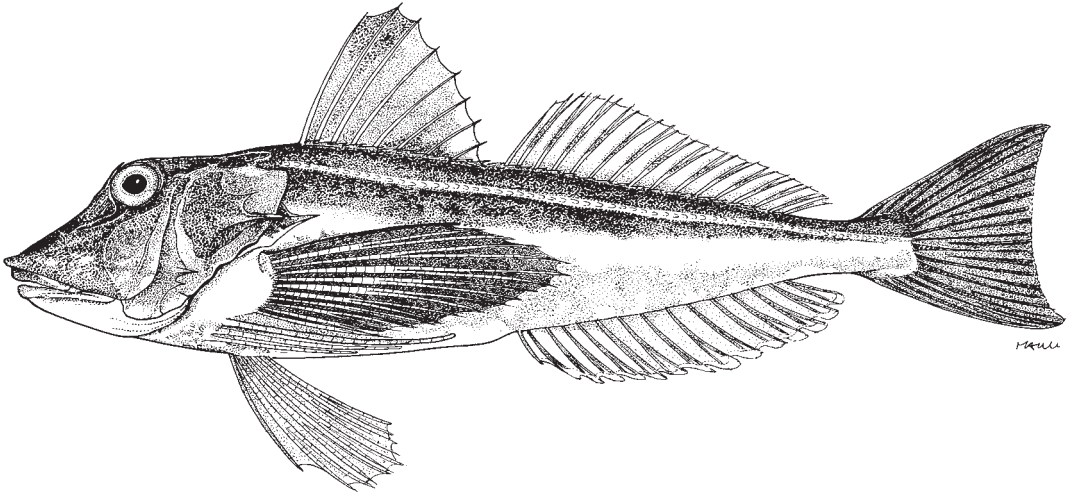
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***Chelidonichthys capensis* (Cuvier in Cuvier and Valenciennes, 1829)**

Frequent synonyms / misidentifications: *Trigla capensis* (Cuvier, 1829) / None.

FAO names: En – Cape gurnard; Fr – Grondin du cap; Sp – Rubio del cabo.



Diagnostic characters: Two separate dorsal fins, the first with 9 or 10 spines, the second with 15 to 17 segmented soft rays; anal fin with 14 to 16 soft rays; pectoral-fin spines or plate-like expansions; swimbladder with accessory branches; **breast and interpelvic area scaleless, belly partially scaled**; body scales small and embedded with 19 to 21 rows above lateral line and 47 or 48 rows below; orbit 7 to 8% standard length; interorbital 5.3 to 6.7% standard length. Total vertebrae 33 or 34. **Colour:** reddish dorsally and upper flanks; vertical fins reddish, pectoral fin dark green with intense black blotch on inner side. Black blotch with small, pale blue or white spots mainly on black blotch's border.

Size: To 70 cm.

Habitat, biology, and fisheries: Benthic, from 10 to 390 m.

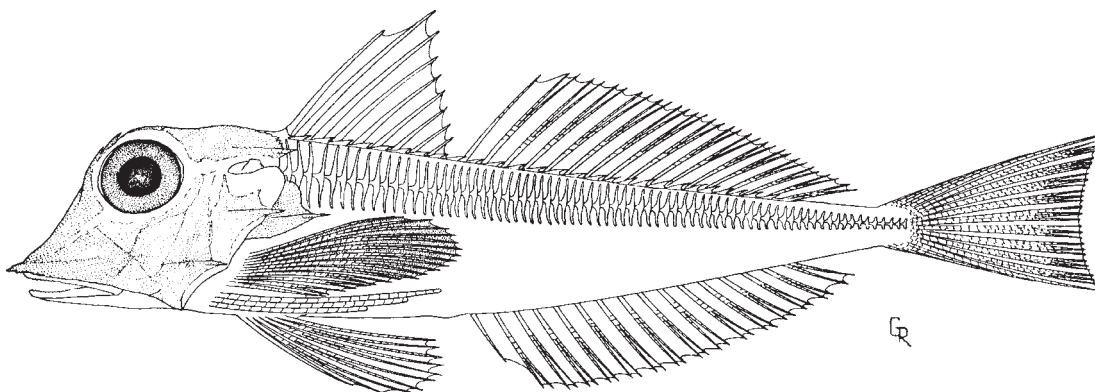
Distribution: From Namibia (Walvis Bay) south around the coast of South Africa northward to Maputo, Mozambique.



***Chelidonichthys cuculus* (Linnaeus, 1758)**

Frequent synonyms / misidentifications: *Aspitrigla cuculus* (Linnaeus, 1758); *Trigla pini* Bloch, 1793; *T. sicula* Swainson, 1839 / None.

FAO names: **En** – Red gurnard; **Fr** – Grondin rouge; **Sp** – Arete.



Diagnostic characters: Two separate dorsal fins, the first with 9 or 10 spines, second dorsal-fin spine not elongated, first dorsal spine serrate anteriorly, the second dorsal fin with 17 or 18 segmented soft rays; anal fin with 16 to 18 soft rays. **Lateral-line scales** 70 to 73, **plate-like, expanded vertically with the distance between top of scale and dorsal-fin base about 25 to 50% of total height of scale.** Total vertebrae 36 or 37. **Colour:** reddish head and dorsum, lower flank whitish.

Size: From 20 to 30 cm, rarely 45 cm.

Habitat, biology, and fisheries: Benthic from 30 to 250 m.

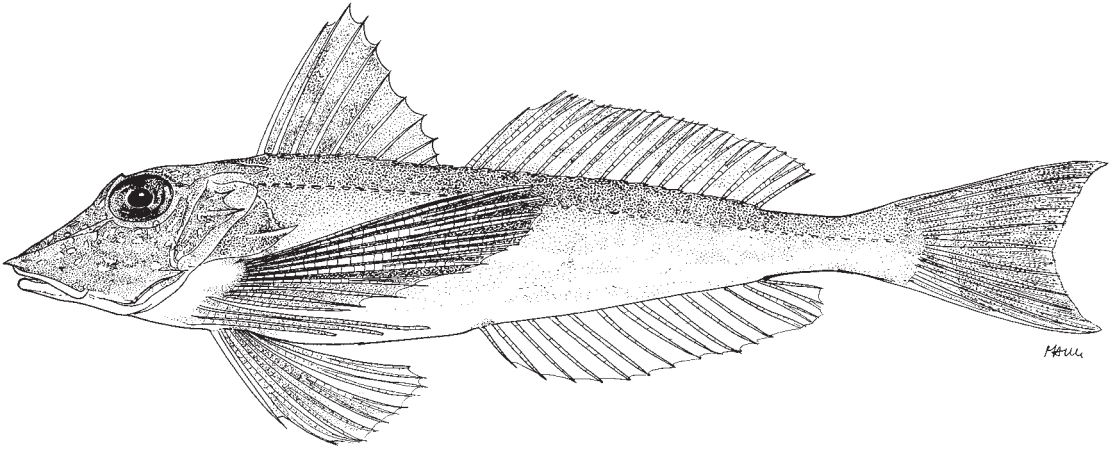
Distribution: North Sea along Atlantic coast of Europe, throughout the Mediterranean, possibly in Black Sea (historically throughout), southward from Gibraltar to Cape Blanc, Mauritania.



***Chelidonichthys gabonensis* (Poll and Roux, 1955)**

Frequent synonyms / misidentifications: *Trigla gabonensis* Poll and Roux, 1955; *Chelidonichthys senegalensis* Puyo, 1957 / None.

FAO names: En – Gabon gurnard; Fr – Grondin du Gabon; Sp – Rubio del Gabón.



Diagnostic characters: Two separate dorsal fins, the first with 9 or 10 spines, the second with 15 to 17 segmented soft rays; anal fin with 14 to 16 soft rays. Lateral-line scales 64 to 70, lack spines or plate-like expansions; swimbladder with no accessory branches, **breast, interpelvic area and belly fully scaled**, body scales not deeply embedded, deciduous in preserved specimens with 8 to 12 rows above lateral line, and 27 to 35 below lateral line. Total vertebrae 33 or 34. **Colour:** reddish brown on dorsum and upper flanks, whitish on lower flank and belly. Pectoral fins dark blue.

Size: From 20 to 30 cm.

Habitat, biology, and fisheries: Benthic from shore to 200 m.

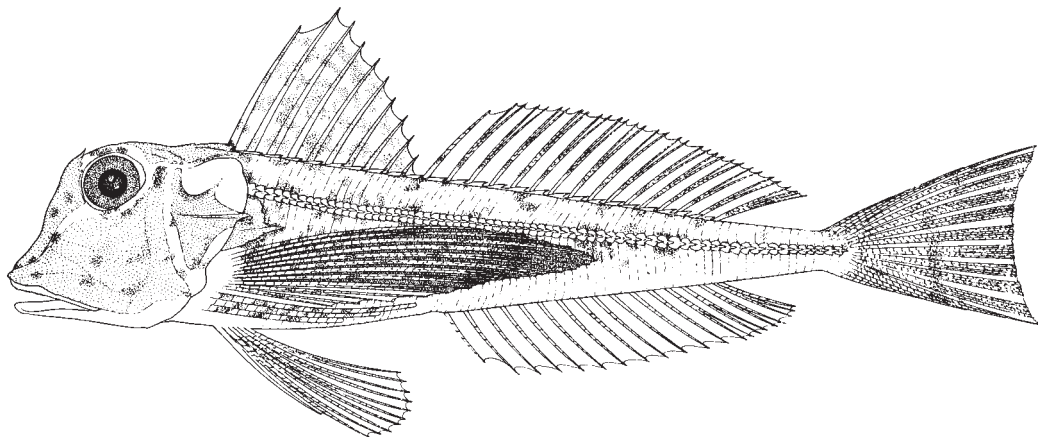
Distribution: Gulf of Guinea from Cape Verde south to Angola. Records from Namibia probably refer to *C. queketti*.



***Chelidonichthys lastoviza* (Bonnaterre, 1788)**

Frequent synonyms / misidentifications: *Trigla adriatica* Gmelin, 1789; *T. lineata* Gmelin, 1789 / None.

FAO names: En – Streaked gurnard; Fr – Grondin camard; Sp – Rubio.



Diagnostic characters: Two separate dorsal fins, the first with 9 to 11 spines, the second with 15 to 17 segmented soft rays; anal fin with 15 to 17 soft rays. Lateral-line scales 63 to 75, **lateral-line canal with extensive vertical branches forming transverse grooves along the body**; pectoral fin long (34 to 47% standard length), **breast variably naked to fully scaled; belly fully scaled**. Total vertebrae 33 to 35. **Colour:** variable with reddish head and dorsum with pale lower flanks. Vertical fins and pelvic fin mostly reddish with some yellow in dorsal fins. Pectoral fin with blue spots forming bands.

Size: From 35 to 40 cm.

Habitat, biology, and fisheries: Benthic from 35 to 150 m.

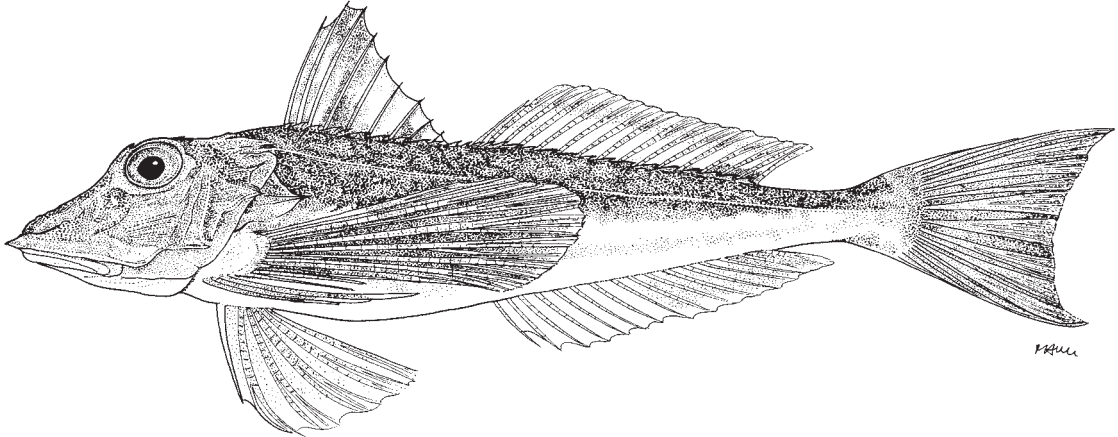
Distribution: Widely distributed from Norway, south along the Low Countries, British Isles, Mediterranean, Azores, coast of Africa from Gibraltar south to Angola. A subspecies, *C. lastoviza africana*, ranges in South Africa from St Sebastian Bay to Port Alfred.



***Chelidonichthys lucerna* (Linnaeus, 1758)**

Frequent synonyms / misidentifications: *Trigla lucerna* Linnaeus, 1758; *T. hirundo* Linnaeus, 1758; *T. corvus* Rafinesque, 1810; *T. hyrax* Pallas, 1814; *T. laevis* Montagu, 1818; *T. microlepidota* Risso, 1824; *T. poeciloptera* Cuvier, 1829; *T. corax* Bonaparte, 1834; *T. pauciradiata* Bennett, 1835; *T. swainsonii* Leach, 1839 / None.

FAO names: En – Tub gurnard; Fr – Grondin perlon, grondin cabote (Area 37); Sp – Bejel.



Diagnostic characters: Two separate dorsal fins, the first with 8 to 10 spines, the second with 16 or 17 segmented soft rays; anal fin with 14 to 16 soft rays. Lateral-line scales 64 to 75, **lateral-line scales lack spines or plate-like expansions**; swimbladder with no accessory branches, pectoral fin long (32 to 42% standard length); **breast and interpelvic area scaleless, belly partially scaled**, body scales embedded and small, 18 to 20 rows above lateral line, 37 to 60 below lateral line. Total vertebrae 33 or 34. **Colour:** red or reddish brown dorsally and upper flanks, belly and lower flanks white; pectoral fin purplish red on lateral outer surface, inner surface bluish with large black circular patch near fin base which may have scattered blue spots.

Size: To 30 cm, rarely to 65 cm (6 kg).

Habitat, biology, and fisheries: Benthic from 5 to 200 m.

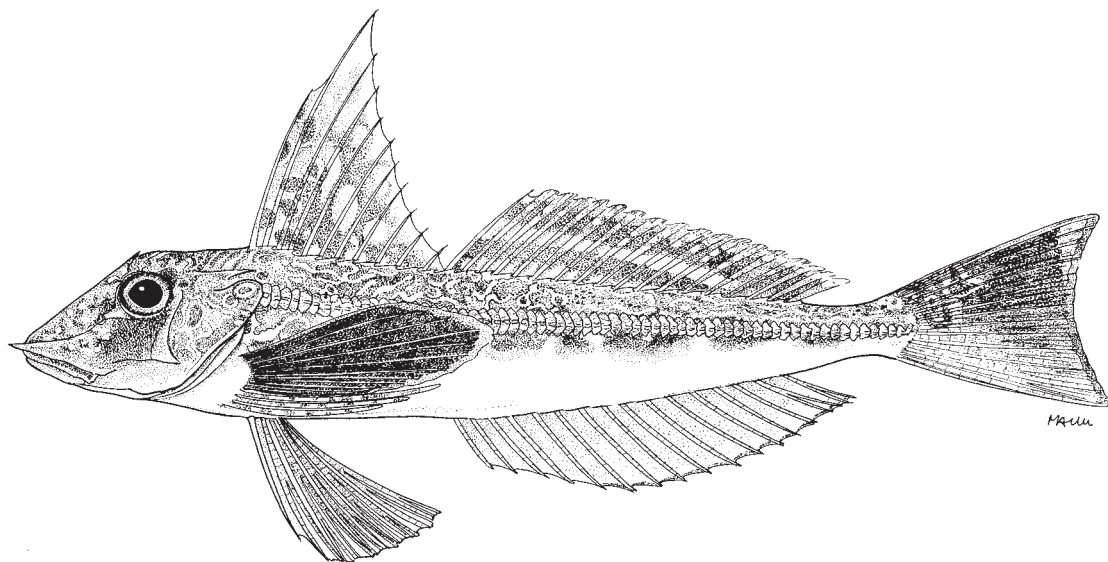
Distribution: Norway southward around British Isles, throughout Mediterranean Sea and Sea of Marmara; historically and rarely in the Black and Azov Seas. From Gibraltar south to Cape Verde. Records south of Cape Verde are unconfirmed and may refer to other species.



***Chelidonichthys obscurus* (Walbaum 1792)**

Frequent synonyms / misidentifications: *Aspitrigla obscura* Bloch and Schneider, 1801; *Trigla bracanthus* Swainson, 1839 / None.

FAO names: **En** – Longfin gurnard; **Fr** – Grondin sombre; **Sp** – Arete aletón.



Diagnostic characters: Two separate dorsal fins, the first with 10 or 11 spines, second dorsal spine elongated as a long filament, first dorsal spine smooth anteriorly, the second dorsal fin with 17 to 19 segmented soft rays; anal fin with 17 or 18 soft rays. Lateral-line scales 6 or 7, **lateral-line scales plate-like, expanded slightly with the distance between top of scale and dorsal-fin base 100% or greater of total height of scale; second dorsal spine elongated as a long filament**, first dorsal spine smooth anteriorly. Total vertebrae 36 or 37. **Colour:** reddish head and dorsum, lower flank whitish.

Size: From 20 to 30 cm.

Habitat, biology, and fisheries: Benthic along coast, confined to continental shelf.

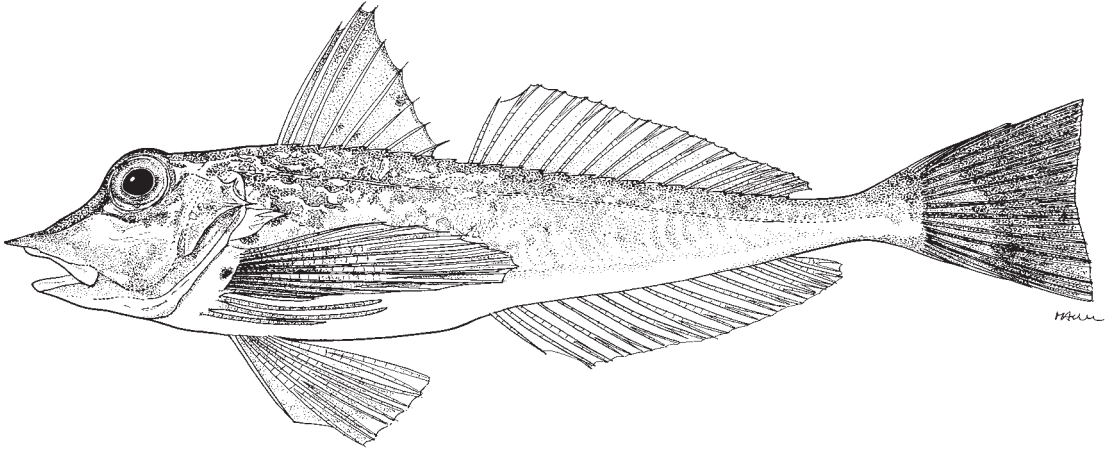
Distribution: Rare from southern British Isles southward to the Loire River becoming common around Iberian peninsula and throughout Mediterranean, southward from Gibraltar to Cape Blanc, Mauritania. Records from Madeira but unconfirmed from Canaries and Azores.



***Chelidonichthys queketti* (Regan, 1904)**

Frequent synonyms / misidentifications: *Trigla queketti* Regan, 1904 / None.

FAO names: En – Lesser gurnard; Fr – Grondin mineur; Sp – Rubio menor.



Diagnostic characters: Head 27 to 31% standard length; **rostral spines short with outer spine longest, inner spines covered with skin.** Interorbital 5.3 to 5.7% standard length, orbit 7.9 to 8.5% standard length. Two separate dorsal fins, the first with 9 or 10 spines, the second with 17 to 19 segmented soft rays; anal fin with 17 or 18 soft rays; pectoral fin 29 to 31% standard length, reaching anal rays. Lateral-line scales 68 to 76, **breast with scales;** body scales small with 10 to 12 rows above lateral line and 26 to 38 rows below. Total vertebrae 36. **Colour:** generally reddish with lower flanks pale or silvery; some fish with yellow lower flanks and yellow second dorsal fin.

Size: To 35 cm.

Habitat, biology, and fisheries: Benthic from shore to 212 m. Potentially marketable but rarely taken.

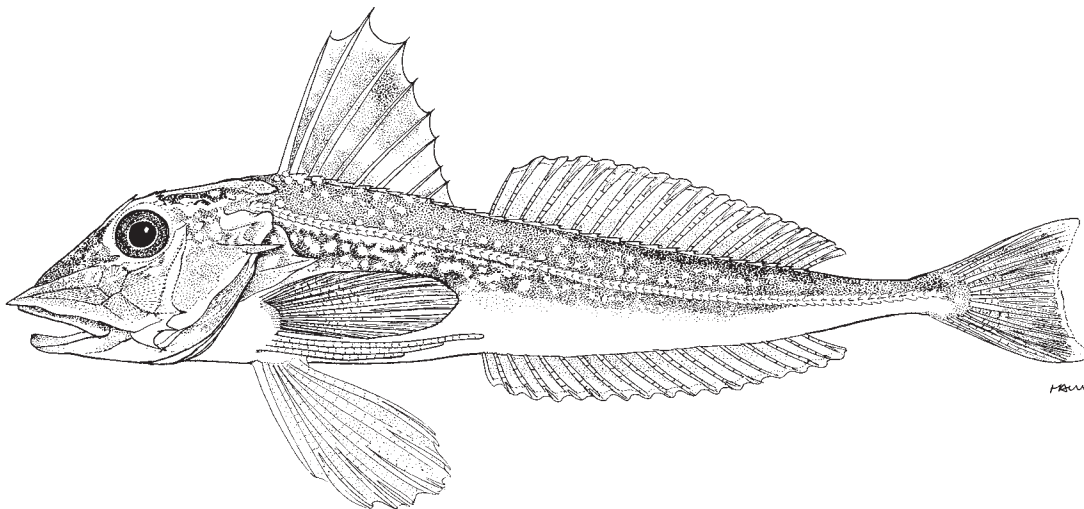
Distribution: Endemic to southern Africa, known from Namibia (Walvis Bay) in 85 to 212 m and around the coast of South Africa to Durban, from shore to 150 m.



***Eutrigla gurnardus* (Linnaeus, 1758)**

Frequent synonyms / misidentifications: *Chelidonichthys gurnardus* Linnaeus, 1758; *Trigla gurnardus* Linnaeus, 1758; *T. grunniens* Lacépède; *T. milvus* Lacépède, 1801; *T. blochii* Yarrell, 1836 / None.

FAO names: **En** – Grey gurnard; **Fr** – Grondin gris; **Sp** – Borracho.



Diagnostic characters: Two separate dorsal fins, the first with 8 or 9 spines, the second with 19 segmented soft rays; anal fin with 18 or 19 soft rays. **Lateral-line scales 71 to 77, with spinate median keels, breast scaleless, interpelvic area scaleless, belly partially scaled; short pectoral fins not reaching anal-fin origin** (23 to 27% standard length). Total vertebrae 37 to 39. **Colour:** grey or reddish brown, with white spots on flanks above and slightly below lateral line.

Size: Generally from 35 to 40 cm, rarely to 60 cm.

Habitat, biology, and fisheries: Benthic from 20 to 200 m.

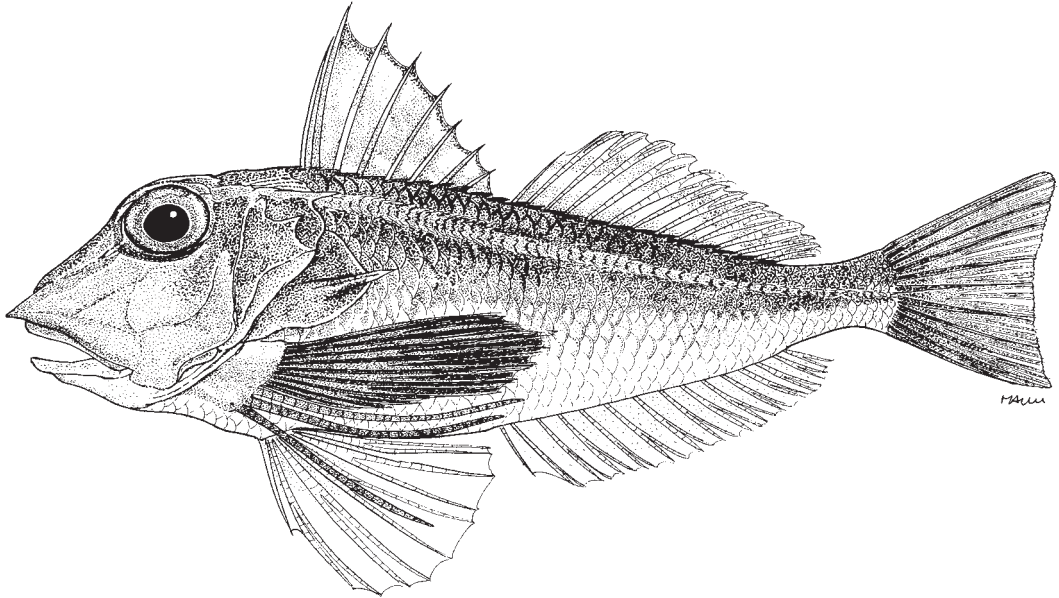
Distribution: From northern Norway south into the western Baltic Sea, westward to the western and southern coast of Iceland, North Sea, around British Isles, Atlantic coast of Europe, throughout the Mediterranean, western Black Sea, south to Morocco and Madeira.



***Lepidotrigla cadmani* Regan, 1915**

Frequent synonyms / misidentifications: *Lepidotrigla laevispinnis* Blache and Ducroz, 1960 / None.

FAO names: En – Scalebreast gurnard; Fr – Grondin écailleux; Sp – Cabete escamudo.



Diagnostic characters: Two separate dorsal fins, the first with 8 to 10 spines, first dorsal-fin spine smooth anteriorly in specimens greater than 10 cm standard length, some serrations in smaller specimens, the second dorsal fin with 13 to 15 segmented soft rays; anal fin with 13 to 15 soft rays. **Breast, interpelvic area, and belly with scales;** scales above lateral line ctenoid, scales below and on breast and belly cycloid. Lateral-line scales 53 to 57 with small spines. **Anterior projection of preorbital bones with outer most spine decidedly larger than inner spines** that decrease progressively in size. Total vertebrae 29 to 31. **Colour:** reddish brown, pectoral fins dark.

Size: Small, from 10 to 17 cm.

Habitat, biology, and fisheries: Benthic in 50 to 400 m.

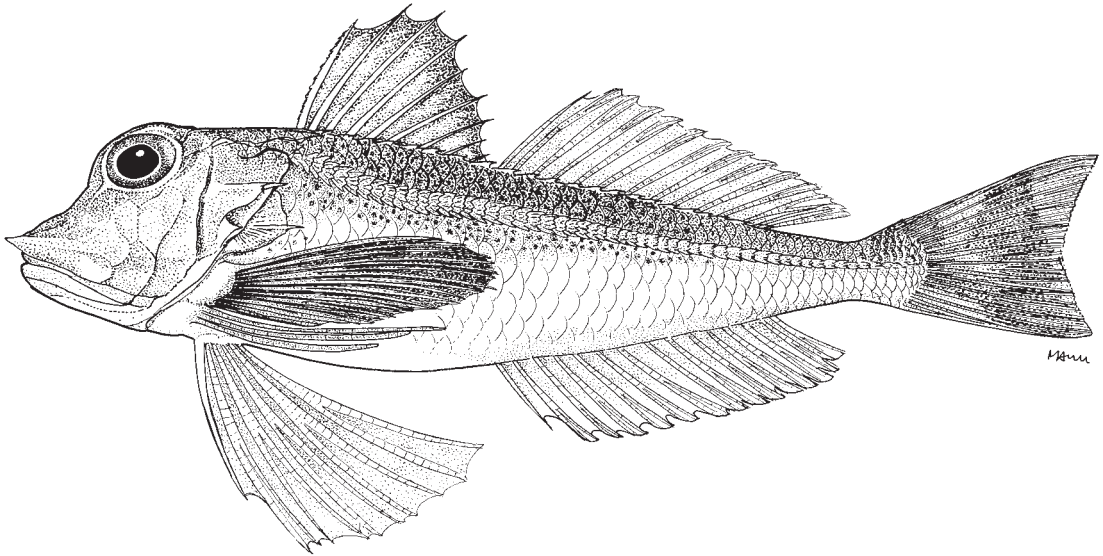
Distribution: Coast of West Africa from 21°N south to Angola.



***Lepidotrigla carolae* Richards, 1968**

Frequent synonyms / misidentifications: None / None.

FAO names: En – Carol's gurnard; Fr – Grondin de Carole; Sp – Caroline.



Diagnostic characters: Two separate dorsal fins, the first with 8 or 9 spines, first dorsal-fin spine serrate on anterior edge, the second dorsal fin with 14 to 16 segmented soft rays; anal fin with 14 to 16 soft rays. **Breast, interpelvic area scaleless, belly partially scaled;** lateral-line scales plate-like with small spines and prominent tubes, body scales ctenoid and deciduous. First dorsal-fin spine serrate on anterior edge. **Anterior projection of preorbital bones with outer most spine decidedly larger than inner spines** that decrease progressively in size. Total vertebrae 30 to 32. **Colour:** reddish on head and dorsum, lower flanks pale, pectoral fin dark.

Size: To 12 cm; common to 9 cm.

Habitat, biology, and fisheries: Benthic in 49 to 200 m.

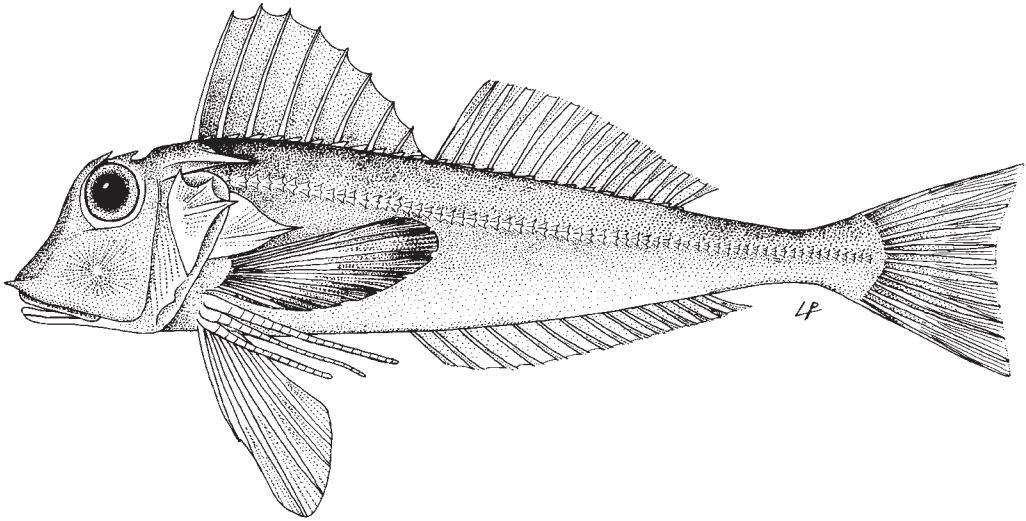
Distribution: Coast of West Africa from 21°N south to Angola.



***Lepidotrigla cavillone* (Lacépède, 1801)**

Frequent synonyms / misidentifications: *Trigla cavillone* Lacépède, 1801; *T. aspera* Viviani, 1805; *T. gonotus* Rafinesque, 1810; *T. leucoptera* Swainson, 1839 / None.

FAO names: En – Large-scaled gurnard.



Diagnostic characters: Spines present on the supraorbital and on the edge of the nuchal ridge, vertical diameter of eye less than the distance to the lower edge of the orbital base of the mandible. **Anterior projection of preorbital bones with 1 or 2 spines slightly larger than remaining spines.** Two separate dorsal fins, the first with 8 or 9 spines, first dorsal-fin spine serrate anteriorly, the second dorsal fin with 14 to 16 segmented soft rays; anal fin with 13 to 16 soft rays. **Breast and interpelvic area scaleless, belly partially scaled;** lateral-line scales 54 to 60, large with spines; body scales ctenoid and firmly attached, higher than broad. Total vertebrae 30 to 32. **Colour:** reddish head and dorsum with pale lower flanks. Vertical fins reddish with anal and pelvic fins pale, pectoral fin dark blue.

Size: Small, from 10 to 15 cm.

Habitat, biology, and fisheries: Benthic in 10 to 500 m.

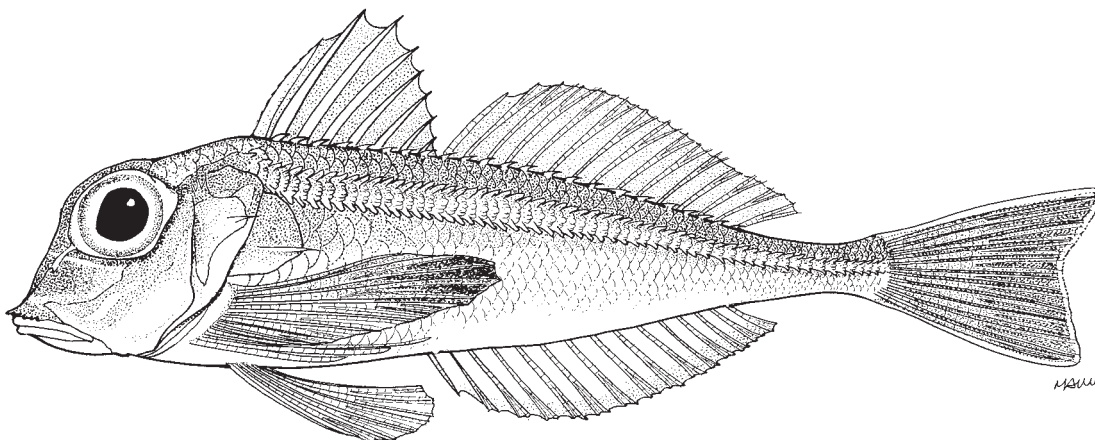
Distribution: Primarily Mediterranean but records from Gibraltar south to Cape Bojador, Western Sahara. Absent from the Black Sea.



***Lepidotrigla dieuzeidei* Blanc and Hureau, 1973**

Frequent synonyms / misidentifications: None / *Lepidotrigla carolea*; *L. cavillone*.

FAO names: En – Spiny gurnard; Fr – Grondin de dieuzeide; Sp – Cabete espinudo.



Diagnostic characters: Two separate dorsal fins, the first with 8 or 9 spines, first dorsal-fin spine serrate anteriorly, the second dorsal fin with 14 to 16 segmented soft rays; anal fin with 13 to 16 soft rays. First dorsal-fin spine serrate anteriorly, **breast and interpelvic area scaleless, belly partially scaled**; lateral-line scales 54 to 60, large with spines, body scales less adherent, weakly ctenoid and broader than high. **Orbital and nuchal ridge spines absent**, vertical diameter of eye equal to or greater than the distance from the lower edge to the orbital base of the mandible. **Anterior projection of preorbital bones with all spines or nearly equal length** and no spines decidedly larger than any other. Total vertebrae 30 to 32. Meristics within range of *Lepidotrigla cavillone*. **Colour:** reddish head and dorsum, pale lower flanks. Pectoral fin blackish distally.

Size: Small, from 10 to 15 cm.

Habitat, biology, and fisheries: Benthic in 100 to 500 m. Poorly known and very difficult to separate from *L. cavillone* and *L. carolae*.

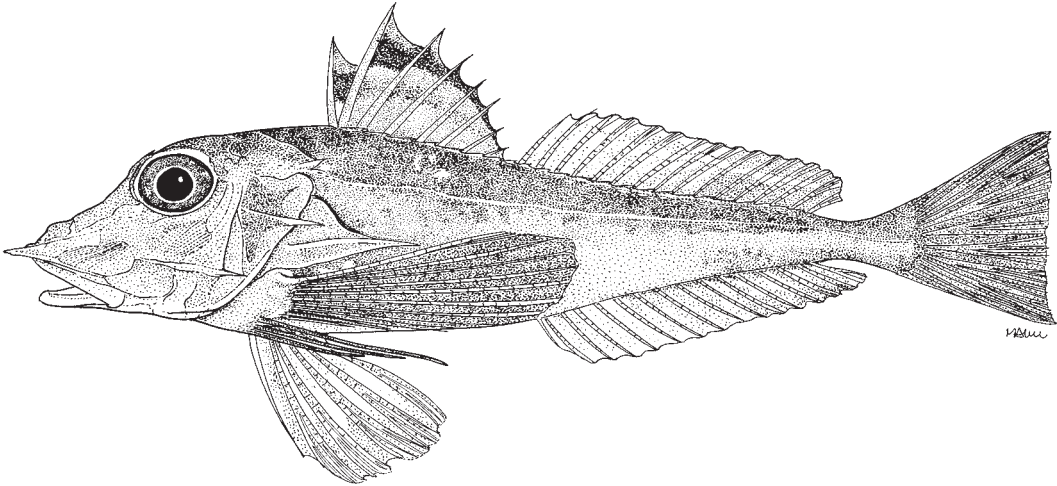
Distribution: Western Mediterranean and along the coast of West Africa from Gibraltar to Mauritania (21°N).



***Trigla lyra* Linnaeus, 1758**

Frequent synonyms / misidentifications: None / None.

FAO names: En – Piper gurnard; Fr – Grondin lye; Sp – Garneo.



Diagnostic characters: Two separate dorsal fins, the first with 8 or 9 spines, the second with 15 or 16 segmented soft rays; anal fin with 15 or 16 soft rays. **Only species with thin-walled swimbladder with extrinsic drumming muscles and no intrinsic drumming muscles;** long and strong cleithral spine (17 to 19% standard length); lateral-line scales 62 to 69 with spines, **breast scaleless, interpelvic area scaleless, belly partially scaled;** pectoral fin long reaching anal-fin origin. Total vertebrae 31 or 32. **Colour:** bright red with black edge on first dorsal-fin margin; pectorals partially black; belly pale.

Size: To 40 cm, rarely to 60 cm.

Habitat, biology, and fisheries: Benthic from 10 to 700 m.

Distribution: British Isles southward into and throughout the Mediterranean, coast of Africa from Gibraltar to Namibia; including Madeira.



INDEX OF SCIENTIFIC AND VERNACULAR NAMES

Explanation of the System

Italics : Valid scientific names (double entry by genera and species)

Italics : Synonyms, misidentifications and subspecies (double entry by genera and species)

ROMAN : Family names

ROMAN : Scientific names of divisions, classes, subclasses, orders, suborders and subfamilies

Roman : FAO names

A	
Abámbo	1986
Abámbo de bajura	1985
Abrotea	2004
Abrótea de natura	2004
Abyssal halosaur	1598-1599
<i>Abyssoberyx</i>	2166
<i>Acanthochaenus</i>	2166
ACANTHURIDAE	1575
ACANTHUROIDEI	1574
<i>accraensis, Pontinus</i>	2263 ,2265
<i>achirus, Nannobranchium</i>	1918
ACROPOMATIDAE	1558
Acropomatids	1558
<i>acus, Syngnathus</i>	2237
<i>adenomus, Diaphus</i>	1885
<i>Adioryx hastatus</i>	2199
<i>adriatica, Trigla</i>	2305
<i>adscensionis, Holocentrus</i>	2198
<i>aequalis, Nezumia</i>	1987,1989
<i>affine, Myctophum</i>	1915
<i>affinis, Aldrovandia</i>	1597
<i>afimbria, Scorpaena notata</i>	2278
African armoured searobin	2296
African freshwater pipefish	2233
African speckled scorpionfish	2283
African spotted scorpionfish	2284
<i>africana, Chelidonichthys lastoviza</i>	2305
<i>africana, Clupea</i>	1719
<i>africana, Ilisha</i>	1719
<i>africana, Nezumia</i>	1989
<i>africanus, Hypomacrus</i>	2283
<i>africanus, Polyacanthonotus</i>	1603
<i>africanus, Scorpaenodes</i>	2283
<i>afzeliusi miri, Pellonula</i>	1732
<i>afzeliusi, Pellonula</i>	1732
<i>agassizii, Scorpaena</i>	2279
<i>Agrostichthys</i>	1940
Alacha	1735
Alacha rabo amarillo	1737
<i>alatus, Lampanyctus</i>	1906
<i>albaiensis, Scorpaenodes</i>	2283
<i>albidus, Gadus</i>	2025
<i>albofasciata, Scorpaena</i>	2279
<i>Albula vulpes</i>	1590
ALBULIDAE	1523,1584,1588, 1590 , 1592-1593,1723,1741
ALBULIFORMES	1523, 1590
<i>albus, Merlangus</i>	2033
<i>Aldrovandia</i>	1594
<i>Aldrovandia affinis</i>	1597
<i>Aldrovandia gracilis</i>	1597
<i>Aldrovandia oleosa</i>	1597
<i>Aldrovandia phalacra</i>	1598
<i>Aldrovandia rostrata</i>	1598
ALEPISAUROIDAE	1536, 1840
ALEPOCEPHALIDAE	1531, 1765
Alfonsino	2194
Alfonsino besugo	2194
Alfonsino palometón	2194
Alfonsinos	1552,2192
<i>algericus, Hippocampus</i>	2234
Allache	1735
Allis shad	1729
<i>Allocyttus guineensis</i>	2208
<i>Allocyttus verrucosus</i>	2209
Alón volador	2248
<i>Alosa alosa</i>	1722, 1729 -1730
<i>Alosa fallax</i>	1722, 1730
<i>Alosa finta</i>	1730
<i>Alosa senegalensis</i>	1735
<i>alosa, Alosa</i>	1722, 1729 -1730
Alose feinte	1730
Alose rasoir	1719
Alose vraie	1729
<i>ambiguous, Merluccius</i>	1998
<i>ambiguous, Merlucius</i>	2011
AMMODYTIDAE	1571
<i>ampullaceus, Saccopharynx</i>	1707
<i>Anchoa guineensis</i>	1717
Anchois	1717
Anchovies	1529,1715
Andersen's lanternfish	1886
<i>anderseni, Diaphus</i>	1886
Angler	2049
Anglerfish	2045,2055
Anglerfishes	1544
Angola rockfish	2267
<i>angolensis, Helicolenus dactylopterus</i>	2260
<i>angolensis, Scorpaena</i>	2267
ANGUILLIDAE	1524, 1605
ANGUILLIFORMES	1524, 1605
Annobon scorpionfish	2268
<i>annobonae, Scorpaena</i>	2268
<i>anomala, Lampadena</i>	1902
Anomalous lanternfish	1902
<i>anonyme, Trachyrincus</i>	1966
ANOPILOGASTRIDAE	1551, 2182 ,2185

- ANOPTERIDAE** 1537, **1849**
 Anson's fangtooth pellonuline 1739
ansorgii, Enneacampus **2233**
ansorgii, Odaxothrissa **1739**
ANTENNARIIDAE 1544, 2045, **2051**, 2054, 2057
ANTIGONIIDAE 1574, 2204, 2206, 2216, 2218
 Antimora bleu 2003
Antimora rostrata **2003**
Antonogadus 2019
APHYONIDAE 1540, 1946, 1953, **1955**, 1964, 2290
 Aphyonids 1540, 1955
Apistes exul 2279
APOGONIDAE 1559
Araiophos 1792
 Arctic lanternfish 1924
arcticum, Protomyctophum (Hierops) **1924**
arcticus, Trachipterus **1937**
arcuatus, Gadomus **1963**
 Arete 2303
 Arete aletón 2307
argentatus, Merluccius 2011
argenteolus, Gadus 2020
argenteus argenteus, Gadicus 2032
argenteus thori, Gadicus 2032
argenteus, Gadicus **2032**
argenteus, Gadicus argenteus 2032
argenteus, Merlangus 2032
 Argentines 1530
ARGENTINIDAE 1530, **1751**
 ARGENTINIFORMES 1530, **1751**
Argyripnus 1792-1793
Argyropelecus 1792
ARIIDAE 1530, **1742**
 Ariommas 1577
ARIOMMATIDAE 1577
Aristostomias 1806
Arius 1747
Arius ater 1749
Arius capellonis 1748
Arius feliceps 1750
Arius gambensis 1747
Arius gigas 1745
Arius granulatus 1748
Arius heudeloti **1748**
Arius heudelotii 1746
Arius laticutatus 1747
Arius mercatoris 1746
Arius parkii 1748
 Armoured searobins 1557, 2296
 Ascension scorpionfish 2269
ascensionis, Holocentrus 2198
ascensionis, Scorpaena **2269**
ashanteensis, Mugil 2105
ashanteensis, Mugil cephalus 2105
aspera, Trigla 2312
asperum, Myctophum **1915**
Aspitrigla cuculus 2303
Aspitrigla obscura 2307
ASTRONESTHIDAE 1533, 1784, 1789, 1793, **1797-**
 1798, 1802, 1805-1806, 1810, 1817, 1861
 ASTRONESTHINAE 1797
A TELEOPODIDAE 1534, 1595, **1819**
 ATELEOPODIFORMES 1534, **1819**
ater, Arius 1749
ater, Galeichthys **1749**
ATHERINIDAE 1549, 1716, 2078, **2111**
 ATHERINIFORMES 1549, **2111**
 Atlantic blackcap lanternfish 1919
 Atlantic lanternfish 1898
 Atlantic tail-light lanternfish 1905
atlantica, Lampadena urophaos **1905**
atlanticum, Oreosoma **2212**
atlanticus, Coelorhynchus 1982
atlanticus, Diogenichthys **1898**
atlanticus, Hoplostethus 2186, **2189**
atlanticus, Macrurus 1982
atlanticus, Megalops **1588-1590**
atlanticus, Tarpon 1588-1589
atrum, Cyema **1704**
atrum, Nannobranchium **1919**
attenuatus, Halosaurus **1599**
attenuatus, Merluccius 1998
AULOPIIDAE 1534, **1820**
 AULOPIIFORMES 1534, **1820**
AULOSTOMIDAE 1555, 2230, **2239**, 2241
Aulostomus chinensis maculatus 2239
Aulostomus chinensis strigosus 2239
Aulostomus strigosus **2239**
aurata, Chelon 2088
aurata, Liza 2088, 2097
aurita, Sardinella 1722, **1735-1736**
 Austral lanternfish 1906
australis, Engraulis **1715**
australis, Lampanyctus **1906**
 Azores scorpionfish 2270
azorica, Scorpaena **2270**
B
 Bacaladilla 2033

Bacaladilla imberbe	2003	Baudroie africaine	2050
Back-finned pipefish	2233	Baudroie commune	2049
Bagre barba blanca	1750	Baudroie épineuse	2047
Bagre bocalisa	1746	Baudroie rousse	2048
Bagre cabecirugoso	1747	Beaked salmon	1740
Bagre de Guinea	1748	Beaked sandfish	1740
Bagre gigante	1745	Beaked sandfishes	1530
Bagre negro	1749	Bearded brotula	1952
Bagrid catfishes	1743	Beardfishes	1942
BAGRIDAE	1743	Beardfishes	1539
<i>bairdii</i> , <i>Gastrostomus</i>	1708	Beardless codling	2003
BALISTIDAE	1582	Bécasse de mer	2247
Banana mullet	2103	Bécasse de mer tachetée	2247
Banane de mer	1590	Bejel	2306
Banane gisu	1592	<i>belloci</i> , <i>Pterothrissus</i>	1590,1592
<i>bananensis</i> , <i>Mugil</i>	2103,2105	BELONIDAE	1549,2118
Bandfishes	1567	BELONIFORMES	1549,2118
<i>bandialensis</i> , <i>Chelon</i>	2090	Benguela hake	2013
<i>bandialensis</i> , <i>Liza</i>	2090	Benoit's lanternfish	1899
<i>Barathronus</i>	1955	<i>benoiti</i> , <i>Hygophum</i>	1899
Barbada	2019	<i>Bentosema</i>	1861,1881
<i>barbata</i> , <i>Brotula</i>	1952	<i>Bentosema glaciale</i>	1881
<i>barbata</i> , <i>Scorpaena</i>	2281	<i>Bentosema suborbitale</i>	1881
<i>barbatus</i> , <i>Gadus</i>	2034	<i>Bertella</i>	2066
<i>barbatus</i> , <i>Gaidropsarus</i>	2019	Bertelsen's lanternfish	1886
Barbillon blanc	1750	<i>bertelseni</i> , <i>Diaphus</i>	1886
<i>Barbourisia rufa</i>	2171	<i>bertelseni</i> , <i>Parataeniophorus</i>	2180
BARBOURISIIDAE	1551,2168,2171,2174	Bertin's one-jawed eel	1713
Barebelly lanternfish	1914	<i>bertini</i> , <i>Monognathus</i>	1713
Barenose lanternfish	1882	Bertorella	2020
Barnard's lanternfish	1925	BERYCIDAE	1552,2187,2192
<i>barnardi</i> , <i>Symbolophorus</i>	1925	BERYCIFORMES	1551,2182
Barracudae	1576	<i>Beryx</i>	2192
Barracudas	1522	Béryx commun	2194
Barracudinas	1536	<i>Beryx decadactylus</i>	2194
Barreleyes	1531	Béryx long	2194
Batfishes	1545,2056	<i>Beryx splendens</i>	2194
<i>Bathophilus</i>	1809	<i>bibroni</i> , <i>Sebastes</i> (<i>Sebastichthys</i>)	2264
BATHYGADIDAE	1541,1756,1959,1965,1969,2005,2007	<i>bibus</i> , <i>Gadus</i>	2034
Bathygadids	1541,1959	<i>bicolor</i> , <i>Rondeletia</i>	2170
BATHYGADINAE	1959,1968	<i>bifurcus</i> , <i>Gadus</i>	2025
<i>Bathygadus macrops</i>	1962	Big roughy	2189
<i>Bathygadus melanobranchus</i>	1962	Bigeye rockling	2022
BATHYLAGIDAE	1531,1756	Bigeyes	1559
<i>bathyphilus</i> , <i>Taaningichthys</i>	1927	Big scales	1550,2163
BATHYSAURIDAE	1537,1851	Bigtoothed pellonula	1733
<i>Batrachoides gmelini</i>	2025	Billfishes	1579
BATRACHOIDIDAE	1544,2036,2252,2290	Birdsnouted flabby whalefish	2181
BATRACHOIDIFORMES	1544,2036	<i>biscayensis</i> , <i>Gaidropsarus</i>	2019

- bispinosus, Chelon* **2085**
 Black codling 2004
 Black dragonfishes 1533,1804
 Black roughly 2190
 Black scorpionfish 2280
 Black sea catfish 1749
 Blackbar soldierfish 2201
 Blackbellied angler. 2048
 Blackbelly rosefish 2260
 Blackchins 1537,1855
 Blackdevils 1546,2061
 Blackhead lanternfish 1911
 Blennies 1571
BLENNIIDAE 1572
 BLENNIOIDEI 1571
Blennius gadoides 2025
blennoides, Phycis **2025**
blochii, Trigla 2309
 Blue antimora 2003
 Blue ling 2027
 Blue whiting 2033
 Bluefishes. 1560
 Bluespotted cornetfish 2244
 Bluntnose lanternfish 1892
 Bluntnout lanternfish 1916
 Boarfishes 1578
 Bobtail eel 1704
 Bobtail eels 1528,1704
boehlkei, Monognathus **1713**
 Böhlke's one-jawed eel 1713
bolini, Notoscopelus (Pareiophus) **1923**
Bolinichthys 1882
Bolinichthys distofax **1882**
Bolinichthys indicus **1882**
Bolinichthys photothorax **1883**
Bolinichthys supralateralis **1883**
bonaparte, Notacanthus **1603**
 Bonaparte's spiny eel 1603
Bonapartia 1789,1793
 Bonefishes 1523
 Bonga shad 1731
 Bonnetmouths 1568
boops, Cyttosoma 2212
boops, Symbolphorus **1925**
 Boquerón 1717
 Borracho 2309
BOTHIDAE 1580
 Boxfishes 1582
 Boxlip mullet. 2110
bracanthus, Trigla 2307
brachiusculus, Grammicolepis **2221**
brachycephalus, Diaphus **1887**
brachycolus, Lyconus **2007**
brachyurus aculeatus, Microphis **2236**
BRAMIDAE 1562
BRANCHIOSTEGIDAE 1560
brasiliensis, Scorpaena **2279**
Bregmaceros mccllellandi **1957**
BREGMACEROTIDAE 1541,**1957**
 Bright lanternfish 1917
 Bristlemouth anglerfishes 1546,2060
 Bristlemouths 1532,1783
 Broadnosed pipefish 2238
Brosmiculus imberbis 1998
 Brota de tierra 2022
 Brótola de fango. 2025
 Brótola de roca. 2026
Brotula barbata **1952**
 Brotula barbé 1952
 Brótula de barbas. 1952
Brotulotaenia 1946
 Brown codling 2004
 Buckler dory 2227
budegassa, Lophius 2044,**2048**-2049
bufo, Scorpaena 2279
Bufoceratias 2064
 Bullseye grenadier 1962
 Bunguelovelies. 1558
 Butterfishes. 1577-1578
 Butterfly flabby whalefish. 2179
byrkelange, Molva 2027
BYTHITIDAE 1540,1944,1946,**1953**,1955,1959,
 1965,1992,2005,2023,2290
C
 Caballito de mar 2235
 Cabete escamudo 2310
 Cabete espinudo 2313
 Cabracho 2281
 Cadenat's scorpionfish 2274
cadenati, Hoplostethus **2190**-2191
cadenati, Merluccius 2013
cadenati, Merluccius polli 2013
cadenatim Merluccius merluccius **2013**
cadmani, Lepidotrigla 2298,**2310**
caelorhincus, Caelorinchus 1983
caelorhincus, Coelorinchus **1982**
Caelorinchus caelorhincus 1983
CALLANTHIIDAE 1559

CALLIONYMIDAE	1572	Cavebass	1568
CALLIONYMOIDEI	1572	Cavernous-peduncled flabby whalefish	2178
Caluga	2110	<i>caவில்one, Lepidotrigla</i>	2312-2313
<i>cameronensis, Sardinella</i>	1736	<i>caவில்one, Trigla</i>	2312
<i>cameronensis, Sardinella</i>	1736	Centrobranchus	1860-1861,1884
<i>canaliculatus, Liza dumerili</i>	2092	Centrobranchus nigroocellatus	1884
<i>canaliculatus, Mugil</i>	2091	CENTROLOPHIDAE	1577
<i>canaliculatus, Strializa</i>	2091	CENTROPHRYNIDAE	1547, 2070
canariensis, Scorpaena	2271	<i>Cephalacanthus volitans</i>	2248
Canary scorpionfish	2271	<i>cephalus ashanteensis, Mugil</i>	2105
Candil africano	2199	<i>cephalus, Mugil</i>	2103,2105
Candil colorado	2201	CEPOLIDAE	1567
Candil espinosa	2200	CERATIIDAE	1547, 2071
Candil gallito	2198	<i>Ceratoscopelus</i>	1884
Cape gurnard	2302	<i>Ceratoscopelus maderensis</i>	1884
Cape John dory	2228	<i>Ceratoscopelus warmingii</i>	1885
Cape Verde mullet	2085	CETOMIMIDAE	1551,2169,2171, 2173
Capelan de Méditerranée	2035	<i>Cetomimoides parri</i>	2179
Capellán	2035	<i>Cetomimus</i>	2174
<i>capellonis, Arius</i>	1748	<i>Cetomimus compunctus</i>	2178
<i>capellonis, Tachysurus</i>	1748	<i>Cetomimus gillii</i>	2178
<i>capensis paradoxus, Merluccius</i>	2012	<i>Cetomimus hempeli</i>	2178
capensis, Chelidonichthys	2302	<i>Cetomimus sp. nov.</i>	2179
<i>capensis, Engraulis</i>	1715-1716,1718	<i>Cetostoma regani</i>	2179
capensis, Merluccius	2010,2012-2013	<i>Chaenophryne</i>	2066
<i>capensis, Merluccius merluccius</i>	2010	CHAETODONTIDAE	1566
<i>capensis, Trigla</i>	2302	<i>Chalinura occidentalis</i>	1986
capensis, Zeus	2228	Challenger's spiny eel	1603
<i>capito, Mugil</i>	2097	challengeri, Polyacanthonotus	1603
Capo chaznete negro	2279	Channeled roskfish	2286
CAPROIDAE	1578,2204,2206,2216,2219,2224,2245	Chato de Guinea	2288
CAPROIDEI	1578	CHAULIODONTIDAE	1533,1784,1789,1793,1797, 1801,1805,1807,1810,1817
capurrii, Mugil	2104	<i>Chauliodus</i>	1861
CARANGIDAE	1561	CHAUNACIDAE	1545,2045,2052, 2054 ,2057
CARAPIDAE	1540, 1944 ,1946,2293	Chaves' lanternfish	1902
Cardinalfishes	1559	chavesi, Lampadena	1902
CARISTIIDAE	1562	<i>Chelidonichthys capensis</i>	2302
<i>Carlarius gigas</i>	1743, 1745	<i>Chelidonichthys cuculus</i>	2303
<i>Carlarius heudelotii</i>	1746	<i>Chelidonichthys gabonensis</i>	2298, 2304
<i>Carlarius latiscutatus</i>	1747	<i>Chelidonichthys gurnardus</i>	2309
<i>Carlarius parkii</i>	1748	<i>Chelidonichthys lastoviza</i>	2305
Carol's gurnard	2311	<i>Chelidonichthys lastoviza africana</i>	2305
carolae, Lepidotrigla	2298, 2311 ,2313	<i>Chelidonichthys lucerna</i>	2306
<i>carolea, Lepidotrigla</i>	2313	<i>Chelidonichthys obscurus</i>	2307
Caroline	2311	<i>Chelidonichthys queketti</i>	2304, 2308
cataphractum, Peristedion	2296	<i>Chelidonichthys senegalensis</i>	2304
Catfishes	1530	<i>chelo, Mugil</i>	2086
caudispinosus, Notoscopelus (Notoscopelus)	1922	<i>Chelon aurata</i>	2088
CAULOPHRYNIDAE	1545, 2059	<i>Chelon bandialensis</i>	2090

<i>Chelon bispinosus</i>	2085	Common Atlantic grenadier	1987
<i>Chelon dumerili</i>	2091	Common mora	2002
<i>Chelon labrosus</i>	2085-2086	Common redmouth whalefish	2170
<i>Chelon ramada</i>	2097	<i>communis</i> , <i>Merlangus</i>	2020,2033
<i>Chelon richardsonii</i>	2099	<i>compunctus</i> , <i>Cetomimus</i>	2178
<i>Chelon saliens</i>	2100	<i>conchifer</i> , <i>Zenopsis</i>	2227
<i>Chelon tricuspidens</i>	2102	Conger eels	1527
Chemnitz's spiny eel	1603	CONGRIDAE	1527,1680
<i>chemnitzii</i> , <i>Notacanthus</i>	1603	<i>copei wilsoni</i> , <i>Paraliparis</i>	2295
CHIASMODONTIDAE	1570	<i>corax</i> , <i>Trigla</i>	2306
<i>chinensis maculatus</i> , <i>Aulostomus</i>	2239	Corneta	2244
<i>chinensis strigosus</i> , <i>Aulostomus</i>	2239	Corneta colorada	2243
<i>Chirolophius kempfi</i>	2047	Cornetfish	2244
<i>Chirostomias</i>	1809,1861	Cornetfishes	1555
Chivato de fondo	1942	Cornetfishes	2241
CHLOPSIDAE	1525,1611	Cornette rouge	2243
CHLOROPHTHALMIDAE	1535,1829,1856	Cornette tachetée	2244
<i>chordatus</i> , <i>Stylephorus</i>	1931	<i>Corniger spinosus</i>	2200
CICHLIDAE	1568	<i>corvus</i> , <i>Trigla</i>	2306
Cichlids	1568	CORYPHAENIDAE	1561
<i>Ciliata</i>	2015	<i>Coryphaenoides sublaevis</i>	1986
<i>cimbrius</i> , <i>Enchelyopus</i>	2021	<i>Coryphaenoides talismani</i>	1984
CIRRHITIDAE	1567	<i>Cosmocampus retropinnis</i>	2233
CITHARIDAE	1579	<i>Cottunculus spinosus</i>	2290
CLARIIDAE	1743	Crapaud	2279
Clingfishes	1572	<i>Crassispinus granulatus</i>	2210
<i>Clupea africana</i>	1719	<i>Crenimugil labrosus</i>	2086
CLUPEIDAE	1529,1585,1589,1591,1593, 1716,1720,1722	Crestfishes	1539,1935
CLUPEIFORMES	1529,1715	Cripplefin lanternfish	1918
Cobia	1561	<i>cristatus</i> , <i>Zu</i>	1937
<i>cocco</i> , <i>Gonichthys</i>	1899	<i>cristulata cristulata</i> , <i>Trachyscorpia</i>	2287
Cocco's lanternfish	1899	<i>cristulata echinata</i> , <i>Trachyscorpia</i>	2251,2287
Codlets	1541,1957	<i>cristulata</i> , <i>Trachyscorpia</i>	2251
Codling	2001	<i>cristulata</i> , <i>Trachyscorpia cristulata</i>	2287
Cods	1541	Croakers	1565
<i>Coelorhynchus atlanticus</i>	1982	Crocodile lanternfish	1907
<i>Coelorhynchus coelorhynchus</i>	1983	<i>crocodilus</i> , <i>Lampanyctus</i>	1907
<i>Coelorhynchus laville</i>	1982	Crown lanternfish	1887
<i>coelorhynchus</i> , <i>Coelorhynchus</i>	1983	<i>cuculus</i> , <i>Aspitrigla</i>	2303
<i>coelorhynchus</i> , <i>Macrurus</i> (<i>Coelorhynchus</i>)	1982	<i>cuculus</i> , <i>Chelidonichthys</i>	2303
<i>Coelorinchus caelorrhincus</i>	1982	<i>cuprarium</i> , <i>Nannobranchium</i>	1919
<i>Coelorinchus geronimo</i>	1983,1989	<i>curema</i> , <i>Mugil</i>	2107
<i>Coelorinchus labiatus</i>	1984	<i>curtipes</i> , <i>Laemonema</i>	2001
<i>Coelorinchus mediterraneus</i>	1984	<i>curvidens</i> , <i>Mugil</i>	2103,2109
<i>Coelorinchus occa</i>	1984	<i>curvidens</i> , <i>Myxus</i>	2104,2109
<i>colias</i> , <i>Gadus</i>	2034	<i>curvidens</i> , <i>Querimana</i>	2109
COLOCONGRIDAE	1526,1667	Cusk eels	1540
<i>colonensis</i> , <i>Scorpaena</i>	2279	Cusk-eels	1946
Combtooth blennies	1572	Cutthroat eels	1526

<i>Cyclothone</i>	1783,1789,1793	<i>Diaphus fragilis</i>	1889
<i>Cyema atrum</i>	1704	<i>Diaphus garmani</i>	1889
CYEMATIDAE	1528,1704	<i>Diaphus holti</i>	1890
CYNOGLOSSIDAE	1581	<i>Diaphus hudsoni</i>	1890
<i>Cynothrissa</i>	1722	<i>Diaphus lucidus</i>	1891
CYTTIDAE	1553,2202,2206,2224	<i>Diaphus luetkeni</i>	1891
<i>Cyttopsis rosea</i>	2226	<i>Diaphus meadi</i>	1892
<i>Cyttosoma boops</i>	2212	<i>Diaphus metopoclampus</i>	1892
<i>Cyttus</i>	2204	<i>Diaphus mollis</i>	1893
<i>Cyttus hololepis</i>	2215	<i>Diaphus ostensfeldi</i>	1893
<i>Cyttus traversi</i>	2202	<i>Diaphus perspicillatus</i>	1894
D		<i>Diaphus problematicus</i>	1894
DACTYLOPTERIDAE	1555,2248,2296,2299	<i>Diaphus rafinesquii</i>	1895
<i>dactylopterus angolensis, Helicolenus</i>	2260	<i>Diaphus splendidus</i>	1895
<i>dactylopterus dactylopterus, Helicolenus</i>	2260	<i>Diaphus subtilis</i>	1896
<i>dactylopterus lahillei, Helicolenus</i>	2260	<i>Diaphus taaningi</i>	1896
<i>Dactylopterus volitans</i>	2248	<i>Diaphus termophilus</i>	1897
<i>dactylopterus, Helicolenus</i>	2251,2260	<i>Diaphus vanhoeffeni</i>	1897
<i>dactylopterus, Helicolenus dactylopterus</i>	2260	Diassanga mullet	2090
Daggertooths	1537,1549	<i>Dibranchus</i>	2056
<i>dalglesihi, Xenolepidichthys</i>	2222	<i>Diceratias</i>	2064
<i>dalwigki, Physiculus</i>	2004	DICERATIIDAE	1546,2064
Damselfishes	1569	<i>didymogramma, Holoscorpaena</i>	2279
<i>Danacetichthys galathenus</i>	2180	<i>dieuzeidei, Lepidotrigla</i>	2313
<i>Danaphos</i>	1792	<i>Dinematichthys</i>	1953
<i>dannevigi, Mora</i>	2002	DINOPERCIDAE	1568
Darwin's slimehead	2189	DIODONTIDAE	1583
<i>darwinii, Gephyroberyx</i>	2189	<i>Diogenichthys</i>	1860,1898
<i>dea, Lampadena</i>	1903	<i>Diogenichthys atlanticus</i>	1898
<i>decadactylus, Beryx</i>	2194	<i>Diplophos</i>	1783,1789,1793
Deep boarfish	1574	<i>dipterygia dipterygia, Molva</i>	2028
Deep-water Cape hake	2012	<i>dipterygia macrophthalma, Molva</i>	2028
Deepsea lizardfishes	1537	<i>dipterygia, Molva</i>	2027
Deepsea smelts	1531	<i>dipterygia, Molva dipterygia</i>	2028
Deepwater cardinalfishes	1560	DIRETMIDAE	1551,2183-2184,2187
Deepwater dragonets	1573	<i>distofax, Bolinichthys</i>	1882
Deepwater lanternfish	1927	<i>Ditropichthys storeri</i>	2180
DERICHTHYIDAE	1526,1669	Doflein's lanternfish	1913
<i>Desmodema</i>	1937	<i>dofleini, Lobianchia</i>	1913
<i>Desmodema polystictum</i>	1937	Dolphinfishes	1561
<i>diadematus, Diaphus</i>	1887	Dories	1553-1554,2223
<i>Diaphus</i>	1885	<i>dorsalis, Ethmalosa</i>	1731
<i>Diaphus adenomus</i>	1885	Dotback lanternfish	1909
<i>Diaphus anderseni</i>	1886	Double-spine seadevils	1546,2064
<i>Diaphus bertelseni</i>	1886	Doublekeel flabby whalefish	2180
<i>Diaphus brachycephalus</i>	1887	Doublethread grenadier	1963
<i>Diaphus diadematus</i>	1887	DRACONETTIDAE	1573
<i>Diaphus dumerilii</i>	1888	Dragonets	1572
<i>Diaphus effulgens</i>	1888	Dreamers	2066

- Dreamers 1547
DREPANEIDAE 1566, **2203**
 Driftfishes 1577
 Duckbill eels 1527
 Duckbills 1571
 Dumeril's lanternfish 1888
dumerili canaliculatus, Liza 2092
dumerili dumerili, Liza 2092
dumerili, Chelon 2091
dumerili, Liza 2088-2089, **2091**, 2097-2098,
 2100-2101
dumerili, Liza dumerili 2092
dumerili, Liza saliens 2092
dumerilii, Diaphus **1888**
duodecim, Nezumia **1989**
 Dusky lanternfish 1919
 Dwarf dory 2215
 Dwarf dory 2215
 Dwarf mullet 2109
- E**
- East Atlantic pipefish 2236
eba, Sardinella 1736
ECHENEIDAE 1560
echinata, Trachyscorpia cristulata 2251, **2287**
Ectreposebastes 2252
Ectreposebastes imus 2250-2251, **2259**
Ectreposebastes niger 2259
 Edwards' paraliparis 2295
edwardsi, Paraliparis **2295**
 Eelpouts 1570
 Eels 1524
effulgens, Diaphus **1888**
Electrona 1861, 1898
Electrona risso 1860, **1898**
ELEOTRIDAE 1573
elongata, Molva dipterygia 2028
elongata, Scorpaena **2272**, 2284
elongatus, Notoscopelus (Notoscopelus) **1922**
elongatus, Radiicephalus 1933
elongatus, Scorpaenodes **2284**
ELOPIDAE 1523, **1584**, 1588, 1723
 ELOPIFORMES 1523, **1584**
Elops 1584
Elops lacerta 1586-1587
Elops senegalensis 1586-1587
EMMELICHTHYIDAE 1562
 Emperors 1564
Enchelyopus 2015
Enchelyopus cimbrius **2021**
encrasicolus, Engraulis 1715-1717
ENGRAULIDAE 1529, 1585, 1589, **1715**, 1720, 1723
Engraulis 1715
Engraulis australis **1715**
Engraulis capensis 1715-1716, 1718
Engraulis encrasicolus 1715-**1717**
Engraulis japonicus 1715
Enneacampus ansorgii **2233**
Enneacampus kaupi **2234**
EPHIPPIDAE 1574
EPIGONIDAE 1560
erythraea, Scorpaena 2280
 Escorpión 2279
 Escórpora 2278
esculentus, Merluccius 2011
Ethmalosa dorsalis 1731
Ethmalosa fimbriata 1722, **1731**-1732
 Ethmalose d'Afrique 1731
Eumecichthys 1935
 European anchovy 1717
 European hake 2011
 European pilchard 1734
EURYPHARYNGIDAE 1528, 1705-1706, **1708**, 1711
Eurypharynx 1706, 1709
Eurypharynx pelecanoioides 1708-1709
Eutrigla gurnardus **2309**
EVERMANNELLIDAE 1536, **1838**
EXOCOETIDAE 1549, **2131**
exul, Apistes 2279
- F**
- faber, Zeus* **2223**, **2229**
falcipinnis, Liza 2093, 2095
falcipinnis, Neochelon 2093
fallax, Alosa 1722, **1730**
 False brotulas 1570
 False morays 1525
 Faneca 2034
 Faneca plateada 2032
 Fanfare lanternfish 1923
 Fanfin anglerfishes 1545
 Fanfins 2059
 Fangtooths 1551, 2182
fasciata, Scorpaena 2280
 Fathead sculpins 2290
 Fathead sculpins 1556
feliceps, Arius 1750
feliceps, Galeichthys **1750**
feliceps, Tachysurus 1750
 Festive lanternfish 1907

<i>festivus, Lampanyctus</i>	1907	<i>Gadus barbatus</i>	2034
Filefishes	1582	<i>Gadus bibus</i>	2034
<i>filifer, Sebastes</i>	2264	<i>Gadus bifurcus</i>	2025
<i>fimbriata, Ethmalosa</i>	1722, 1731 -1732	<i>Gadus colias</i>	2034
<i>finta, Alosa</i>	1730	<i>Gadus fuscus</i>	2020
Firebrow lanternfish	1885	<i>Gadus jubatus</i>	2020
<i>Fistularia petimba</i>	2241, 2243	<i>Gadus melanostomus</i>	2033
<i>Fistularia serrata</i>	2243	<i>Gadus merluccius</i>	2010
<i>Fistularia tabacaria</i>	2241, 2244	<i>Gadus potasso</i>	2033
<i>Fistularia villosa</i>	2243	<i>Gadus ruber</i>	2011
FISTULARIIDAE	1555,2230,2239, 2241	<i>Gadus tricirratus</i>	2020
Flabby lanternfish	1896	GAIDROPSARIDAE	1543, 2015
Flabby whalefishes	2173	<i>Gaidropsarus</i>	2015,2019
Flagfins	1534	<i>Gaidropsarus barbatus</i>	2019
Flatface lanternfish	1894	<i>Gaidropsarus biscayensis</i>	2019
Flathead grey mullet	2105	<i>Gaidropsarus granti</i>	2021
Flatheads	1556,1579,2288	<i>Gaidropsarus guttatus</i>	2022
Flutemouths	2241	<i>Gaidropsarus macrophthalmus</i>	2019 ,2022
Flying gurnard	2248	<i>Gaidropsarus mediterraneus</i>	2020
Flying gurnards	1555,2248	<i>Gaidropsarus mustellaris</i>	2020
Flyingfishes	1549	<i>Gaidropsarus vulgaris</i>	2019-2020, 2022
Folgor's scorpionfish	2262	<i>gaillardae, Scorpaena</i>	2282
<i>folgori, Neomerinthe</i>	2262	<i>galathenus, Danacetichthys</i>	2180
Footballfishes	1546,2062	<i>Galeichthys ater</i>	1749
Forkbeard	2026	<i>Galeichthys feliceps</i>	1750
Fourbeard rockling	2021	Gallineta	2260
Fragile lanternfish	1889	Gallineta rosada	2272
<i>fragilis, Diaphus</i>	1889	Galúa	2100
Freshwater eels	1524	Galúa africana	2104
Frogfishes	1544,2051	Galupe	2088
<i>furcatus, Phycis</i>	2025-2026	<i>gambensis, Arius</i>	1747
<i>fuscus, Gadus</i>	2020	<i>gambensis, Trachysurus</i>	1747
G		Garman's lanternfish	1889
Gabon gurnard	2304	<i>garmanim, Diaphus</i>	1889
<i>gabonensis, Chelidonichthys</i>	2298, 2304	Garneo	2314
<i>gabonensis, Trigla</i>	2304	GASTEROSTEIFORMES	1554, 2230
Gadella	1998	<i>Gastrostomus bairdii</i>	1708
<i>Gadella imberbis</i>	1998, 2003	Gauss' lanternfish	1912
<i>Gadella maraldi</i>	1998	<i>gaussi, Lepidophanes</i>	1912
<i>Gadiculus argenteus</i>	2032	<i>gemellarii, Lobianchia</i>	1913
<i>Gadiculus argenteus argenteus</i>	2032	Gemellaro's lanternfish	1913
<i>Gadiculus argenteus thori</i>	2032	GEMPYLIDAE	1576
GADIDAE	1543,1947,1953,1955,1992, 2008,2023, 2029	<i>Gephyroberyx</i>	2186
GADIFORMES	1541, 1957	<i>Gephyroberyx darwinii</i>	2189
<i>gadoides, Blennius</i>	2025	<i>geronimo, Coelorinchus</i>	1983, 1989
<i>Gadomus arcuatus</i>	1963	GERREIDAE	1563
<i>Gadus albidus</i>	2025	Ghanean rockfish	2263
<i>Gadus argenteolus</i>	2020	Giant sea catfish	1745
		GIBBERICHTHYIDAE	2169

- GIGANTACTINIDAE** 1548, **2073**
- GIGANTURIDAE** 1537, **1853**
- gigas, Arius* 1745
- gigas, Carlarius* 1743, **1745**
- Gill's flabby whalefish 2178
- gillii, Cetomimus* **2178**
- ginsburgi, Scorpaena* 2279
- GIRELLIDAE** 1559
- glaciale, Benthosema* **1881**
- Glacier lanternfish 1881
- glesne, Regalecus* 1939-1940
- gmelini, Batrachoides* 2025
- Goatfishes 1565, 1943
- Gobies 1573
- GOBIESOCIDAE** 1572
- GOBIESOCOIDEI 1572
- GOBIIDAE** 1573, 2293
- GOBIOIDEI 1573
- Goddess lanternfish 1903
- Golden grey mullet 2088
- Gonichthys* 1860, 1899
- Gonichthys cocco* **1899**
- Gonorhynchus gonorhynchus* 1740
- Gonorhynchus greyi* 1741
- gonorhynchus, Gonorhynchus* 1740
- GONORYNCHIDAE** 1530, **1740**
- GONORYNCHIFORMES 1530, 1740
- Gonorynchus gonorynchus* **1740**
- gonorynchus, Gonorynchus* **1740**
- Gonostoma* 1783, 1789, 1793
- GONOSTOMATIDAE** 1532, **1783**, 1789, 1793, 1798, 1802, 1807, 1810, 1817, 1856, 1861
- Gonostomatids 1785
- gonotus, Trigla* 2312
- Goosefishes 1544, 2044
- GRAMMICOLEPIDIDAE** 1554, 2203, 2216, **2218**, 2224
- Grammicolepids 2218
- Grammicolepis brachiusculus* **2221**
- Grammoplites gruveli* 2288
- Granadero liso 1987
- Granadero tristán 1982
- Grande allache 1736
- grandicornis, Scorpaena* 2273, 2279
- grandisquamis, Liza* 2090, 2094-**2095**
- grandisquamis, Parachelon* 2095
- granigera, Sardinella* 1736
- Grant's rockling 2021
- granti, Gaidropsarus* **2021**
- granulatus, Arius* 1748
- granulosus, Crassispinus* 2210
- Greater forkbeard 2025
- Greater pipefish 2237
- Greeneyes 1535
- Grenadier barbu 1985
- Grenadier lisse 1987
- Grenadier raton 1982
- Grenadier scie 1986
- Grenadiers 1542, 1968
- Grey gurnard 2309
- greyi, Gonorynchus* 1741
- Grondin cabote 2306
- Grondin camard 2305
- Grondin de Carole 2311
- Grondin de dieuzeide 2313
- Grondin du cap 2302
- Grondin du Gabon 2304
- Grondin écailleux 2310
- Grondin gris 2309
- Grondin lye 2314
- Grondin mineur 2308
- Grondin perlon 2306
- Grondin rouge 2303
- Grondin sombre 2307
- Grondin volant 2248
- Grooved mullet 2091
- Groppos 1559
- Groupers 1558
- grunniens, Trigla* 2309
- Grunts 1563
- gruveli, Grammoplites* 2288
- gruveli, Platycephalus* 2288
- gruveli, Solitas* **2288**
- guentheri, Halosaurus* **1599**
- guentheri, Lepidion* **2004**
- guentheri, Lepidophanes* **1912**
- guentheri, Setarches* 2251, **2286**
- Guinea flathead 2288
- Guinea oreo 2208
- Guinean codling 1999
- Guinean sea catfish 1748
- Guinée d'Afrique occidentale 1586
- Guinée du Sénégal 1587
- guineensis, Allocyttus* **2208**
- guineensis, Anchoa* 1717
- gulosus, Parataeniophorus* 2179
- Gulpers 1528, 1705
- Günther's halosaur 1599
- Günther's lanternfish 1912

Gurnards	1557,2298	<i>herringi</i> , <i>Monognathus</i>	1713
<i>gurnardus</i> , <i>Chelidonichthys</i>	2309	Herrings	1529,1722
<i>gurnardus</i> , <i>Eutrigla</i>	2309	HETERENCHELYIDAE	1525,1607
<i>gurnardus</i> , <i>Trigla</i>	2309	<i>Heteromugil tricuspidens</i>	2102
<i>guttatus</i> , <i>Gaidropsarus</i>	2022	<i>heudeloti</i> , <i>Arius</i>	1748
<i>guttatus</i> , <i>Lampris</i>	1929-1930	<i>heudelotii</i> , <i>Arius</i>	1746
<i>guttulatus</i> , <i>Hippocampus</i>	2235	<i>heudelotii</i> , <i>Carlarius</i>	1746
<i>Gymnoscopelus</i>	1861	<i>heudelotii</i> , <i>Tachysurus</i>	1748
<i>Gyrinomimus</i>	2174	<i>Hidronus marlucius</i>	2011
<i>Gyrinomimus myersi</i>	2180	<i>hildebrandi</i> , <i>Nezumia</i>	1987-1988
H		HIMANTOLOPHIDAE	1546,2062
HAEMULIDAE	1563	Hinds	1558
Hairytail swallower eel	1707	Hippocampe à long bec	2235
Hakes	1541	Hippocampe à nez court	2235
<i>Halargyreus johnsonii</i>	2003	<i>Hippocampus</i>	2230
Halfbeaks	1549	<i>Hippocampus algiricus</i>	2234
<i>Halieutichthys</i>	2056	<i>Hippocampus guttulatus</i>	2235
<i>Haloporphyreus modestum</i>	2000	<i>Hippocampus hippocampus</i>	2235
HALOSAURIDAE	1524, 1594 ,1740	<i>hippocampus</i> , <i>Hippocampus</i>	2235
<i>Halosauropsis macrochir</i>	1598	<i>hirundo</i> , <i>Trigla</i>	2306
Halosaurs	1524,1594	<i>Histrio</i>	2051
<i>Halosaurus attenuatus</i>	1599	<i>hoefleri</i> , <i>Liza saliens</i>	2092
<i>Halosaurus guentheri</i>	1599	<i>hoefleri</i> , <i>Mugil</i>	2091
<i>Halosaurus johnsonianus</i>	1599	Hollowcheek seadevils	1547,2070
<i>Halosaurus ovenii</i>	1600	Hollowsnout grenadier	1982
Hamlets	1558	HOLOCENTRIDAE	1552,2195
Hammerjaws	1536	HOLOCENTRINAE	2195,2198
<i>Haplophryne</i>	2075-2076	<i>Holocentrus adscensionis</i>	2198
<i>Harengula rouxi</i>	1737	<i>Holocentrus ascensionis</i>	2198
<i>hastatum</i> , <i>Sargocentron</i>	2199	<i>Holocentrus hastatus</i>	2199
<i>hastatus</i> , <i>Adioryx</i>	2199	<i>hololepis</i> , <i>Cyttus</i>	2215
<i>hastatus</i> , <i>Holocentrus</i>	2199	<i>hololepis</i> , <i>Zenion</i>	2215
Hatchetfishes	1532,1792	<i>Holoscorpaena didymogramma</i>	2279
Hawaiian halosaur	1598	Holt's lanternfish	1890
<i>hawaiiensis</i> , <i>Malacocephalus</i>	1985	<i>holti</i> , <i>Diaphus</i>	1890
Hawkfishes	1567	Hooked redmouth whalefish	2170
Headlight lanternfish	1888	Hoplostète argenté	2190
Hector's lanternfish	1905	Hoplostète de Darwin	2189
<i>hectoris</i> , <i>Lampanyctodes</i>	1905	Hoplostète noir	2190
<i>helgae</i> , <i>Neocyttus</i>	2208, 2210 -2211	Hoplostète orange	2189
<i>Helicolenus dactylopterus</i>	2251,2260	Hoplostète scutelle	2191
<i>Helicolenus dactylopterus angolensis</i>	2260	<i>Hoplostethus</i>	2186
<i>Helicolenus dactylopterus dactylopterus</i>	2260	<i>Hoplostethus atlanticus</i>	2186, 2189
<i>Helicolenus dactylopterus lahillei</i>	2260	<i>Hoplostethus cadenati</i>	2190 -2191
<i>Helicolenus maderensis</i>	2260	<i>Hoplostethus mediterraneus</i>	2190
HEMIRAMPHIDAE	1549, 2156	<i>Hoplostethus mediterraneus trunovi</i>	2190
Hempel's flabby whalefish	2178	<i>Hoplostethus melanopus</i>	2191
<i>hempeli</i> , <i>Cetomimus</i>	2178	<i>Hoplostethus vniro</i>	2190-2191
Herring's one-jawed eel	1713	Horned lanternfish	1895

- HOWELLIDAE** 1568
Hudson's lanternfish 1890
hudsoni, *Diaphus* **1890**
huloti, *Physiculus* **2004**
Hygom's lanternfish 1900
hygomii, *Hygophum* **1900**
Hygophum 1899
Hygophum benoiti **1899**
Hygophum hygomii **1900**
Hygophum macrochir **1900**
Hygophum reinhardtii **1901**
Hygophum taaningi **1901**
Hypomacrus africanus **2283**
hypselopterus, *Mugil* 2095
hyrax, *Trigla* 2306
- I**
- Ichthyococcus* 1788
IDIACANTHIDAE 1533,1784,1789,1793,1798,
1802,**1804**,1807,1810,1817
IDIACANTHINAE 1804
Idiastion 2252
Idiastion kyphos 2251,2261
Ilisha africana **1719**
imberbis, *Brosmiculus* 1998
imberbis, *Gadella* 1998,**2003**
immaculatus, *Lampris* 1930
imperialis, *Sebastes* 2260
imus, *Ectreposebastes* 2250-2251,**2259**
indicus, *Bolinichthys* 1882
INERMIIDAE 1568
Insular scorpionfish 2285
insularis, *Scorpaenodes* 2285
interrupta, *Loweina* 1914
intricarius, *Lampanyctus* 1908
Intricate lanternfish 1908
IPNOPIIDAE 1535,**1833**
Irish oreo 2210
Isaac's lanternfish 1920
isaacsi, *Nannobranchium* 1920
ISTIOPHORIDAE 1579
- J**
- Jacks 1561
jacobus, *Myripristis* **2201**
japonicum, *Zenion* 2215
japonicus, *Engraulis* **1715**
japonicus, *Macrurus* 1984
Jellynose fishes 1534
Jellynoses 1534
Jespersen's one-jawed eel 1714
jespersenii, *Monognathus* **1714**
John dory 2229
Johnson's halosaur 1599
johnsonianus, *Halosaurus* **1599**
johnsonii, *Halargyreus* **2003**
jubatus, *Gadus* 2020
- K**
- kaupi*, *Enneacampus* **2234**
kempi, *Chirolophius* 2047
kempi, *Lophiodes* **2047**
King dory 2202
Kob 1749
Kreff's lanternfish 1926
kreffti, *Symbolophorus* **1926**
kreoyerii, *Notoscopelus (Notoscopelus)* **1922**
Krøyer's lanternfish 1922
kuhlii, *Pontinus* 2251,**2264**,2271,2287
kyphos, *Idiastion* 2251,**2261**
KYPHOSIDAE 1567
- L**
- labeo*, *Oedalechilus* 2086,**2110**
labiatus, *Coelorinchus* **1984**
LABRIDAE 1569
LABRISOMIDAE 1572
Labrisomids 1572
LABROIDEI 1568
labrosus, *Chelon* 2085-**2086**
labrosus, *Crenimugil* 2086
labrosus, *Mugil* 2086
lacepede, *Lophotus* **1935**
lacerta, *Elops* **1586**-1587
Ladyfishes 1523,1584
Laemonema curtipes 2001
Laemonema laureysi **1999**
Laemonema robustum **2000**
Laemonema yarrellii **2001**
laevis, *Malacocephalus* **1985**
laevis, *Scorpaena* **2273**
laevis, *Trigla* 2306
laevispinnis, *Lepidotrigla* 2310
lagoensis, *Trachysurus* 1747
lahillei, *Helicolenus dactylopterus* 2260
Lampadena 1902
Lampadena anomala **1902**
Lampadena chavesi **1902**
Lampadena dea **1903**
Lampadena luminosa **1903**
Lampadena notialis 1904

<i>Lampadena pontifex</i>	1904	<i>leonensis, Pellonula</i>	1732
<i>Lampadena speculigera</i>	1904	<i>Lepidion guentheri</i>	2004
<i>Lampadena urophaos atlantica</i>	1905	<i>Lepidoleprus trachyrincus</i>	1966
<i>Lampanyctodes</i>	1861,1905	<i>Lepidophanes</i>	1912
<i>Lampanyctodes hectoris</i>	1905	<i>Lepidophanes gaussi</i>	1912
<i>Lampanyctus</i>	1856,1906	<i>Lepidophanes guentheri</i>	1912
<i>Lampanyctus alatus</i>	1906	<i>Lepidotrigla cadmani</i>	2298,2310
<i>Lampanyctus australis</i>	1906	<i>Lepidotrigla carolae</i>	2298,2311,2313
<i>Lampanyctus crocodilus</i>	1907	<i>Lepidotrigla carolea</i>	2313
<i>Lampanyctus festivus</i>	1907	<i>Lepidotrigla cavillone</i>	2312-2313
<i>Lampanyctus intricarius</i>	1908	<i>Lepidotrigla dieuzeidei</i>	2313
<i>Lampanyctus macdonaldi</i>	1908	<i>Lepidotrigla laevispinnis</i>	2310
<i>Lampanyctus nobilis</i>	1909	<i>Leptacanthichthys</i>	2066
<i>Lampanyctus photonotus</i>	1909	LEPTOCHILICHTHYIDAE	1531,1762
<i>Lampanyctus pusillus</i>	1910	<i>lessepsianus, Merluccius merluccius</i>	2011
<i>Lampanyctus tenuiformis</i>	1910	Lesser gurnard	2308
<i>Lampanyctus vadulus</i>	1911	LETHRINIDAE	1564
<i>Lampichthys</i>	1911	<i>leucoptera, Trigla</i>	2312
<i>Lampichthys procerus</i>	1911	Lightfishes	1532,1788
LAMPRIDAE	1538,1929	Lighthousefishes	1788
Lampriforms	1929,1935,1937,1939	<i>limbatus, Phycis</i>	2026
LAMPRIFORMES	1538,1929	<i>lineata, Trigla</i>	2305
<i>Lampris immaculatus</i>	1930	lineatum, Nannobranchium	1920
<i>Lampris guttatus</i>	1929-1930	Lings	1543,2027
Lamprogrammus	1946	Lingue bleue	2027
<i>lanatus, Merluccius</i>	2011	<i>linnei, Merluccius</i>	2011
Lancetfishes	1536	Linophryne	2075
Lanternmule de Hector	1905	LINOPHRYNIDAE	1548,2075
Lanterne à grandes écailles	1927	Linternillas de Hector	1905
Lanterne crocodile	1907	<i>Lionurus (Nezumia) occidentalis</i>	1986
Lanterne de Doflein	1913	LIPARIDAE	1556,2290,2292
Lanterne glaciaire	1881	Lisa blanca	2107
Lanternfishes	1537-1538,1860	Lisa de Cabo Verde	2085
Large-scaled gurnard	2312	Lisa diassanga	2090
Largefin lanternfish	1900	Lisa enana	2109
Largescale flounders	1579	Lisa negra	2086
Largescaled blackchin	1858	Lisa sudafricana	2099
Largescaled mullet	2095	Lisa tridente	2102
Lasiognathus	2069	Liza acanalada	2091
<i>lastoviza africana, Chelidonichthys</i>	2305	Liza aletona	2093
lastoviza, Chelidonichthys	2305	Liza aurata	2088,2097
<i>laticutatus, Arius</i>	1747	Liza banana	2103
laticutatus, Carlarius	1747	Liza bandialensis	2090
laureysi, Laemonema	1999	Liza dumerili	2088-2098,2091,2097-2098, 2100-2101
<i>laville, Coelorhynchus</i>	1982	<i>Liza dumerili canaliculatus</i>	2092
Leaping African mullet	2104	<i>Liza dumerili dumerili</i>	2092
Leaping mullet	2100	Liza escamuda	2095
<i>leda, Pontinus</i>	2263,2265	Liza falcipinnis	2093,2095
Lefteye flounders	1580	Liza grandisquamis	2090,2094-2095

- Liza ramada* 2088, **2097**, 2100
Liza richardsonii **2099**
Liza saliens 2091, **2100**
Liza saliens dumerili 2092
Liza saliens hoeffleri 2092
Liza tricuspidens **2102**
 Lizardfishes 1534-1535
Lobianchia 1913
Lobianchia dofleini 1913
Lobianchia gemellarii 1913
LOBOTIDAE 1563
 Long-snouted freshwater pipefish 2234
 Long-snouted seahorse 2235
 Longfin bonefish 1592
 Longfin bonefishes 1524, 1592
 Longfin escolars 1575
 Longfin flabby whalefish 2179
 Longfin gurnard 2307
longibarbatius, Stomias 1816
longipinnis, Zenion 2215
longirostris, Trachyrincus 1966-1967
 Longneck eels 1526
 Longspine African angler 2047
 Longspine bellowsfish 2247
 Longspine snipefish 2247
 Longtail blackcap lanternfish 1920
 Lookdown dories 2202
 Loosejaws 1533, 1806
LOPHIIDAE 1544, **2044**, 2051, 2055, 2057
 LOPHIIFORMES 1544, **2044**
Lophiodes kempfi 2047
Lophius budegassa 2044, 2048-2049
Lophius piscatorius 2044, 2048-2049
Lophius vaillanti 2050
LOPHOTIDAE 1539, 1934-**1935**, 1940
 Lophotids 1935
Lophotus 1935, 1940-1941
Lophotus lacepede **1935**
loppei, Scorpaena **2274**
loricata, Rondeletia **2170**
Lota 2016
LOTIDAE 1543, 2016, 2024, **2027**
 LOTINAE 2015, 2023
 Louvar 1575
Loweina 1860, 1914
Loweina interrupta 1914
Loweina rara 1914
lucerna, Chelidonichthys 2306
lucerna, Trigla 2306
lucidus, Diaphus **1891**
luetkeni, Diaphus **1891**
lumbriciformis, Nerophis **2237**
luminosa, Lampadena **1903**
 Luminous lanternfish 1903
 Lunar lanternfish 1918
luscus, Trisopterus **2034**
lutea, Scorpaena 2281
LUTJANIDAE 1563
 Lutjanids 1563
 Lütken's lanternfish 1891
LUVARIDAE 1575
luzonensis, Malacocephalus 1985
Lycionodes 2007
Lyconus 2007
Lyconus brachycolus **2007**
lyra, Trigla **2314**
M
 Macabí 1590
 Macabí badejo 1592
 MacDonald's lanternfish 1908
macdonaldi, Lampanyctus **1908**
 Mâchoiron banderille 1746
 Mâchoiron de Guinée 1748
 Mâchoiron de tête rugueuse 1747
 Mâchoiron géant 1745
 Mâchoiron noir 1749
 Machuelo 1736
 Mackerels 1576
macrocephalus, Psychrolutes **2290**
macrochir, Halosauropsis **1598**
macrochir, Hygophum **1900**
macrodactylus, Trigla **2298**
macrolepidotus, Neoscopelus **1858**
macronema, Peristedion **2297**
macrophthalmus, Molva dipterygia 2028
macrophthalmus, Gaidropsarus 2019, **2022**
macrops, Bathygadus **1962**
MACRORAMPHOSIDAE 1555, **2245**, 2247
Macroramphosus scolopax **2247**
macrosolen, Notopogon **2247**
Macrostomias 1816
MACROURIDAE 1542, 1594, 1944, 1947, 1953, 1959,
 1964-1965, 1967-**1968**, 2008
 MACROURINAE 1968
Macrouroides 1944, 1964
MACROUROIDIDAE 1541, **1964**, 1969
 MACROUROIDINAE 1964, 1968
 Macrouroids 1541, 1964

MACROURONINAE	2007	<i>mccllellandi</i> , <i>Bregmaceros</i>	1957
<i>Macrourus rupestris</i>	1982	Mead's lanternfish	1892
<i>Macruronus</i>	2007	<i>meadi</i> , <i>Diaphus</i>	1892
<i>Macruronus maderensis</i>	2007	<i>mediterranea</i> , <i>Mora</i>	2002
<i>Macruropus violaceus</i>	1986	Mediterranean bigeye rockling	2019
<i>Macrurus (Coelorhynchus) coelorhynchus</i>	1982	Mediterranean slimehead	2190
<i>Macrurus atlanticus</i>	1982	<i>mediterraneus trunovi</i> , <i>Hoplostethus</i>	2190
<i>Macrurus japonicus</i>	1984	<i>mediterraneus</i> , <i>Coelorinchus</i>	1984
<i>Macrurus serratus</i>	1987	<i>mediterraneus</i> , <i>Gaidropsarus</i>	2020
<i>Macrurus smiliophorus</i>	1987	<i>mediterraneus</i> , <i>Hoplostethus</i>	2190
<i>maculatus</i> , <i>Aulostomus chinensis</i>	2239	<i>mediterraneus</i> , <i>Phycis</i>	2026
<i>maculatus</i>, <i>Pseudocyttus</i>	2214	Medusafishes	1577
<i>maculatus</i> , <i>Sebastes</i>	2260	<i>megalokynodon</i> , <i>Motella</i>	2019
Madeira lanternfish	1884	MEGALOPIDAE	1523,1584, 1588 ,1590,1593,1723
Madeira rockfish	2275	<i>Megalops atlanticus</i>	1588 -1590
Madeiran sardinella	1736	MELAMPHAIDAE	1550, 2163 ,2166
<i>maderensis</i> , <i>Ceratoscopelus</i>	1884	<i>melanobranchus</i> , <i>Bathygadus</i>	1962
<i>maderensis</i> , <i>Helicolenus</i>	2260	MELANOCETIDAE	1546, 2061
<i>maderensis</i> , <i>Macruronus</i>	2007	MELANONIDAE	1542,1960,1969,1992, 2005 ,2008
<i>maderensis</i> , <i>Sardinella</i>	1722,1732, 1736 -1737	<i>melanopus</i> , <i>Hoplostethus</i>	2191
<i>maderensis</i> , <i>Scorpaena</i>	2275	Melanostomiid	1810
<i>madurensis</i> , <i>Scorpaena</i>	2275	MELANOSTOMIIDAE	1534,1784,1789,1793,1798, 1802,1805,1807, 1809 ,1817
Malacho de Africa occidental	1586	MELANOSTOMIINAE	1810
Malacho senegalés	1587	<i>melanostomus</i> , <i>Gadus</i>	2033
<i>Malacocephalus hawaiiensis</i>	1985	Melliss's scorpionfish	2276
<i>Malacocephalus laevis</i>	1985	<i>mellissii</i> , <i>Scorpaena</i>	2276
<i>Malacocephalus luzonensis</i>	1985	<i>mento</i> , <i>Odaxothrissa</i>	1739
<i>Malacocephalus nipponensis</i>	1985	<i>mercatoris</i> , <i>Arius</i>	1746
<i>Malacocephalus occidentalis</i>	1986	Merlan argenté	2032
MALACOSTEIDAE	1533,1784,1789,1793,1798, 1802,1805- 1806 ,1810,1817	Merlan bleu	2033
MALACOSTEINAE	1806	<i>Merlangus albus</i>	2033
<i>Malacosteus</i>	1784,1789,1793	<i>Merlangus argenteus</i>	2032
Malarmado africano	2296	<i>Merlangus communis</i>	2020,2033
Malarmat africain	2296	<i>Merlangus pertusis</i>	2033
<i>Malthopsis</i>	2056	<i>Merlangus vernalis</i>	2033
<i>Manducus</i>	1789	Merlu côtier du Cap	2010
Manefishes	1562	Merlu d'Afrique tropicale	2013
<i>maraldi</i>, <i>Gadella</i>	1998	Merlu du large du Cap	2012
<i>Margrethia</i>	1783,1789,1793	Merlu du Sénégal	2014
Marignan rouge	2199	Merlu européen	2011
Marignon coq	2198	Merluccid	1542
Marignon épineus	2200	Merluccid hakes	2007
Marignon mombin	2201	MERLUCCIIDAE	1542,1992, 2007 ,2024,2027,2029
<i>marina</i> , <i>Tinca</i>	2026	MERLUCCIINAE	2007
Marine smelts	1530	<i>Merluccius</i>	2007
<i>marlucius</i> , <i>Hidronus</i>	2011	<i>Merluccius ambiguus</i>	1998
<i>maroccanus</i> , <i>Trachinoides</i>	2011	<i>Merluccius argentatus</i>	2011
Maruca azul	2027	<i>Merluccius attenuatus</i>	1998
<i>massiliensis</i> , <i>Scorpaena</i>	2280	<i>Merluccius cadenati</i>	2013

- merluccius cadenati*, *Merluccius* 2013
Merluccius capensis 2010,2012-2013
Merluccius capensis paradoxus 2012
merluccius capensis, *Merluccius* 2010
Merluccius esculentus 2011
merluccius lessepsianus, *Merluccius* 2011
Merluccius linnei 2011
Merluccius merluccius 2011,2014
Merluccius merluccius cadenati 2013
Merluccius merluccius capensis 2010
Merluccius merluccius lessepsianus 2011
Merluccius merluccius merluccius 2011
Merluccius merluccius paradoxus 2012
Merluccius merluccius polli 2013
Merluccius merluccius senegalensis 2014
Merluccius merluccius smiridus 2011
merluccius merluccius, *Merluccius* 2011
Merluccius paradoxus 2010,2012
merluccius paradoxus, *Merluccius* 2012
Merluccius polli 2010,2013-2014
Merluccius polli cadenati 2013
Merluccius polli polli 2013
merluccius polli, *Merluccius* 2013
Merluccius senegalensis 2011,2013-2014
merluccius senegalensis, *Merluccius* 2014
Merluccius smiridus 2011
merluccius smiridus, *Merluccius* 2011
Merluccius uraleptus 1998
Merluccius vulgaris 2010-2011
merluccius, *Gadus* 2010
merluccius*, *Merluccius 2011,2014
merluccius, *Merluccius merluccius* 2011
Merlucius ambiguus 2011
Merlucius lanatus 2011
Merlucius sinuatus 2011
Merluza de altura del Cabo 2012
Merluza de Benguela 2013
Merluza del Cabo 2010
Merluza del Senegal 2014
Merluza europea 2011
Merrett's spiny eel 1604
merretti*, *Polyacanthonotus 1604
Metallic lanternfish 1915
metopoclampus*, *Diaphus 1892
metzelaari, *Mugil* 2107
meyerwardeni, *Woodsia* 1788
microchir*, *Neoscopelus 1855,1858
MICRODESMIDAE 1573
microlepidota, *Trigla* 2306
Micromesistius poutassou 2011,2033
micronychodon*, *Nezumia 1989-1990
Microphis brachyurus aculeatus 2236
MICROSTOMATIDAE 1530,1754
Microthrissa miri 1732
Microthrissa normanae 1732
Midwater scorpionfish 2259
milvus, *Trigla* 2309
minimus*, *Taaningichthys 1928
minutus capelanus, *Trisopterus* 2035
minutus minutus, *Trisopterus* 2035
minutus*, *Trisopterus 2035
minutus, *Trisopterus minutus* 2035
Minyichthys sentus 2236
miri, *Microthrissa* 1732
miri, *Pellonula* 1732
miri, *Pellonula afzeliusi* 1732
Mirror lanternfish 1904
MOCHOKIDAE 1743
modesta, *Pellonula* 1736
modestum, *Haloporphyreus* 2000
Mojarras 1563
Molas 1583
MOLIDAE 1583
Mollareta 2022
Mollera azul 2003
Mollera moranella 2002
mollis*, *Diaphus 1893
Molva byrkelange 2027
Molva dipterygia 2027
Molva dipterygia dipterygia 2028
Molva dipterygia elongata 2028
Molva dipterygia macrophthalma 2028
Molva molva 2028
molva, *Molva* 2028
MONACANTHIDAE 1582
Monkfishes 2044
MONODACTYLIDAE 1565
monodi, *Mugil* 2104
MONOGNATHIDAE 1529,1705-1706,1708,1710
Monognathids 1710
Monognathus 1710
Monognathus bertini 1713
Monognathus boehlkei 1713
Monognathus herringi 1713
Monognathus jespersenii 1714
Monognathus nigeli 1714
Monognathus taningi 1714
Mora commun 2002

<i>Mora dannevigii</i>	2002	Mulet lippu	2086
<i>Mora mediterranea</i>	2002	Mulet mignon	2109
<i>Mora moro</i>	2002	Mulet porc	2097
<i>Mora pacifica</i>	2002	Mulet sauteur	2100
Moras	1542,1991	Mulet sauteur d'Afrique	2104
Morays	1525	Mulet sudafricain	2099
MORIDAE	1542,1947,1953,1955,1967, 1991,2006,2008,2024,2027,2030	Mulet tident	2102
Moro imberbe	2003	Mullets	1548,2077
<i>moro, Moro</i>	2002	MULLIDAE	1565,1943
MORONIDAE	1557	<i>multipunctatus, Scopelopsis</i>	1924
Morragute	2097	Multispotted lanternfish	1924
Mostelle	2019	MURAENESOCIDAE	1527, 1673
Mostelle de Méditerranée	2020	MURAENIDAE	1525, 1614
<i>Motella</i>	2019	<i>mustellaris, Gaidropsarus</i>	2020
<i>Motella megalokynodon</i>	2019	MYCTOPHIDAE	1538,1784,1789,1793,1798, 1802,1811,1817,1856, 1860
Motelle à quatre barbillons	2021	MYCTOPHIFORMES	1537, 1855
Motelle commune	2022	<i>Myctophum</i>	1915
<i>Mugil ashanteensis</i>	2105	<i>Myctophum affine</i>	1915
<i>Mugil bananensis</i>	2103,2105	<i>Myctophum asperum</i>	1915
<i>Mugil canaliculatus</i>	2091	<i>Myctophum nitidulum</i>	1916
<i>Mugil capito</i>	2097	<i>Myctophum obtusirostre</i>	1916
<i>Mugil capurrii</i>	2104	<i>Myctophum phengodes</i>	1917
<i>Mugil cephalus</i>	2103,2105	<i>Myctophum punctatum</i>	1917
<i>Mugil cephalus ashanteensis</i>	2105	<i>Myctophum selenops</i>	1860, 1918
<i>Mugil chelo</i>	2086	Myers' flabby whalefish	2180
<i>Mugil curema</i>	2107	<i>myersi, Gyrinomimus</i>	2180
<i>Mugil curvidens</i>	2103,2109	MYRIPRISTINAE	2195,2200
<i>Mugil hoeferi</i>	2091	<i>Myripristis</i>	2195
<i>Mugil hypselopterus</i>	2095	<i>Myripristis jacobus</i>	2201
<i>Mugil labrosus</i>	2086	MYROCONGRIDAE	1525, 1643
<i>Mugil metzelaari</i>	2107	<i>mystes, Scorpaena plumieri</i>	2279
<i>Mugil monodi</i>	2104	<i>Myxus curvidens</i>	2104,2109
<i>Mugil nigrostrigatus</i>	2085	N	
<i>Mugil our</i>	2105	Nacreous lanternfish	1911
<i>Mugil provensalis</i>	2085	Naked lanternfish	1928
<i>Mugil septentrionalis</i>	2086	<i>Nannobranchium</i>	1918
<i>Mugil trichodon</i>	2109	<i>Nannobranchium achirus</i>	1918
MUGILIDAE	1548, 2077	<i>Nannobranchium atrum</i>	1919
MUGILIFORMES	1548, 2077	<i>Nannobranchium cuprarium</i>	1919
Mulet à grandes nageoires	2093	<i>Nannobranchium isaacsi</i>	1920
Mulet à grosse tête	2105	<i>Nannobranchium lineatum</i>	1920
Mulet banae	2103	<i>Nannobranchium wisneri</i>	1921
Mulet blanc	2107	<i>natalensis, Scorpaena</i>	2281
Mulet bouri	2091	<i>nebulosa, Zenopsis</i>	2227
Mulet des îles Cap Vert	2085	Needlefishes	1549
Mulet diassanga	2090	NEMICHTHYIDAE	1527, 1675
Mulet doré	2088	Nemichthyids	1704
Mulet écailleux	2095	NEOCERATIIDAE	1546, 2060
Mulet labéon	2110		

- Neochelon falcipinnis* 2093
Neocyttus helgae 2208, **2210-2211**
Neocyttus rhomboidalis 2210-2211
Neomerinthe folgori **2262**
NEOSCOPELIDAE 1537, 1784, 1789, 1793, 1798,
 1802, 1811, 1817, **1855, 1861**
Neoscopelus 1855, 1861
Neoscopelus macrolepidotus **1858**
Neoscopelus microchir 1855, 1858
Neoscopelus n. sp. **1858**
Nerophis lumbriciformis **2237**
Nerophis ophidion **2237**
 Netdevils 1548, 2075
NETTASTOMATIDAE 1527, **1695**
Nezumia aequalis 1987, 1989
Nezumia africana 1989
Nezumia duodecim **1989**
Nezumia hildebrandi 1987-1988
Nezumia micronychodon 1989-**1990**
 Nibbers 1559
 Nigel's one-jawed eel 1714
nigeli, Monognathus **1714**
niger, Ectreposebastes **2259**
 Nigerian fangtooth pellonuline 1739
nigroocellatus, Centrobranchus **1884**
nigropunctatus, Pontinus **2266**
nigrostrigatus, Mugil 2085
nipponensis, Malacocephalus 1985
nitidulum, Myctophum **1916**
nobilis, Lampanyctus **1909**
nobilis, Polymixia **1942**
 Noble lanternfish 1909
NOMEIDAE 1577
 Norman's scorpionfish 2277
normanae, Microthrissa 1732
normani, Scorpaena **2277**
 Northern swallower eel 1707
NOTACANTHIDAE 1524, **1601**
 Notacanthids 1601
Notacanthus bonaparte 1603
Notacanthus chemnitzii **1603**
notata afimbria, Scorpaena 2278
notata, Scorpaena **2278**
notialis, Lampadena **1904**
Notolychnus 1860, 1921
Notolychnus valdiviae **1921**
Notopogon macrosolen **2247**
Notoscopelus 1922
Notoscopelus (Notoscopelus) caudispinosus . **1922**
Notoscopelus (Notoscopelus) elongatus **1922**
Notoscopelus (Notoscopelus) kroeyerii **1922**
Notoscopelus (Notoscopelus) resplendens . . **1923**
Notoscopelus (Pareiophus) bolini **1923**
NOTOSUDIDAE 1535, **1831**
nuttingi, Scorpaena 2279
O
 Oarfishes 1539, 1939
obscura, Aspitrigla 2307
obscurus, Chelidonichthys **2307**
obtusirostre, Myctophum **1916**
occa, Coelorinchus 1984
occidentalis, Chalinura 1986
occidentalis, Lionurus (Nezumia) 1986
occidentalis, Malacocephalus **1986**
occidentalis, Ventrifossa 1986
ocellatus, Sardinops **1738**
ocellatus, Zenopsis 2227
Odaxothrissa 1722
Odaxothrissa ansorgii **1739**
Odaxothrissa mento **1739**
Oedalechilus labeo 2086, **2110**
 Offshore rockfish 2264
OGCOCEPHALIDAE 1545, 2045, 2052, 2055-**2056**
Ogcocephalus 2056
 Oily halosaur 1597
oleosa, Aldrovandia 1597
OMOSUDIDAE 1536, **1842**
 One-jawed eels 1529, 1710
ONEIRODIDAE 1547, **2066**
Onos sellai 2020
Onus 2019
Onus riali 2011
 Opahs 1538, 1929
OPHICHTHIDAE 1526, **1654**
OPHIDIIDAE 1540, 1944, **1946**, 1953, 1955, 1960,
 1965, 1969, 1992, 2006, 2016, 2290, 2293
 OPHIDIIFORMES 1540, **1944**
ophidion, Nerophis **2237**
OPISTHOPROCTIDAE 1531, **1759**
 Orange roughy 2186, 2189
 Orange scorpionfish 2281
 Oreos 1553, 2205
Oreosoma 2205
Oreosoma atlanticum **2212**
OREOSOMATIDAE 1553, 2203, **2205**, 2216,
 2219, 2224, 2245
 Ostenfeld's lanternfish 1893
ostenfeldi, Diaphus **1893**
OSTRACIIDAE 1582

<i>our, Mugil</i>	2105	Pencilsmelts	1530
<i>ovenii, Halosaurus</i>	1600	Perch-like fishes	1557
Owen's halosaur	1600	PERCIFORMES	1557,1568,1570,1572-1575, 1577-1579
Ox-eyed oreo	2212	PERCOIDEI	1557
P		PERCOPHIDAE	1557,1571,2289
<i>Pachystomias</i>	1809-1810	PERISTEDIIDAE	1557, 2296 ,2299
Pacific spotted scorpionfish	2279	<i>Peristedion</i>	2298
<i>pacifica, Mora</i>	2002	<i>Peristedion cataphractum</i>	2296
Pale halosaur	1597	<i>Peristedion macronema</i>	2297
PARABROTULIDAE	1570,2293	<i>perspicillatus, Diaphus</i>	1894
<i>Parachelon grandisquamis</i>	2095	<i>pertusis, Merlangus</i>	2033
<i>paradoxus, Merluccius</i>	2010, 2012	<i>petimba, Fistularia</i>	2241, 2243
<i>paradoxus, Merluccius capensis</i>	2012	<i>phalacra, Aldrovandia</i>	1598
<i>paradoxus, Merluccius merluccius</i>	2012	<i>phengodes, Myctophum</i>	1917
PARALEPIDIDAE	1536, 1844	PHOSICHTHYIDAE	1532,1783-1784, 1788 ,1793, 1798,1802,1807,1810,1817,1856,1861
PARALICHTHYIDAE	1581	<i>Photocorynus</i>	2075-2076
<i>Paraliparis copei wilsoni</i>	2295	<i>photonotus, Lampanyctus</i>	1909
<i>Paraliparis edwardsi</i>	2295	<i>Photostomias</i>	1784,1789,1793,1802,1810,1817
<i>Parataeniophorus bertelseni</i>	2180	<i>photothorax, Bolinichthys</i>	1883
<i>Parataeniophorus gulosus</i>	2179	Phycid hakes	1543,2023
PARAZENIDAE	2223,2226	PHYCIDAE	1543,1947,1953,1955,1992, 2016, 2023 ,2028,2030
Pardete	2105	PHYCINAE	2015
<i>Pareiophus</i>	1922	<i>Phycis blennoides</i>	2025
<i>parkii, Arius</i>	1748	Phycis de fond	2025
<i>parkii, Carlarius</i>	1748	Phycis de roche	2026
<i>parri, Cetomimoides</i>	2179	<i>Phycis furcatus</i>	2025-2026
Parrotfishes	1569	<i>Phycis limbatus</i>	2026
Patchwork lanternfish	1923	<i>Phycis mediterraneus</i>	2026
<i>pauciradiata, Trigla</i>	2306	<i>Phycis phycis</i>	2026
<i>paurolychnus, Taaningichthys</i>	1856,1860, 1928	<i>Phycis tinca</i>	2025
Paz de San Pedro	2229	<i>phycis, Phycis</i>	2026
Pearleyes	1536	<i>Physiculus dalwigki</i>	2004
Pearlfishes	1540,1944	<i>Physiculus huloti</i>	2004
Pearlyspotted lanternfish	1916	Picklefishes	1568
Pelagic cods	1542,2005	Pike congers	1527
<i>pelagicus, Syngnathus</i>	2238	Pilchard de l'Afrique australe	1738
<i>pelecanoides, Eurypharynx</i>	1708-1709	Pilchards	1722
Pelican eel	1708	<i>pilchardus, Sardina</i>	1722,1734
Pelican eels	1528,1708	<i>pini, Trigla</i>	2303
Pellona	1722	Pipefishes	1554,2230
Pellonula	1732	Piper gurnard	2314
<i>Pellonula afzeliusi</i>	1732	<i>piscatorius, Lophius</i>	2044,2048- 2049
<i>Pellonula afzeliusi miri</i>	1732	Platycephale de Guinée	2288
Pellonula leonensis	1732	PLATYCEPHALIDAE	1556, 2288 ,2299
<i>Pellonula miri</i>	1732	<i>Platycephalus gruvelli</i>	2288
<i>Pellonula modesta</i>	1736	PLATYTROCTIDAE	1532, 1771
<i>Pellonula stanleyana</i>	1733	PLEURONECTIDAE	1580
Pellonula vorax	1733		
PEMPHERIDIDAE	2193		

- PLEURONECTIFORMES 1579
plumieri mystes, Scorpaena 2279
plumieri, Scorpaena 2273,2279
poeciloptera, Trigla 2306
 Poisson chèvre robuste 1942
polli cadenati, Merluccius 2013
polli polli, Merluccius 2013
polli, Merluccius 2010,2013-2014
polli, Merluccius merluccius 2013
polli, Merluccius polli 2013
Pollichthys 1788
Polyacanthonotus africanus 1603
Polyacanthonotus challengerii 1603
Polyacanthonotus merretti 1604
Polyipnus 1792-1793
Polymetme 1784,1788-1789,1793
Polymixia nobilis 1942
 POLYMIXIIDAE 1539,1942
 POLYMIXIIFORMES 1539,1942
 POLYNEMIDAE 1564
 POLYPRIONIDAE 1558
polystictum, Desmodema 1937
 POMACANTHIDAE 1566
 POMACENTRIDAE 1569
 POMATOMIDAE 1560
 Pomfrets 1562
pontifex, Lampadena 1904
Pontinus 2250
Pontinus accraensis 2263,2265
Pontinus kuhlii 2251,2264,2271,2287
Pontinus leda 2263,2265
Pontinus nigropunctatus 2266
 Poor cod 2035
 Poracupine fishes 1583
porcus, Scorpaena 2278,2280
 Porgies 1564
potassoa, Gadus 2033
poutassou, Micromesistius 2011,2033
 Pouting 2034
 PRIACANTHIDAE 1559
 Pricklefishes 1550,2166
 Prickly lanternfish 1915
 Priestly lanternfish 1904
 PRISTIGASTERIDAE 1529,1719,1723
 Pristigasterids 1529,1719
 Problematic lanternfish 1894
problematicus, Diaphus 1894
procerus, Lampichthys 1911
Procetichthys 2173
Protomyctophum 1924
Protomyctophum (Hierops) 1860
Protomyctophum (Hierops) arcticum 1924
provencalis, Mugil 2085
 PSETTODIDAE 1579
Pseudocyttus maculatus 2214
Psychrolutes macrocephalus 2290
 PSYCHROLUTIDAE 1556,2290
 PTEROTHRISSIDAE 1524,1590,1592,1741
 PTEROTHRISSINAE 1593
Pterothrissus 1592-1593
Pterothrissus belloci 1590,1592
 Pufferfishes 1582
 Puffers 1583
punctatum, Myctophum 1917
pusillus, Lampanyctus 1910
 Pygmy lanternfish 1910
Pyramodon 1944
Q
queketti, Chelidonichthys 2304,2308
queketti, Trigla 2308
Querimana curvidens 2109
R
 Racascio de Accra 2263
 Racasse de Cadenat 2274
 Racasse de l'Angola 2267
 Racasse épineuse 2287
 RACHYCENTRIDAE 1561
 RADIICEPHALIDAE 1538,1931,1933,1935-1936
Radiicephalus elongatus 1933
 Rafinesque's lanternfish 1895
rafinesquii, Diaphus 1895
ramada, Chelon 2097
ramada, Liza 2088,2097,2100
ramosus, Saccopharynx 1707
 Rape 2049
 Rape africano 2050
 Rape negro 2048
rara, Loweina 1914
 Rare lanternfish 1914
 Rascacio 2280
 Rascacio aleta manchada 2282
 Rascacio de Angola 2267
 Rascacio de Cadenat 2274
 Rascacio de Folgór 2262
 Rascacio de fuera 2264
 Rascacio de Madeira 2275
 Rascacio de Norman 2277

Rascacio espinoso	2287	<i>Rhynchactis</i>	2073
Rascacio profundo	2259	<i>riali, Onus</i>	2011
Rascacio rosado	2265	Ribbonfishes	1539,1937
<i>rascacio, Scorpaena</i>	2279	<i>richardsonii, Chelon</i>	2099
Rascasio serrano	2286	<i>richardsonii, Liza</i>	2099
<i>rascassa, Scorpaena</i>	2280	Righteye flounder	1580
Rascasse à nageoires tachetées	2282	<i>risso, Electrona</i>	1860,1898
Rascasse brune	2280	Risso's lanternfish	1898
Rascasse de Accra	2263	Robust codling	2000
Rascasse de Folgor	2262	<i>robustum, Laemonema</i>	2000
Rascasse de large	2264	Rocklings	1543,2015
Rascasse de Madère	2275	<i>Rondeletia bicolor</i>	2170
Rascasse de Norman	2277	<i>Rondeletia loricata</i>	2170
Rascasse profonde	2259	RONDELETIIDAE	1550,2168,2171,2174
Rascasse pustuleue	2278	<i>rosea, Cyttopsis</i>	2226
Rascasse rose	2272	<i>rostrata, Aldrovandia</i>	1598
Rascasse rouge	2281	<i>rostrata, Antimora</i>	2003
Rascasse serran	2286	Rough-head sea catfish	1747
Rascasse tachetée	2265	Roughies	2186
Rattails	1968	Roughsnout grenadier	1966
Red bream	2194	Round sardinella	1735
Red cornetfish	2243	Roundnose lanternfish	1884
Red dory	2226	<i>rouxi, Harengula</i>	1737
Red gurnard	2303	<i>rouxi, Sardinella</i>	1737
Red scorpionfish	2281	<i>rubellio, Scorpaena</i>	2275
Red squirrelfish	2199	<i>ruber, Gaber</i>	2011
Redmouth whalefishes	1550,2168	Rubio	2305
Redvelvet whalefish	2171	Rubio del cabo	2302
Redvelvet whalefishes	1551	Rubio del Gabón	2304
REGALECIDAE	1539,1938-1939	Rubio menor	2308
Regalecids	1939	Rubyfishes	1562
<i>Regalecus</i>	1940-1941	<i>rufa, Babourisia</i>	2171
<i>Regalecus glesne</i>	1939-1940	<i>rufinus, Symbolophorus</i>	1926
<i>Regalecus russellii</i>	1939-1940	Rufous lanternfish	1926
<i>regani, Cetostoma</i>	2179	<i>rupestris, Macrourus</i>	1982
Reinhardt's lanternfish	1901	<i>russellii, Regalecus</i>	1939-1940
<i>reinhardtii, Hygophum</i>	1901		
Reloj anaranjado	2189	S	
Reloj de Darwin	2189	Sábalo africano	1731
Reloj escama pequeña	2191	Sábalo común	1729
Reloj mediterráneo	2190	Sabertooth fishes	1536
Reloj negro	2190	Saboga	1730
Remoras	1560	SACCOPHARYNGIDAE	1528,1704-1705,1707-1708,1711
<i>resplendens, Notoscopelus (Notoscopelus)</i>	1923	Saccopharyngids	1705
<i>retropinnis, Cosmocampus</i>	2233	SACCOPHARYNGIFORMES	1528,1704-1705,1708
<i>Rhadinesthes</i>	1797	<i>Saccopharynx</i>	1705-1706,1708
<i>Rhamphocetichthys</i>	2173	<i>Saccopharynx ampullaceus</i>	1707
<i>Rhamphocetichthys savagei</i>	2181	<i>Saccopharynx ramosus</i>	1707
<i>rhomboidalis, Neocyttus</i>	2210-2211	<i>Saccopharynx thalassa</i>	1707

Saddled grenadier	1982	Scalebreast gurnard	2310
<i>sagax, Sardinops</i>	1738	Scaleless black dragonfishes	1534,1809
Saint Pierre	2229	Scalloped ribbonfish	1937
Saint Pierre argenté	2227	Scaly dragonfishes	1534,1816
Saint Pierre du Cap	2228	SCARIDAE	1569
Saint Pierre rouge	2226	SCIAENIDAE	1565,1749
<i>saliens dumerili, Liza</i>	2092	SCOMBERESOCIDAE	1549,2127
<i>saliens hoefleri, Liza</i>	2092	SCOMBRIDAE	1576
<i>saliens, Chelon</i>	2100	SCOMBROIDEI	1575
<i>saliens, Liza</i>	2091,2100	SCOMBROLABRACIDAE	1575
San Pedro colorado	2226	SCOPELARCHIDAE	1536,1836
San Pedro del Cabo	2228	<i>Scopelengys</i>	1855,1861
San Pedro plateato	2227	<i>Scopelengys tristis</i>	1859
Sand flounders	1581	<i>Scopelogadus</i>	2163
Sand-perches	1558	<i>Scopelopsis</i>	1860,1924
Sandfishes	1530	<i>Scopelopsis multipunctatus</i>	1924
Sandlances	1571	SCOPHTHALMIDAE	1580
Sandperches	1570	<i>Scorpaena</i>	2251
Sardina	1722	<i>Scorpaena agassizii</i>	2279
Sardina de Africa austral	1738	<i>Scorpaena albofasciata</i>	2279
Sardina europea	1734	<i>Scorpaena angolensis</i>	2267
Sardina pilchardus	1722,1734	<i>Scorpaena annobonae</i>	2268
Sardine commune	1734	<i>Scorpaena ascensionis</i>	2269
Sardinela atlántica	1735	<i>Scorpaena azorica</i>	2270
Sardinella	1722,1737	<i>Scorpaena barbata</i>	2281
Sardinella aurita	1722,1735-1736	<i>Scorpaena brasiliensis</i>	2279
<i>Sardinella cameronensis</i>	1736	<i>Scorpaena bufo</i>	2279
<i>Sardinella eba</i>	1736	Scorpaena canariensis	2271
<i>Sardinella granigera</i>	1736	<i>Scorpaena colonensis</i>	2279
Sardinella maderensis	1722,1732,1736-1737	Scorpaena elongata	2272,2284
Sardinella rouxi	1737	<i>Scorpaena erythraea</i>	2280
Sardinellas	1722	<i>Scorpaena fasciata</i>	2280
Sardinelle à queue jaune	1737	<i>Scorpaena gaillardae</i>	2282
Sardinelle ronde	1735	<i>Scorpaena ginsburgi</i>	2279
Sardineta africana	1719	Scorpaena grandicornis	2273,2279
Sardinita guineana	1732	<i>Scorpaena laevis</i>	2273
Sardinops	1722	Scorpaena loppei	2274
Sardinops ocellatus	1738	<i>Scorpaena lutea</i>	2281
<i>Sardinops sagax</i>	1738	Scorpaena maderensis	2275
Sargassum	2051	<i>Scorpaena madurensis</i>	2275
Sargassum pipefish	2238	<i>Scorpaena massiliensis</i>	2280
Sargocentron	2195	Scorpaena mellissii	2276
Sargocentron hastatum	2199	<i>Scorpaena natalensis</i>	2281
Sauries	1549	Scorpaena normani	2277
<i>savagei, Rhamphocetichthys</i>	2181	Scorpaena notata	2278
Sawtooth eels	1528	<i>Scorpaena notata afimbria</i>	2278
Scabbardfishes	1576	<i>Scorpaena nuttingi</i>	2279
scabrus, Trachyrincus	1966	Scorpaena plumieri	2273,2279
Scads	1561	<i>Scorpaena plumieri mystes</i>	2279

<i>Scorpaena porcus</i>	2278, 2280	<i>serratus, Macrurus</i>	1987
<i>Scorpaena rascacio</i>	2279	SERRIVOMERIDAE	1528, 1700
<i>Scorpaena rascassa</i>	2280	<i>Setarches guentheri</i>	2251, 2286
<i>Scorpaena rubellio</i>	2275	Shads	1722
<i>Scorpaena scrofa</i>	2267, 2281 -2282	Shallow-water Cape hake	2010
<i>Scorpaena scrofina</i>	2279	Sharpcheek scorpionfish	2261
<i>Scorpaena senegalensis</i>	2273	Sharpnose halosaur	1598
<i>Scorpaena sp.</i>	2262	Shore rockling	2020
<i>Scorpaena stephanica</i>	2267, 2282	Short body sardine	1736
<i>Scorpaena teneriffea</i>	2278	Short-snouted seahorse	2235
<i>Scorpaena ustulata</i>	2278	Short-tail pipefish	2236
SCORPAENIDAE	1556, 2250 , 2289	Short-tailed eels	1526
Scorpaenids	2252	Shortfaced eels	1525
SCORPAENIFORMES	1555, 2248	Shorthead lanternfish	1887
<i>Scorpaenodes africanus</i>	2283	Shortline swallower eel	1707
<i>Scorpaenodes albaiensis</i>	2283	Shortspine African angler	2050
<i>Scorpaenodes elongatus</i>	2284	Sicklefin mullet	2093
<i>Scorpaenodes insularis</i>	2285	Sicklefish	1566
Scorpionfishes	1555-1556, 2250	<i>sicula, Trigla</i>	2303
<i>scrofa, Scorpaena</i>	2267, 2281 -2282	<i>Sigmops</i>	1783
<i>scrofina, Scorpaena</i>	2279	SILURIFORMES	1530, 1742
Sea catfishes	1530, 1742	Silver John dory	2227
Sea chubs	1567	Silversides	1549
Sea toads	1545, 2054	Silvery pout	2032
Seabasses	1558	<i>sinuatus, Merluccius</i>	2011
Seadevils	1547, 2071	Sleeper gobies	1573
Seahorses	2230	Slender codling	2003
Searobins	1555	Slender halosaur	1597
Sébaste chèvre	2260	Slender lanternfish	1910
<i>Sebastes (Sebastichthys) bibrani</i>	2264	Slender rockfish	2272
<i>Sebastes filifer</i>	2264	Slickheads	1531
<i>Sebastes imperialis</i>	2260	Slimeheads	1552, 2186
<i>Sebastes maculatus</i>	2260	Slopewater lanternfish	1896
<i>selenops, Myctophum</i>	1860, 1918	Small red scorpionfish	2278
<i>sellai, Onos</i>	2020	Smallfin lanternfish	1881
<i>senegalensis, Alosa</i>	1735	Smallscale slimehead	2191
<i>senegalensis, Chelidonichthys</i>	2304	Smallscaled blackchin	1858
<i>senegalensis, Elops</i>	1586-1587	Smallscaled scorpionfish	2280
<i>senegalensis, Merluccius</i>	2011, 2013-2014	Smalltooth grenadier	1990
<i>senegalensis, Merluccius merluccius</i>	2014	Smalltoothed pellonula	1732
<i>senegalensis, Scorpaena</i>	2273	<i>smiliophorus, Macrurus</i>	1987
Senegalese hake	2014	<i>smiridus, Merluccius</i>	2011
Senegalese ladyfish	1587	<i>smiridus, Merluccius merluccius</i>	2011
Senegalese rockfish	2273	Smooth oreo dory	2214
<i>sentus, Minyichthys</i>	2236	Smoothcheek lanternfish	1882
<i>septentrionalis, Mugil</i>	2086	Smoothmouth sea catfish	1746
<i>Sergestes</i>	2259	Snaggletooths	1533, 1797
SERRANIDAE	1558, 2252	Snailfishes	1556, 2292
<i>serrata, Fistularia</i>	2243	Snake eels	1526

- Snake mackerels 1576
 Snipe eels 1527
 Snipefishes 1555,2245
 Soft lanternfish 1893
 Softhead grenadier 1985
 Soldierfishes 2195
SOLEIDAE 1581
Solitas gruveli **2288**
Solivomer 1855
 Sombre blackchin 1859
Sonoda 1792-1793
 South African mullet 2099
 Southern African pilchard 1738
 Spadefishes 1574
 Spanish sardine 1735
SPARIDAE 1564
 Spearsnouted grenadier 1984
 Speckled deepwaater scorpionfish 2265
speculigera, Lampadena **1904**
SPHYRAENIDAE 1522,1576
 Spiky oreo 2211
 Spinetail lanternfish 1922
Spiniphryne 2066
spinosus, Corniger **2200**
spinosus, Cottunculus **2290**
 Spiny eels 1524
 Spiny gurnard 2313
 Spiny scorpionfish 2287
 Spiny turbot 1579
 Spinycheek soldierfish 2200
 Spinyfins 1551,2184
splendens, Beryx **2194**
 Splendid alfonsino 2194
splendidus, Diaphus **1895**
 Spotfin lanternfish 1925
 Spotlight lanternfish 1891
 Spotted lanternfish 1917
 Spotted tinselfish 2222
 Spotted-fin rockfish 2282
 Spratelle de Guinée 1732
 Sprats 1722
 Spurcheek lanternfish 1883
Squalogadus 1964
 Squarltails 1577
 Squirrelfish 2198
 Squirrelfishes 1551,2195
 St Helena deepwater scorpionfish 2266
stanleyana, Pellonula 1733
 Stargazers 1570-1571
STEINDACHNERIIDAE 1944,1953
stephanica, Scorpaena 2267,**2282**
STEPHANOBERYCIDAE 1550,2163,**2166**-2167
 STEPHANOBERYCIFORMES 1550,**2163**
STERNOPTYCHIDAE 1532,**1792**,1783-1784,1789,
 1798,1802,1807,1810,1817,1856,1861
Sternoptyx 1792
Stethopristes 2223
Stomias longibarbus **1816**
STOMIIDAE 1534,1784,1789,1793,1797-1798,
 1801,1804,1806-1807,1810,**1816**
 STOMIIFORMES 1532,**1783**,1861
 STOMIINAE 1801
storeri, Ditropichthys **2180**
 Stout beardfish 1942
 Straightnose pipefish 2237
 Streaked gurnard 2305
Strializa canaliculatus 2091
strigosus, Aulostomus **2239**
strigosus, Aulostomus chinensis 2239
Strinsia tinca 1998
 Striped mullet 2105
 Striped springer mullet 2102
STROMATEIDAE 1578
 STROMATEOIDEI 1577
 Stubby lanternfish 1883
STYLEPHORIDAE 1538,**1931**
Stylephorus chordatus **1931**
sublaevis, Coryphaenoides 1986
suborbitale, Benthosema **1881**
subtilis, Diaphus **1896**
supralateralis, Bolinichthys **1883**
 Surgeonfishes 1574-1575
swainsonii, Trigla 2306
 Swallower eels 1528,1705
 Swallowers 1570
 Swordfish 1579
Symbolophorus 1925
Symbolophorus barnardi **1925**
Symbolophorus boops **1925**
Symbolophorus krefftii **1926**
Symbolophorus rufinus **1926**
Symbolophorus veranyi **1927**
SYMPHYSANODONTIDAE 1558
SYNAPHOBRANCHIDAE 1526,**1645**
SYNGNATHIDAE 1554,**2230**,2239,2241
Syngnathus acus **2237**
Syngnathus pelagicus **2238**
Syngnathus typhle **2238**
SYNODIDAE 1743

SYNODONTIDAE	1535, 1824	Toadfishes	1544
T		Tongueless smooth-heads	1531
<i>taaningi, Diaphus</i>	1896	Tonguesoles	1581
<i>taaningi, Hygophum</i>	1901	Topside lanternfish	1921
<i>Taaningichthys</i>	1860, 1927	Tracaud commun	2034
<i>Taaningichthys bathyphilus</i>	1927	TRACHICHTHYIDAE	1552, 2183-2184, 2186 , 2193
<i>Taaningichthys minimus</i>	1928	TRACHINIDAE	1570
<i>Taaningichthys paurolychnus</i>	1856, 1860, 1928	TRACHINOIDEI	1570
<i>tabacaria, Fistularia</i>	2241, 2244	<i>Trachinoides maroccanus</i>	2011
TACHYSURIDAE	1743	TRACHIPTERIDAE	1539, 1934, 1937 , 1940
<i>Tachysurus capellonis</i>	1748	Trachipterids	1937
<i>Tachysurus feliceps</i>	1750	<i>Trachipterus</i>	1937, 1940-1941
<i>Tachysurus gambensis</i>	1747	<i>Trachipterus arcticus</i>	1937
<i>Tachysurus heudelotii</i>	1748	<i>Trachipterus trachypterus</i>	1937
<i>talismani, Coryphaenoides</i>	1984	<i>Trachipterus trachyurus</i>	1937
Tåning's lanternfish	1901	<i>trachypterus, Trachipterus</i>	1937
Taning's one-jawed eel	1714	TRACHYRINCIDAE	1541, 1966 , 1969
<i>taningi, Monognathus</i>	1714	Trachyrincids	1541, 1966-1967
Tapertails	1538, 1933	TRACHYRINCINAE	1967-1968
Tarpón	1588	<i>Trachyrincus</i>	1967
Tarpon argenté	1588	<i>Trachyrincus anonyma</i>	1966
<i>Tarpon atlanticus</i>	1588-1589	<i>Trachyrincus longirostris</i>	1966-1967
Tarpons	1523, 1588	<i>Trachyrincus scabrus</i>	1966
Tatley	1558	<i>trachyrincus, Lepidoleprus</i>	1966
Telescope fishes	1537	<i>Trachyscorpia cristulata</i>	2251
Temperate basses	1557	<i>Trachyscorpia cristulata cristulata</i>	2287
<i>teneriffea, Scorpaena</i>	2278	<i>Trachyscorpia cristulata echinata</i>	2251, 2287
Tenpounders	1523, 1584	<i>Trachysurus lagoensis</i>	1747
<i>termophilus, Diaphus</i>	1897	<i>trachyurus, Trachipterus</i>	1937
TETRAGONURIDAE	1577	<i>traversi, Cyttus</i>	2202
TETRAODONTIDAE	1583	TRICHIURIDAE	1576
TETRAODONTIFORMES	1582	<i>trichodon, Mugil</i>	2109
<i>thalassa, Saccopharynx</i>	1707	<i>triccirratu, Gadus</i>	2020
THAUMATICHTHYIDAE	1547, 2069	<i>tricuspidens, Chelon</i>	2102
<i>Thaumatichthys</i>	2069	<i>tricuspidens, Heteromugil</i>	2102
Thicklip grey mullet	2086	<i>tricuspidens, Liza</i>	2102
Thin morays	1525	Triggerfishes	1582
Thinlip grey mullet	2097	<i>Trigla adriatica</i>	2305
<i>thori, Gadidulus argenteus</i>	2032	<i>Trigla aspera</i>	2312
Thorny tinselfish	2221	<i>Trigla blochii</i>	2309
Threadfins	1564	<i>Trigla bracanthus</i>	2307
Three-bearded rockling	2022	<i>Trigla capensis</i>	2302
Threeprong grenadier	1989	<i>Trigla cavillone</i>	2312
Tidepool rockling	2022	<i>Trigla corax</i>	2306
Tilefishes	1560	<i>Trigla corvus</i>	2306
<i>Tinca marina</i>	2026	<i>Trigla gabonensis</i>	2304
<i>tinca, Phycis</i>	2025	<i>Trigla gonotus</i>	2312
<i>tinca, Strinsia</i>	1998	<i>Trigla grunniens</i>	2309
Tinselfishes	1554, 2218	<i>Trigla gurnardus</i>	2309

- Trigla hirundo* 2306
Trigla hyrax 2306
Trigla laevis 2306
Trigla leucoptera 2312
Trigla lineata 2305
Trigla lucerna 2306
***Trigla lyra* 2314**
***Trigla macrodactylus* 2298**
Trigla microlepidota 2306
Trigla milvus 2309
Trigla pauciradiata 2306
Trigla pini 2303
Trigla poeciloptera 2306
Trigla queketti 2308
Trigla sicula 2303
Trigla swainsonii 2306
TRIGLIDAE 1557,2248,2251,2289,2296,**2298**
 Triplefins 1571
 Tripletails 1563
***Triplophos* 1783,1789**
 Tripod fishes 1535
TRIPTERYGIIDAE 1571
***Trisopterus luscus* 2034**
***Trisopterus minutus* 2035**
Trisopterus minutus capelanus 2035
Trisopterus minutus minutus 2035
***tristis, Scopelengys* 1859**
Trompeta pinctada 2239
Trompète tachetée 2239
Trompetero 2247
Trompetero manchado 2247
 True cods 1543,2029
 Trumpetfish 2239
 Trumpetfishes 1555,2239
trunovi, Hoplostetus mediterraneus 2190
 Tub gurnard 2306
 Tube-eyed tapertails 1931
 Tube-eyes 1538
 Tubeshoulders 1532
 Tunas 1575
 Turbots 1580
 Twaité shad 1730
 Twelve-rayed grenadier 1989
***typhle, Syngnathus* 2238**
- U**
- uraleptus, Merluccius* 1998
URANOSCOPIIDAE 1571
UROLOPHIDAE 2057
***urophaos atlantica, Lampadena* 1905**
- ustulata, Scorpaena* 2278
- V**
- vadulus, Lampanyctus* 1911**
 Vaillant's grenadier 1962
***vallanti, Lophius* 2050**
***valdiviae, Notolychnus* 1921**
***vanhoeffeni, Diaphus* 1897**
 VanHöffen's lanternfish 1897
Ventrifossa 1986
Ventrifossa occidentalis 1986
 Vérany's lanternfish 1927
***veranyi, Symbolophorus* 1927**
vernalis, Merlangus 2033
***verrucosus, Alloctytus* 2209**
villosa, Fistularia 2243
violaceus, Macruroplus 1986
 Viperfishes 1533,1801
 Viviparous brotulas 1540,1953
vniro, Hoplostethus 2190-2191
 Vniro's roughy 2191
volitans, Cephalacanthus 2248
***volitans, Dactylopterus* 2248**
***vorax, Pellonula* 1733**
***vulgaris, Gaidropsarus* 2019-2020,2022**
vulgaris, Merluccius 2010-2011
***vulpes, Albula* 1590**
- W**
- Waistcoat lanternfish 1928
 Warming's lanternfish 1885
***warmingii, Ceratoscopelus* 1885**
 Warmwater lanternfish 1897
 Warty dory 2209
 Waryfishes 1535
 Weeverfishes 1570
 West African ilisha 1719
 West African ladyfish 1586
 West African seahorse 2234
 Western softhead grenadier 1986
 Whalefishes 1550-1551
 Whipnose anglerfishes 1548,2073
 White barbel 1750
 White mullet 2107
 Wilson's paraliparis 2295
***wilsoni, Paraliparis copei* 2295**
 Winged lanternfish 1906
 Wisner's lanternfish 1921
***wisneri, Nannobranchium* 1921**
 Wonderfishes 1547,2069

<i>Woodsia</i>	1788	ZEIDAE	1554,2203,2216,2219, 2223 ,2245
<i>Woodsia meyerwaardeni</i>	1788	Zeids	2223
Worm pipefish	2237	ZEIFORMES	1553, 2202
Wormfishes	1573	ZENIIDAE	2206
Wrasses	1568-1569	<i>Zenion hololepis</i>	2215
Wreckfishes	1558	<i>Zenion japonicum</i>	2215
X		<i>Zenion longipinnis</i>	2215
<i>Xenolepidichthys</i>	2218	ZENIONTIDAE	1553,2203,2206, 2215 ,2219,2224
<i>Xenolepidichthys dalglesihi</i>	2222	Zeniontids	1553,2215
XIPHIIDAE	1579	<i>Zenopsis</i>	2223
XIPHIOIDEI	1579	<i>Zenopsis conchifer</i>	2227
Y		<i>Zenopsis nebulosa</i>	2227
<i>Yarrella</i>	1784,1788-1789,1793	<i>Zenopsis ocellatus</i>	2227
<i>yarrellii, Laemonema</i>	2001	<i>Zeus</i>	2223
Yellowtail sardinella	1737	<i>Zeus capensis</i>	2228
Yellowtail sardinella	1737	<i>Zeus faber</i>	2223, 2229
Young flabby whalefish	2180	Zipper dories	1553
Z		ZOARCIDAE	1570,2293
<i>Zalieutes</i>	2056	ZOARCOIDEI	1570
		<i>Zu</i>	1937
		<i>Zu cristatus</i>	1937

This multivolume field guide covers the species of interest to fisheries of the major resource groups exploited in the Eastern Central Atlantic. The area of coverage includes FAO fishing area 34 and part of 47. The marine resource groups included are bivalves, gastropods, chitons, cephalopods, stomatopods, shrimps, lobsters, crabs, hagfishes, sharks, batoid fishes, chimaeras, bony fishes and sea turtles. The introductory chapter outlines the environmental, ecological, and biogeographical factors influencing the marine biota, and the basic components of the fisheries in the Eastern Central Atlantic. Within the field guide, the sections on the resource groups are arranged phylogenetically according to higher taxonomic levels such as class, order, and family. Each resource group is introduced by general remarks on the group, an illustrated section on technical terms and measurements, and a key or guide to orders or families. Each family generally has an account summarizing family diagnostic characters, biological and fisheries information, notes on similar families occurring in the area, a key to species, a checklist of species, and a short list of relevant literature. Families that are less important to fisheries include an abbreviated family account and no detailed species information. Species in the important families are treated in detail (arranged alphabetically by genus and species) and include the species name, frequent synonyms and names of similar species, an illustration, FAO common name(s), diagnostic characters, biology and fisheries information, notes on geographical distribution, and a distribution map. For less important species, abbreviated accounts are used. Generally this includes the species name, FAO common name(s), an illustration, a distribution map, and notes on biology, fisheries, and distribution. Each volume concludes with its own index of scientific and common names.



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