

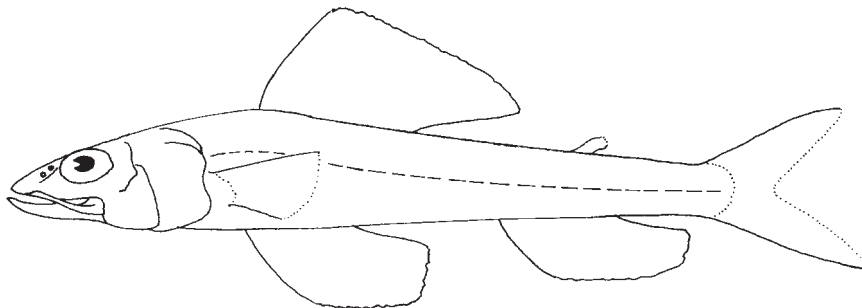
Order AULOPIFORMES

AULOPIDAE

Aulopus

by J.R. Paxton and V.H. Niem

Diagnostic characters: Small to moderate (to 60 cm) aulopiform fishes; body moderately slender, subcylindrical anteriorly to moderately compressed posteriorly, moderately elongate. Head moderate. Eye moderate to large, round, lateral. Snout moderate, slightly longer than eye diameter. **Mouth large, upper jaw mostly not reaching rear end of eye; 2 supramaxillae present;** lower jaw terminal, without bony or fleshy tip. **Teeth numerous, small, needle-shaped, mostly depressible;** present on jaws, vomer, palatine, and tongue. **Gill rakers lath-like.** No spines in fins; **dorsal fin moderate to long based and high, inserted over or behind pelvic-fin insertion,** with 14 to 22 rays, first few may be elongate; anal fin posterior, with 8 to 14 rays; caudal fin with 19 principal rays; pelvic fins located under dorsal fin, with 9 rays; pectoral fins lateral, with 11 to 14 rays; 1 dorsal adipose fin over or behind last anal-fin rays. Lateral dermal keels absent on caudal peduncle. Lateral line present, not extending onto caudal fin. Scales cycloid or spinoid, absent on top of head. No photophores or luminescent organs. Total vertebrae 36 to 53. Colour: variable, often sexually dimorphic; often brownish to reddish, with iridescent shading and irregular mottlings on sides; dorsal fin often with spots.

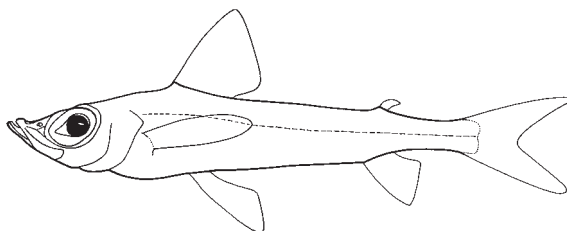


Habitat, biology, and fisheries: Benthic fishes from inshore to outer shelf and upper slope, rarely to 1 000 m; commonest in shallow waters. Feed as probable carnivores. Sexes separate. Of minor commercial importance in a number of areas, including Australia and Japan.

Remarks: About 9 species worldwide in tropical and temperate latitudes. Parin and Kotlyar (1989) described a new species from the eastern South Pacific. They placed all Pacific species in the genus *Hime*, distinct from the Atlantic *Aulopus*. In their recent phylogenetic review of the order, Baldwin and Johnson (1996) recognized only the latter genus. A revision of the family is needed, as undescribed species from outside and inside the area have been recognized. Additional species may well be recorded in the area with more trawling.

Similar families occurring in the area

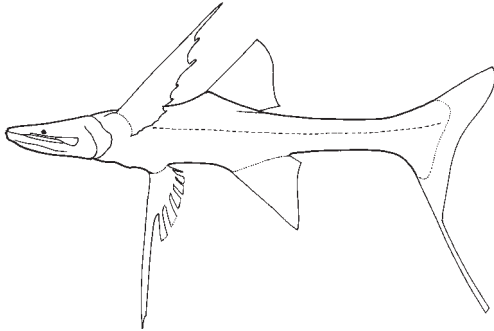
Chlorophthalmidae: eye with teardrop-shaped pupil; lower jaw with bony tip; only 1 supramaxilla present; dorsal fin inserted before pelvic-fin insertion; tongue toothless.



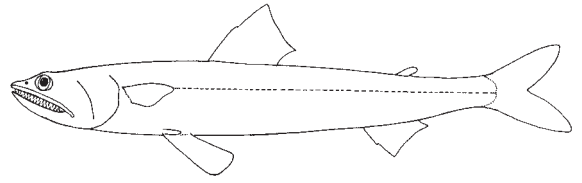
Chlorophthalmidae

Ipnopidae: lower jaw with fleshy tip; only 1 supramaxilla; dorsal fin inserted before pelvic-fin insertion; tongue toothless.

Synodontidae: jaws extending well behind eyes; gill rakers reduced to gill teeth or spines.



Ipnopidae



Synodontidae

List of species occurring in the area

- Aulopus curtirostris* Thomson, 1967
- Aulopus japonicus* (Günther, 1880)
- Aulopus purpurissatus* Richardson, 1843
- Aulopus* sp.

References

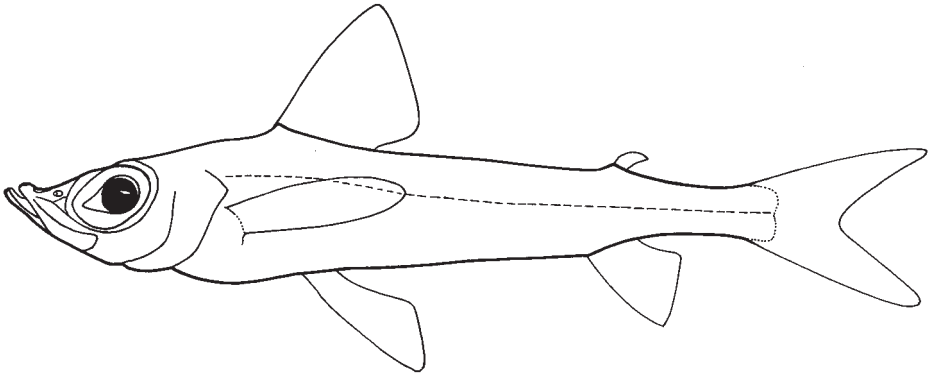
- Baldwin, C.C. and G.D. Johnson. 1996. Interrelationships of Aulopiformes. In *Interrelationships of fishes*, edited by M.L.J. Stiassny, L.R. Parenti, and G.D. Johnson. San Diego, Academic Press, pp. 355-404.
- Parin, N.V. and A.N. Kotlyar. 1989. A new aulopodid species, *Hime microps*, from the eastern South Pacific, with comments on geographic variations of *H. japonica*. *Japan. J. Ichthyol.*, 35(4):407-413.

CHLOROPHTHALMIDAE

Greeneyes

by J.R. Paxton and V.H. Niem

Diagnostic characters: Small (to about 30 cm) aulopiform fishes; body moderately slender, subcylindrical anteriorly to moderately compressed posteriorly, moderately elongate. Head moderate. **Eye large, round, lateral with teardrop-shaped pupil.** Snout moderate, somewhat shorter than eye diameter, depressed. Mouth moderate, **upper jaw not extending behind midpoint of eye; 1 supramaxilla; lower jaw terminal, with bony tip. Teeth small, needle-shaped,** mostly depressible, present in patches or bands on jaws, vomer, and palatine; tongue toothless. **Gill rakers lath-like.** No spines in fins; **dorsal fin short based and high, before middle of body,** inserted before pelvic-fin insertion; with 10 to 12 rays; anal fin far behind dorsal fin, with 7 to 11 rays; caudal fin with 19 principal rays; pelvic fins in anterior half of body, with 8 or 9 rays; pectoral fins lateral, with 14 to 21 rays; 1 dorsal adipose fin over anal fin. Lateral dermal keels absent on caudal peduncle. Lateral line present, not extending onto tail. Scales cycloid or spinoid, absent on top of head. No photophores; internal luminescent organ in a few species. Total vertebrae 38 to 50. **Colour:** yellowish brown, sometimes with dusky or yellow green mottlings; **tapetum of eye brilliant green in freshly caught specimens.**

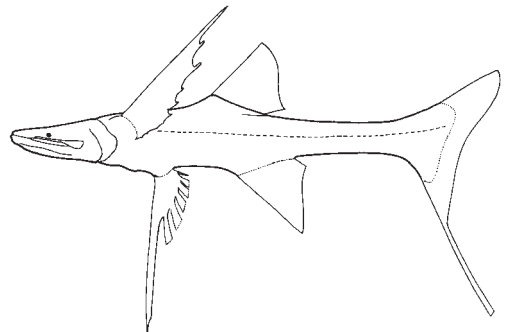


Habitat, biology, and fisheries: Benthic or benthopelagic outer shelf and slope fishes. Feed as carnivores on bottom-dwelling invertebrates. Synchronous hermaphrodites. Moderately common deep-sea fishes of some commercial importance in Mediterranean as fresh fish and in eastern Atlantic for fish meal.

Remarks: Two genera with more than 20 named species, throughout the world ocean in tropical and temperate latitudes. The family requires revision, and with more than 15 species named from the Pacific, some of the listed species may be synonyms. Additional species from the area can be expected.

Similar families occurring in the area

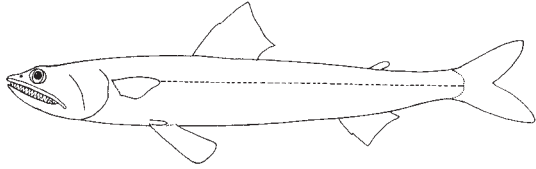
Ipnopidae: upper jaw extending far behind eye; dorsal fin inserted over or behind pelvic fins.



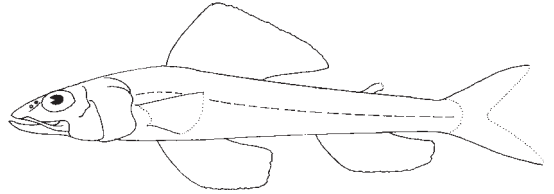
Ipnopidae

Synodontidae: pupil round; teeth present on tongue; gill rakers reduced to gill teeth or spines.

Aulopidae: pupil round; lower jaw without bony or fleshy tip; 2 supramaxillae; dorsal fin inserted behind pelvic-fin insertion; teeth present on tongue.



Synodontidae



Aulopidae

List of species occurring in the area

- Chlorophthalmus acutifrons* Hiyama, 1940
- Chlorophthalmus agassizi* Bonaparte, 1840
- Chlorophthalmus albatrossis* Jordan and Starks, 1904
- Chlorophthalmus albimaculatus* Okamura, 1984
- Chlorophthalmus bicornis* Norman, 1939
- Chlorophthalmus corniger* Alcock, 1894
- Chlorophthalmus legandi* Fourmanoir and Rivaton, 1979
- Chlorophthalmus nigromarginatus* Kamohara, 1953
- Chlorophthalmus oblongus* Kamohara, 1953

Reference

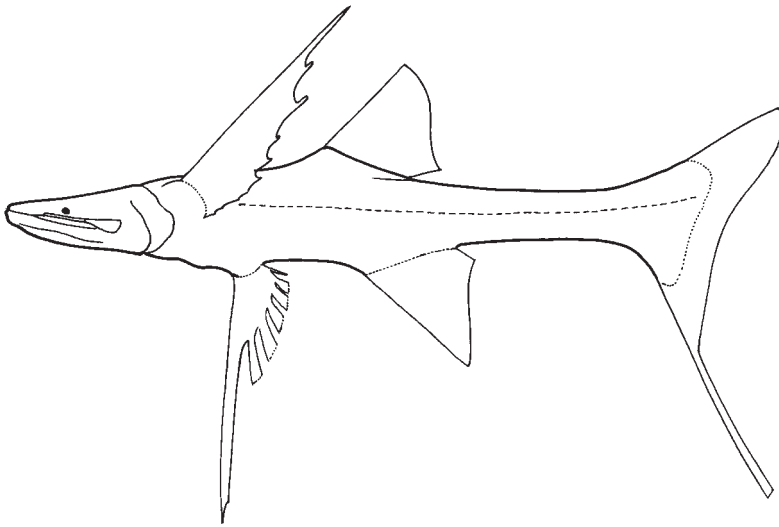
- Okamura, O. 1984. Family Chlorophthalmidae. In *The fishes of the Japanese Archipelago*, edited by H. Masuda, K. Amaoka, C. Araga, T. Uyeno, and T. Yoshino. Tokyo, Tokai University Press, pp. 62-63.

IPNOPIDAE

Tripod fishes

by J.R. Paxton and V.H. Niem

Diagnostic characters: Small to medium (to 45 cm) aulopiform fishes; body slender, subcylindrical anteriorly to moderately compressed, moderately elongate. Head small to moderate. **Eye usually specialized, either minute and lateral (most), or large and lateral with elliptical pupil (*Bathysauroides*, *Bathysauropsis*), or flat, directed dorsally, and lensless (*Ipnops*).** Snout moderate to long, depressed (*Bathymicrops*, *Ipnops*) or rounded, longer than eye diameter. **Mouth large, upper jaw extending far behind eye; lower jaw terminal, with fleshy tip; 1 supramaxilla present or absent. Teeth minute, needle-shaped, mostly depressible, present in patches or bands on jaws, vomer and usually on palatine; tongue toothless. Gill rakers lath-like or reduced to low rugose knobs.** No spines in fins; **dorsal fin short or moderate based and moderately high, over or before middle of body,** inserted over or behind pelvic fin, with 8 to 16 rays; anal fin under to far behind dorsal fin, with 7 to 19 rays; caudal fin with 19 principal rays; **pelvic fins in anterior half of body, often large,** with 7 to 9 rays; pectoral fins lateral with 9 to 24 rays; caudal fin and paired fins with elongate specialized rays in *Bathypterois*; dorsal adipose fin present behind anal fin or absent. Lateral dermal keels absent on caudal peduncle. Lateral line present, extending onto tail in some. Scales cycloid, deciduous. No photophores or other luminescent organs. Total vertebrae 44 to 80. **Colour:** variable, often brown or blackish, sometimes with white.

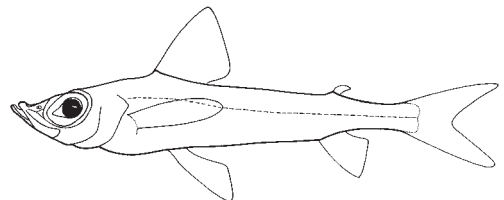


Habitat, biology, and fisheries: Bottom-dwelling deep-sea fishes of slope and abyss to below 5 000 m, amongst the deepest living fishes. Feed as zooplankton pickers or carnivores on benthic invertebrates. Synchronous hermaphrodites. Rare deep-sea fishes of no commercial importance.

Remarks: Six genera with 33 species, throughout the world ocean in tropical and temperate latitudes. Baldwin and Johnson (1996) removed *Bathysauropsis* and their new *Bathysauroides* from the family, with the latter placed closest to the Giganturidae. As few regions of the area have been sampled below 500 m, new records and new species in this family are expected.

Similar families occurring in the area

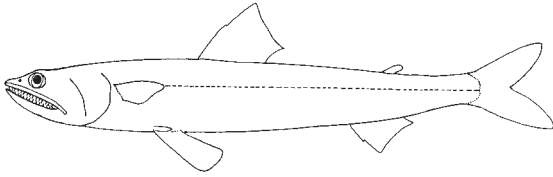
Chlorophthalmidae: eyes green, with teardrop-shaped pupil; upper jaw not extending beyond midpoint of eye.



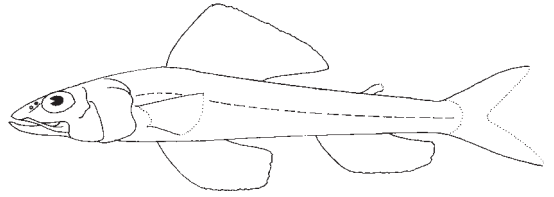
Chlorophthalmidae

Synodontidae: teeth present on tongue.

Aulopidae: lower jaw without fleshy tip; 2 supramaxillae; teeth present on tongue.



Synodontidae



Aulopidae

List of species occurring in the area

- Bathymicrops belyaninae* Nielsen and Merrett, 1992
Bathymicrops brevipinnis Nielsen, 1966
Bathymicrops multispinis Nielsen and Merrett, 1992
Bathypterois andriashevi Sulak and Shcherbachev, 1988
Bathypterois atricolor Alcock, 1896
Bathypterois grallator (Goode and Bean, 1886)
Bathypterois guentheri Alcock, 1889
Bathypterois longifilis Günther, 1878
Bathypterois longipes Günther, 1878
Bathysauroides gigas (Kamohara, 1952)
Bathysauropsis malayanus (Fowler, 1938)
Ipnops agassizi Garman, 1899
Ipnops meadi Nielsen, 1966

References

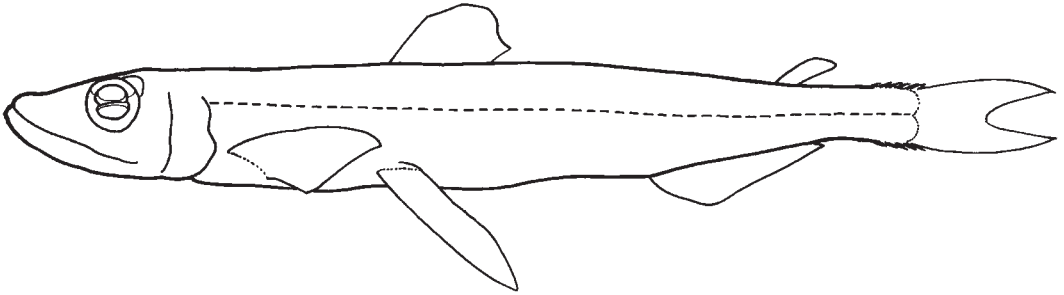
- Baldwin, C.C. and G.D. Johnson. 1996. Interrelationships of Aulopiformes. In *Interrelationships of fishes*, edited by M.L.J. Stiassny, L.R. Parenti, and G.D. Johnson. San Diego, Academic Press, pp. 355-404.
- Merrett, N.R. and J.G. Nielsen. 1987. A new genus and species of the family Ipnopidae (Pisces, Teleostei) from the eastern North Atlantic, with notes on its ecology. *Jour. Fish Biol.*, 31:451-464.
- Sulak, K.J. 1977. The systematics and biology of *Bathypterois* (Pisces, Chlorophthalmidae) with a revised classification of benthic myctophiform fishes. *Galathea Rept.*, 14:49-108.

SCOPELARCHIDAE

Pearleyes

by J.R. Paxton and V.H. Niem

Diagnostic characters: Small (to 23 cm) aulopiform fishes; body moderately slender, moderately to strongly compressed, moderately elongate. Head moderate. **Eyes large, tubular, directed dorsally or dorsoanteriorly with white tissue ("pearl organ") on side of tube.** Snout moderate, longer than eye diameter. **Mouth large, jaws reaching to or beyond rear end of eye;** 1 supramaxilla or none; lower jaw terminal, without fleshy tip. Upper jaw teeth small, retrorse, in 1 row; **lower jaw teeth in 2 rows, the medial longest in mouth, depressible canines;** vomer with few fixed canines; palatine teeth in 1 or 2 rows, the anterior and medial large canines; **a row of large teeth on tongue, usually hooked backward.** **Gill rakers reduced to gill teeth.** No spines in fins; **dorsal fin short based and low or moderate, above middle or in posterior part of body,** with 5 to 10 rays; anal fin large, posterior, with 17 to 39 (usually to 27) rays; caudal fin with 19 to 21 principal rays; pelvic fins before, under or behind dorsal fin, large in some, with 9 rays; pectoral fins low on body, large in some, with 18 to 28 rays; 1 dorsal adipose fin over last anal-fin rays. Lateral dermal keels absent on caudal peduncle. **Lateral line present,** extending onto caudal peduncle, **with large scales pierced by a central, large pore covered by a bony flap, attached behind the pore.** Scales cycloid. No photophores; **internal luminescent organ in a few.** Total vertebrae 40 to 65. **Colour:** brownish to blackish, brassy iridescent, sometimes with lines of pigment along the lateral line.



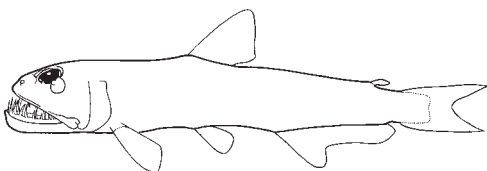
Habitat, biology, and fisheries: Mesopelagic, with most adults from 500 to 1 000 m and possible vertical migrators. Adults feed as carnivores on mesopelagic fishes. Synchronous hermaphrodites. Uncommon deep-sea fishes of no commercial importance.

Remarks: Four genera and 18 species found worldwide except the Arctic and Mediterranean Seas. More midwater trawling in the area should result in range extensions.

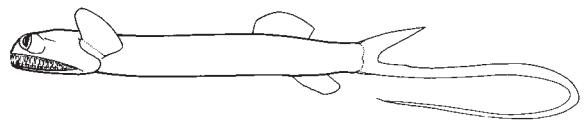
Similar families occurring in the area

Evermannellidae: tongue toothless; no body or lateral-line scales.

Giganturidae: also with tubular eyes, but tongue toothless; lower caudal-fin lobe prolonged; lateral line absent; scales absent.



Evermannellidae



Giganturidae

List of species occurring in the area

- Benthalbella infans* Zugmayer, 1911
Rosenblattichthys alatus (Fourmanoir, 1970)
Scopelarchoides climax Johnson, 1974
Scopelarchoides danae Johnson, 1974
Scopelarchoides signifer Johnson, 1974
Scopelarchus analis (Brauer, 1902)
Scopelarchus guentheri Alcock, 1896
Scopelarchus michaelsarsi Koefoed, 1955

References

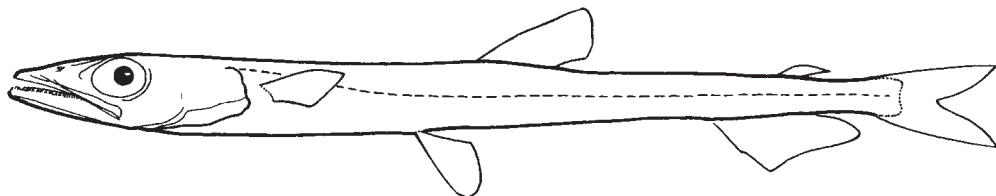
- Johnson, R.K. 1974. A revision of the alepisauroid family Scopelarchidae (Pisces: Myctophiformes). *Fieldiana Zool.*, (66):249 p.
- Johnson, R.K. 1982. Fishes of the families Evermannellidae and Scopelarchidae: systematics, morphology, interrelationships, and zoogeography. *Fieldiana Zool.* (n.s.), (12):252 p.

NOTOSUDIDAE

Waryfishes

by J.R. Paxton and V.H. Niem

Diagnostic characters: Small to moderate (to 50 cm) aulopiform fishes; body slender, round anteriorly to somewhat depressed posteriorly, **elongate**. Head small to moderate. **Eye large, round, lateral, with elliptical pupil**. Snout moderately long, about equal to eye diameter, with rounded tip. **Mouth large, jaws extending under middle of to behind eye**; 1 supramaxilla; lower jaw terminal. **Teeth small, numerous, pointed**; jaw teeth in 1 (upper jaw) or 2 (lower jaw) narrow bands; **vomerine teeth in 2 patches**; palatine teeth in 2 or 3 rows; tongue toothless. **Gill rakers lath-like**. No spines in fins; **dorsal fin short based and moderately high, at about middle of body over (*Ahliesaurus* only) or behind pelvic fins, with 9 to 14 rays**; anal fin far posterior, with 16 to 21 rays; caudal fin with 19 principal rays; pelvic fins below or anterior to dorsal fin, with 9 (rarely 10) rays; **pectoral fins long, lateral, with 10 to 15 rays**; 1 dorsal adipose fin over posterior half of anal fin. Lateral dermal keels absent on caudal peduncle. Lateral line present, extending onto tail. Scales cycloid, deciduous. No photophores or luminescent organs. Total vertebrae 42 to 67. **Colour:** light brown to dark brown, darkest in head region; gill covers blackish; ventral scales silvery.



Habitat, biology, and fisheries: Meso- and bathypelagic, or meso-, bathy- and benthopelagic, or insular epipelagic. Feed as zooplankton pickers and carnivores, with copepods in stomachs of juveniles and larger crustaceans and midwater fishes eaten by adults. Synchronous hermaphrodites. Uncommon oceanic or deep-sea fishes of no commercial importance.

Remarks: Three genera with 16 to 19 species, throughout the world ocean from subarctic to subantarctic latitudes. Further midwater trawling in the area could extend the range of some species and clarify the validity of some known only as larvae. Sometimes listed as the family Scopelosauridae.

Similar families occurring in the area

Paralepididae: dorsal fin behind middle of body; teeth slender canines; gill rakers reduced to gill teeth or spines.

Omosudidae: lower jaw very deep; large fangs in jaws; gill rakers reduced to gill teeth; dorsal fin somewhat behind middle of body; lateral dermal keels present on caudal peduncle; scales absent.



Paralepididae



Omosudidae

List of species occurring in the area

Ahliesaurus berryi Bertelsen, Krefft, and Marshall, 1976

Ahliesaurus brevis Bertelsen, Krefft, and Marshall, 1976

Scopelosaurus gibbsi Bertelsen, Krefft, and Marshall, 1976

Scopelosaurus herwigi Bertelsen, Krefft, and Marshall, 1976

Scopelosaurus hoedti Bleeker, 1860

Scopelosaurus maui Bertelsen, Krefft, and Marshall, 1976

Scopelosaurus meadi Bertelsen, Krefft, and Marshall, 1976

Scopelosaurus smithi Bean, 1925

Reference

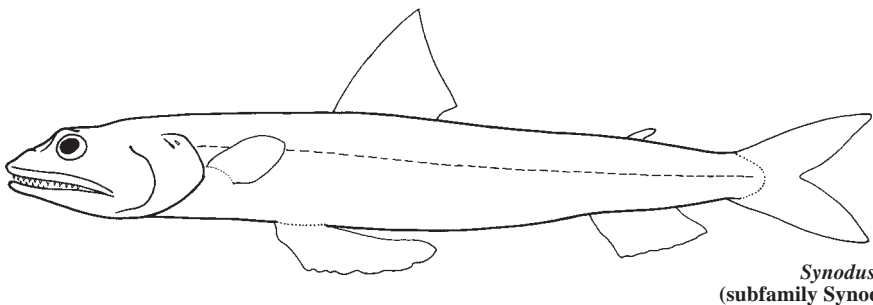
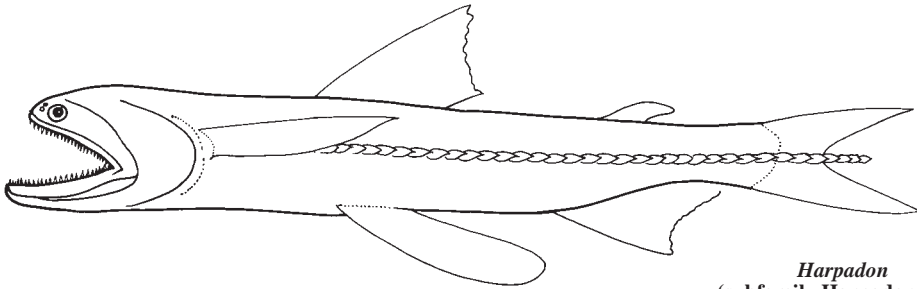
Bertelsen, E., G. Krefft, and N.B. Marshall. 1976. The fishes of the family Notosudidae. *Dana Rept.*, (86):115 p.

SYNODONTIDAE

Lizardfishes (also bombay ducks, sauries)

by B.C. Russell

DDiagnostic characters: **Small to moderate-sized** (to 70 cm, but usually much smaller) **aulopiform** fishes; **body elongate, slender, and cylindrical** (*Synodus*, *Saurida*, *Trachinocephalus*) or **compressed** (*Harpadon*). Head depressed to compressed; bone 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, bordered its entire length by premaxilla, its length more than 1/2 head length 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*) or vestigial (*Harpadon*); supramaxilla small (1 in *Harpadon*, 2 in *Saurida*) or absent (*Synodus* and *Trachinocephalus*)**. Lower jaw with or without a fleshy knob at its tip. Teeth of moderate size, usually cardiform and depressible, not barbed; no distinct canines; **teeth on palatines (present in a single band in *Synodus* and *Trachinocephalus*, or 2 bands in *Saurida* and *Harpadon*) and on tongue. Vomer present (*Saurida*, *Harpadon*) or absent (*Synodus*, *Trachinocephalus*)**. Gill openings large; gill membranes free from isthmus; 4 gill arches, extending far forward into mouth, well in advance of 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*), 15 to 18 (*Synodus*) or 17 (*Harpadon*)**. Head and body with **cycloid scales (*Saurida*, *Synodus*, *Trachinocephalus*), or naked except for a series of scales along lateral line and on tail (*Harpadon*)**. **Scales present on procurrent and primary caudal fin rays (*Saurida*), present only on procurrent rays (*Trachinocephalus*) or absent (*Harpadon*, *Synodus*)**. Fins with articulated soft rays except a few anterior secondary caudal-fin rays, none greatly prolonged (except in *Saurida tumbil* with elongated anterior dorsal-fin rays); no spines. **Dorsal fin about midway on back**, posterior to pelvic-fin insertion; first 2 rays always unbranched, all others usually branched, with last ray always branched to its base. **Anal fin posterior to end of dorsal fin**; first 2 rays always unbranched, all other rays branched or unbranched, with last ray always branched to its base. **Dorsal adipose fin over base of anal fin** (except in *Synodus sageneus* adipose fin reduced or absent). Pectoral fins not usually reaching to or extending beyond origin of pelvic fins; first and last rays always unbranched, all other rays usually branched. **Pelvic fins with 8 (*Synodus*, *Trachinocephalus*) or 9 rays (*Harpadon*, *Saurida*)**, fins close together and inserted abdominally, posterior to pectoral-fin origin and usually anterior to dorsal-fin origin; first and last rays unbranched, all other rays branched; **inner rays of pelvic fins subequal or slightly longer than outer rays (*Harpadon*, *Saurida*) or distinctly longer (about 2 to 3 times) than outermost rays (*Synodus*, *Trachinocephalus*)**. Caudal fin forked, 19 principle rays, 17 branched rays. 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.



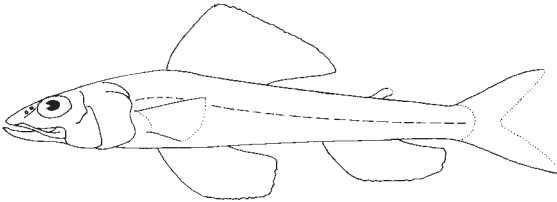
Habitat, biology, and fisheries: Marine, bottom-living fishes found on coral and rock, and mud and sand bottoms in coastal, estuarine, and offshore shelf waters, to depths of about 300 m, although most species occur in much shallower water. Voracious predators, feed mainly on other small fishes and crustaceans. Spawning and larval development is reported for *Synodus*, with release of gametes occurring in midwater about 4 m above the substrate. Eggs are small to medium size (2.5 to 4.3 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. Lizardfishes are only a minor component of commercial and artisanal fisheries of the Western Central Pacific. For 1995, FAO's Yearbook of Fishery Statistics reports a total catch of lizardfishes of around 64 800 t from the area (Indonesia, Malaysia, Philippines, Singapore, Thailand). Caught mainly with bottom trawls or artisanal gear. Occasionally marketed fresh, dried salted, or smoked; also made into fish cakes and fish balls; bombay ducks used to make a relish for curry.

Remarks: Recognition of the limits of the family Synodontidae here as comprising the genera *Harpadon*, *Saurida*, *Synodus*, and *Trachinocephalus* generally accords with the classification of Nelson (1994), except for the genus *Bathysaurus* which, following the more recent work of Baldwin and Johnson (1996), is placed in the separate family Bathysauridae (suborder Giganturoidei).

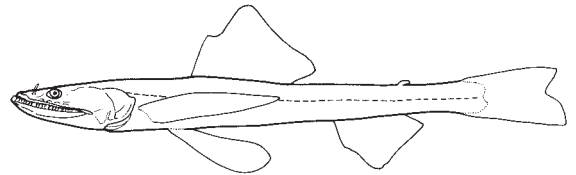
Similar families occurring in the area

Aulopidae: mouth moderate, upper jaw mostly not reaching rear end of eye; dorsal adipose fin present; pectoral fins with 11 to 14 rays, uppermost rays usually longest; pelvic fins with 9 rays; procurrent and principle rays of caudal fin without scales; branchiostegal rays about 16; gill rakers normal, lath-like shape; 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; dorsal adipose fin present or absent; pectoral fins with 15 to 17 rays, central ray or rays of pectoral fins usually prolonged; pelvic-fin rays 8, inner rays slightly shorter than outer rays; lateral-line scales enlarged; procurrent and principle rays of caudal fin with a row of scales; branchiostegal rays 8 to 13; teeth present on vomer; gill rakers reduced to patches of spines.



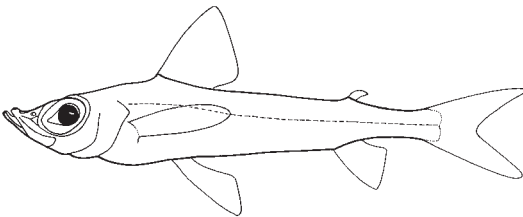
Aulopidae



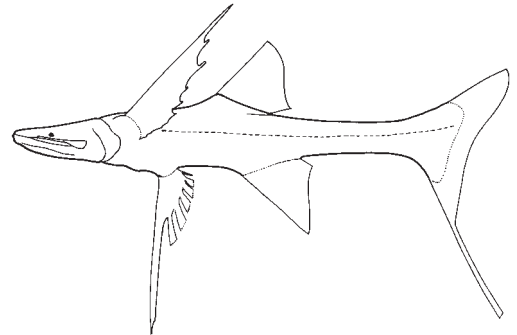
Bathysauridae

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; dorsal adipose fin present; anal fin far with 7 to 11 rays; pectoral fins with 15 to 19 rays, uppermost rays usually longest; pelvic fins with 8 or 9 rays; gill rakers normal, lath-like shape.

Ipnopidae: eye always specialized, either minute (*Bathymicrops*, *Bathypterois*), large (*Bathysauropsis*), or flat, directed dorsally, and lensless (*Ipnops*); mouth large, 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; dorsal adipose fin present or absent; anal fin under to far behind dorsal fin, with 7 to 19 rays; pelvic fins in anterior half of body, often elongate, with 7 to 9 rays, pectoral fins with 9 to 24 rays; caudal fin and paired fins with elongate specialised rays in *Bathypterois*; gill rakers normal, lath-like or reduced to low rugose knobs.



Chlorophthalmidae



Ipnopidae

Key to the species of Synodontidae occurring in the area

Note: the genus *Saurida* is in need of revision and the key to species and nomenclature of this genus should be regarded as provisional.

- 1a. Pelvic-fin rays 8, inner rays about 2 to 3 times longer than outermost rays (Fig. 1a) (subfamily **Synodontinae**) → 2
- 1b. Pelvic-fin rays 9, inner rays subequal or slightly longer than outer rays (Fig. 1b) (subfamily **Harpadontinae**) → 17

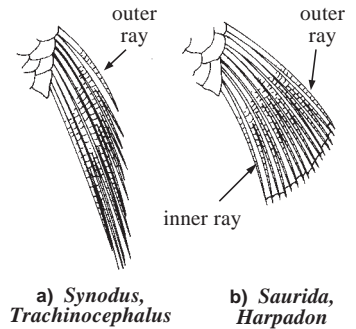


Fig. 1 pelvic fin

- 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) (except *Synodus sageneus*); no scales on procurrent caudal-fin rays (Fig. 3b) (**Synodus**) → 3

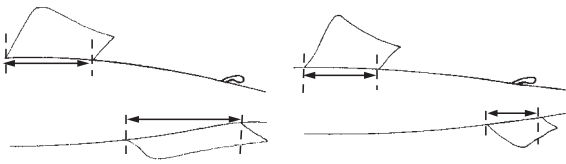


Fig. 2 dorsal and anal fins

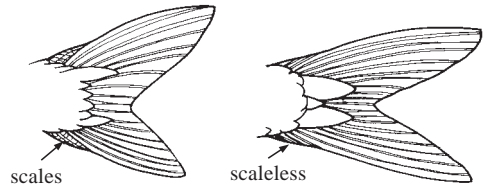


Fig. 3 caudal fin

(after Cressey in Smith and Heemstra, 1986)

- 3a. Anteriormost palatine teeth longer than more posterior teeth and in a discrete group (Fig. 4a) → 4
- 3b. Anteriormost palatine teeth not longer than others and not in a discrete group (Fig. 4b) → 10
- 4a. Scales above lateral line 3 ½ (rarely 4 ½) (Fig. 5a) → 5
- 4b. Scales above lateral line 5 ½ (rarely 6 ½) (Fig. 5b) → 7

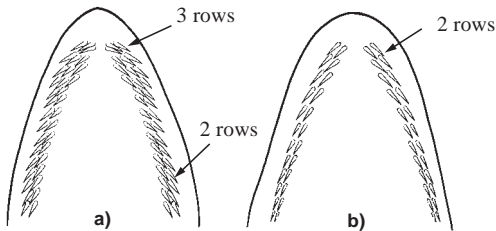


Fig. 4 palatine tooth bands on roof of mouth

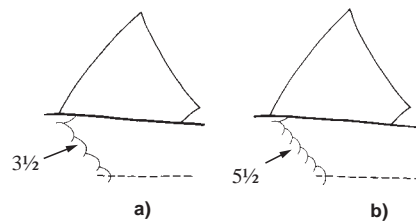


Fig. 5 scales above lateral line

- 5a. Conspicuous pigmented area on upper distal corner of operculum . . . **Synodus tectus**
- 5b. No conspicuous pigmented area on operculum → 6

- 6a. Pectoral fins just extending to a line from pelvic-fin origin to dorsal-fin origin (Fig. 6a). **Synodus doaki**
- 6b. Pectoral fins extending well beyond a line from pelvic-fin origin to dorsal-fin origin (Fig. 6b) **Synodus binotatus**

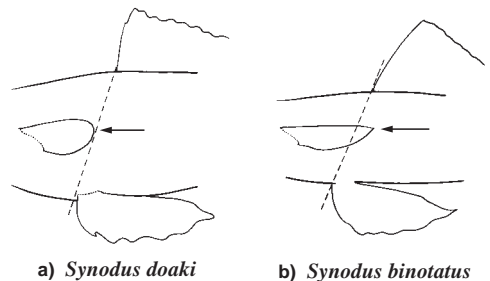


Fig. 6

- 7a. Postoral portion of cheeks scaly (Fig. 7a). *Synodus variegatus*
- 7b. Postoral portion of cheeks naked (Fig. 7b) → 8

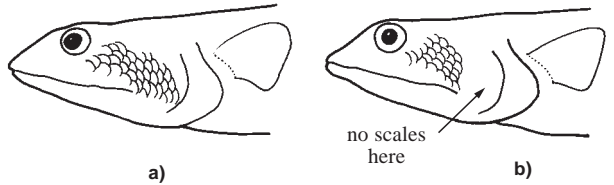


Fig. 7 lateral view of head

- 8a. Caudal peduncle with conspicuous black lateral spot; very short nasal flap on anterior nares *Synodus jaculum*
- 8b. Caudal peduncle without conspicuous black spot; anterior nasal flap short or long → 9

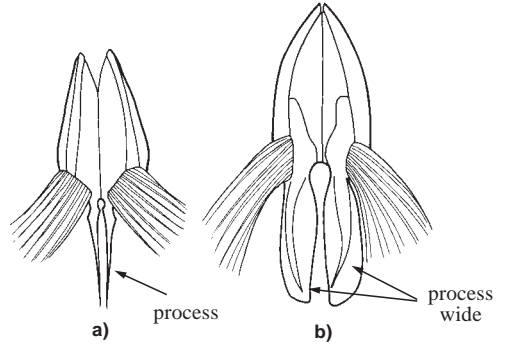


Fig. 8 head and pelvic fins (ventral view)
(after Cressey, 1981)

- 9a. Lateral-line scales 55 to 61; nasal flap very short, triangular; usually 2 spots on snout. . . *Synodus capricornis*
- 9b. More than 62 lateral-line scales; nasal flap with flagellum *Synodus dermatogenys*

- 10a. Process of pelvic fins narrow (Fig. 8a). . . . → 11
- 10b. Process of pelvic fins wide (Fig. 8b) → 14

- 11a. Pectoral fins not extending to a line from pelvic-fin origin to dorsal-fin origin; peritoneum black. *Synodus kaianus*
- 11b. Pectoral fins extending to or beyond a line from pelvic-fin origin to dorsal-fin origin; peritoneum pale or brown → 12

- 12a. Peritoneum entirely dark or at least in dorsal half, peritoneal spots 5 or 6 *Synodus macrops*
- 12b. Peritoneum pale, peritoneal spots 7 to 11 → 13

- 13a. Snout distinctly rounded in dorsal view (Fig. 9a); length of nasal flap nearly equal to base width (Fig. 10a) *Synodus oculus*
- 13b. Snout pointed in dorsal view (Fig. 9b); length of nasal flap much greater than base width (Fig. 10b). *Synodus macrocephalus*

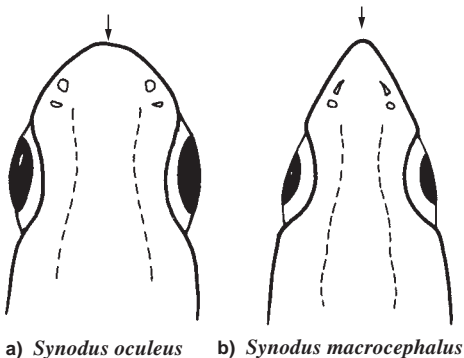


Fig. 9 dorsal view of head

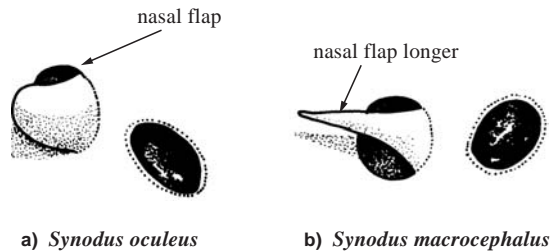


Fig. 10 nostrils of left side

- 14a. Anal-fin base longer than dorsal-fin base. *Synodus sageneus*
- 14b. Anal-fin base shorter than dorsal-fin base → 15

- 15a. Not more than 30 teeth on free end of tongue; no dark spots on upper distal corner of operculum *Synodus rubromarmoratus*
- 15b. More than 30 teeth on free end of tongue; 2 or 3 dark spots on upper distal corner of operculum → 16

- 16a. Pectoral fins not extending to a line from pelvic-fin origin to dorsal-fin origin; nasal flap long, triangular (Fig. 11a) *Synodus indicus*
- 16b. Pectoral fins extending to a line from pelvic-fin origin to dorsal-fin origin; nasal flap short, rounded (Fig. 11b). *Synodus similis*

- 17a. Lateral-line scales enlarged, extending as a median lobe of caudal fin, primary caudal-fin rays without scales (Fig. 12a); body compressed (*Harpadon*) → 18
- 17b. Lateral-line scales not enlarged, not extending beyond base of caudal fin, procurent and primary caudal-fin rays with scales (Fig 12b); body cylindrical (*Saurida*) → 20

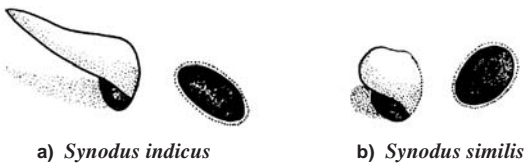


Fig. 11 nostrils of left side

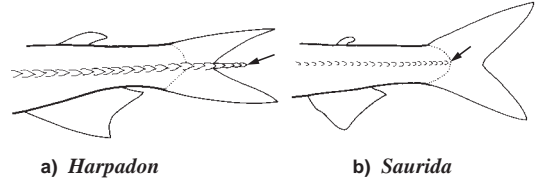


Fig. 12

- 18a. Pectoral fins reaching beyond origin of dorsal fin (Fig. 13a); dorsal-fin rays 12 or 13 *Harpadon nehereus*
- 18b. Pectoral fins reaching well short of origin of dorsal fin (Fig. 13b, c); dorsal-fin rays 13 to 15 → 19

- 19a. Pectoral fins reaching to more than 1/2 distance from snout to origin of dorsal fin (Fig. 13b). *Harpadon transluscens*
- 19b. Pectoral fins reaching much less than 1/2 distance from snout to origin of dorsal fin (Fig. 13c) *Harpadon microchir*

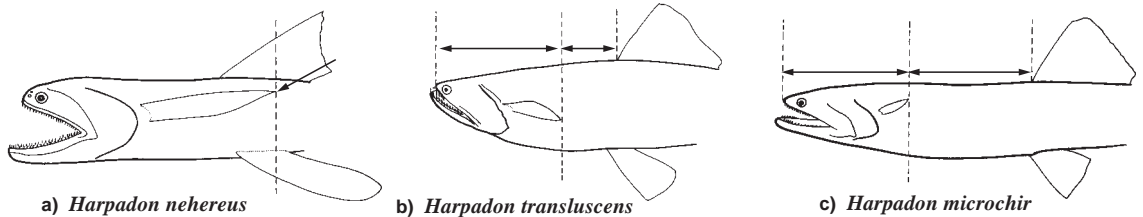


Fig. 13

- 20a. Lower jaw longer than upper jaw, distinctly visible from above when mouth is closed (Fig. 14). *Saurida isarankurai*
- 20b. Lower jaw shorter than or equal to upper jaw, not visible from above when mouth is closed → 21

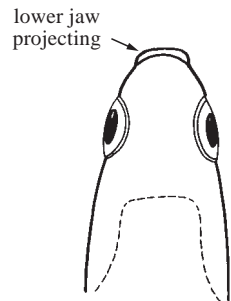


Fig. 14 dorsal view of head

- 21a. Longest ray of dorsal fin 2 to 3 times as long as last ray; scale in axil of pectoral fins short and broad (Fig. 15a); all fins with series of dark bars or spots → 22
- 21b. Longest ray of dorsal fin more than 3 times as long as last ray; scale in axil of pectoral fins long and pointed (Fig. 15b); fins (except first dorsal- and caudal-fin rays in some species) without dark bars or spots → 24

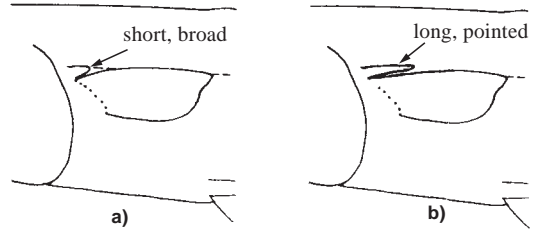


Fig. 15 axillary scale of pelvic fin

- 22a. Lateral-line scales 52 or fewer; dorsal-fin origin inserted behind midpoint of distance from snout to adipose-fin origin; usually 13 or fewer pectoral-fin rays; no bright orange colour on mouth or body → 23
- 22b. Lateral-line scales 54 or more (rarely 53); dorsal-fin origin inserted anterior to or near midpoint of distance from snout to adipose-fin origin; usually 14 or 15 pectoral-fin rays; fresh specimens with bright orange bars on mouth and orange or rose tint on fins and body *Saurida flamma*
- 23a. Pectoral fins short, tip just reaches pelvic-fin insertion and reaches not closer to dorsal-fin origin than fourth predorsal scale row (Fig. 16a); usually 12 pectoral-fin rays (rarely 11 or 13); vomer toothless; inner palatine teeth in 2 distinct rows (Fig. 17a); dark pigment always present on gill filaments and upper half of peritoneal cavity . . . *Saurida nebulosa*
- 23b. Pectoral fins long, tip extends clearly past pelvic-fin insertion to within 2 or 3 scale rows of dorsal-fin origin (Fig. 16b); usually 13 pectoral-fin rays (rarely 12 or 14); small patch of teeth on vomer; inner palatine teeth in about 3 poorly defined rows (Fig. 17b); gill filaments often without pigment; peritoneal pigment usually restricted to narrow band over the kidneys *Saurida gracilis*

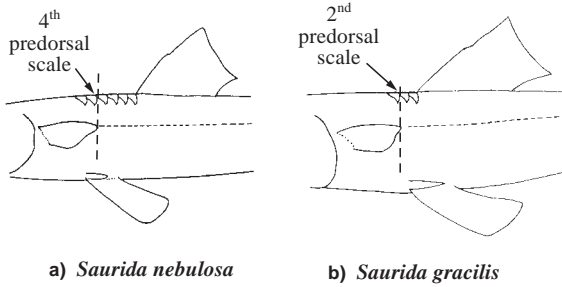


Fig. 16

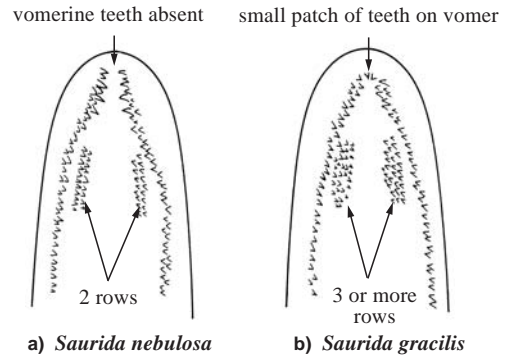


Fig. 17 teeth on roof of mouth

- 24a. Pectoral fins long, extending beyond insertion of first dorsal-fin ray (Fig. 18a), their length more than 30% of standard length *Saurida longimanus*
- 24b. Pectoral fins short, not reaching to or extending a little beyond base of pelvic fins (Fig. 18b), their length less than 20% of standard length → 25

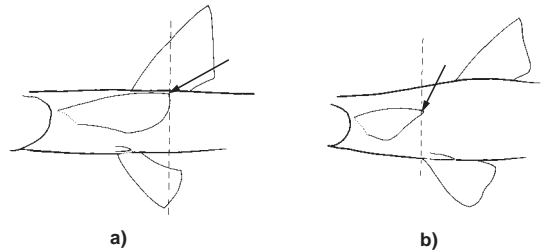


Fig. 18 posterior extension of pectoral fin

25a. Outer bands of palatine teeth in 3 or more rows anteriorly (Fig. 19a); pectoral fins not or only just reaching base of pelvic fins → 26

25b. Outer bands of palatine teeth in only 2 rows anteriorly (Fig. 19b); pectoral fins reaching to at least base of pelvic fins → 28

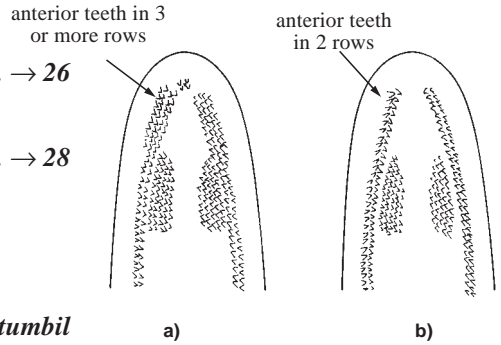


Fig. 19 teeth on roof of mouth

26a. Lateral-line scales 55 or fewer, predorsal scales 16 to 19; pectoral fins not or only just reaching to pelvic-fin base; inner and outer bands of palatine teeth narrowly separated; traces of faint darker cross bands on back . *Saurida tumbil*

26b. Lateral-line scales 56 or more, predorsal scales 20 or more; pectoral fins never reaching to pelvic-fin base; inner and outer bands of palatine teeth widely separated; traces of faint darker cross bands on back → 27

27a. Lateral-line scales 56 to 58; predorsal scales 20 or 21; caudal peduncle moderate; upper half of inside of pectoral fins dusky; 9 or 10 faint blotches along lateral line, sometimes traces of very indistinct cross bars on back *Saurida argentea*

27b. Lateral-line scales 62 to 66; predorsal scales 20 to 30; caudal peduncle depressed; inside of pectoral fins uniformly dusky; no blotches or cross bands on back or side *Saurida elongata*

28a. Lateral-line scales 47 to 50; teeth on tongue relatively large, caniniform, not closely packed, in fewer than 5 irregular rows across width of anterior tongue (Fig. 20a); anterior dorsal-fin margin and upper caudal-fin margin with small black spots *Saurida grandisquamis*

28b. Lateral-line scales 52 to 60; teeth on tongue minute, villiform, closely packed, in more than 5 irregular rows across width of anterior tongue (Fig. 20b); anterior dorsal-fin margin without black spots, upper edge of caudal fin with or without black spots → 29

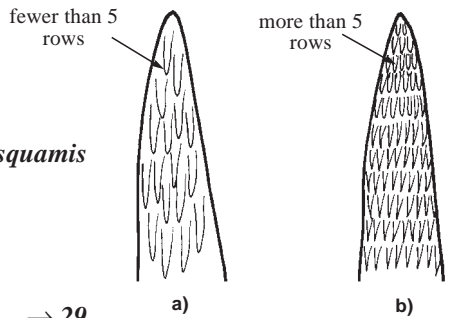


Fig. 20 teeth on tongue

29a. Second (occasionally third and fourth) ray of dorsal fin elongate and filamentous (Fig. 21a); upper lobe of caudal fin longer than lower; upper edge of caudal fin without spots or bars; lower edge of caudal fin dusky *Saurida filamentosa*

29b. Rays of dorsal fin not particularly elongate (Fig. 21b); upper and lower lobes of caudal fin about equal in length; upper edge of caudal fin with about 8 black spots or bars; lower edge of caudal fin whitish or translucent . . *Saurida undosquamis*

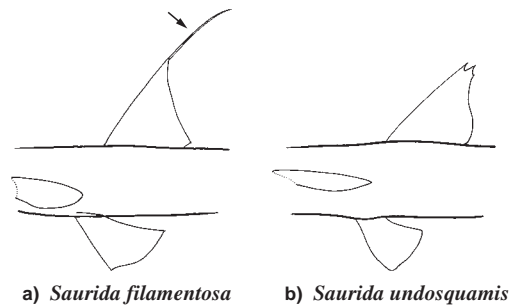


Fig. 21

List of species occurring in the area

The symbol  is given when species accounts are included.

-  *Harpadon microchir* Günther, 1878
-  *Harpadon nehereus* (Hamilton-Buchanan, 1822)
-  *Harpadon translucens* Saville-Kent, 1889
-  *Saurida argentea* Macleay, 1881
-  *Saurida elongata* (Temminck and Schlegel, 1846)
-  *Saurida filamentosa* Ogilby, 1910
-  *Saurida flamma* Waples, 1982
-  *Saurida gracilis* (Quoy and Gaimard, 1824)
-  *Saurida grandisquamis* (Günther, 1864)
-  *Saurida isarankurai* Shindo and Yamada, 1972
-  *Saurida longimanus* (Norman, 1939)
-  *Saurida nebulosa* (Cuvier and Valenciennes, 1849)
-  *Saurida tumbil* (Bloch, 1795)
-  *Saurida undosquamis* (Richardson, 1848)
-  *Synodus binotatus* (Schultz, 1953)
-  *Synodus capricornis* (Cressey and Randall, 1978)
-  *Synodus dermatogenys* (Fowler, 1912)
-  *Synodus doaki* (Russell and Cressey, 1979)
-  *Synodus indicus* (Day, 1873)
-  *Synodus jaculum* (Russell and Cressey, 1979)
-  *Synodus kaianus* (Günther, 1880)
-  *Synodus macrocephalus* (Cressey, 1981)
-  *Synodus macrops* (Tanaka, 1917)
-  *Synodus oculus* (Cressey, 1981)
-  *Synodus rubromarmoratus* (Russell and Cressey, 1979)
-  *Synodus sageneus* (Waite, 1905)
-  *Synodus similis* (McCulloch, 1921)
-  *Synodus tectus* (Cressey, 1981)
-  *Synodus variegatus* (Lacepède, 1803)
-  *Trachinocephalus myops* (Bloch and Schneider, 1801)

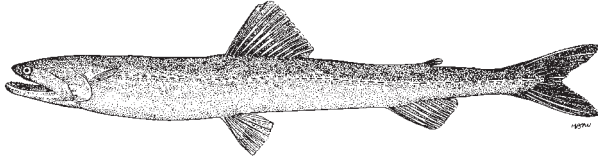
References

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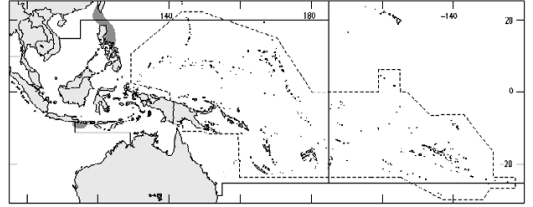
***Harpadon microchir* Günther, 1878**

En - Smallfinned Bombay duck.

Maximum standard length about 70 cm. Inhabits soft bottoms in deep water. No importance to fisheries. Known from Japan, northeastern Philippines, and southern Indonesia.



(after Masuda et al., 1984)

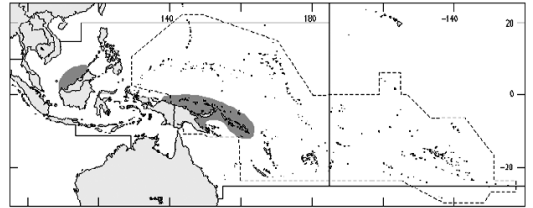
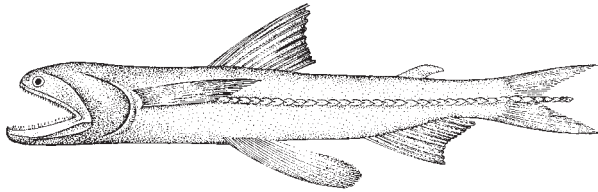


***Harpadon nehereus* (Hamilton-Buchanan, 1822)**

BUC

En - Bombay duck; **Fr** - Scopelidé; **Sp** - Bumalo.

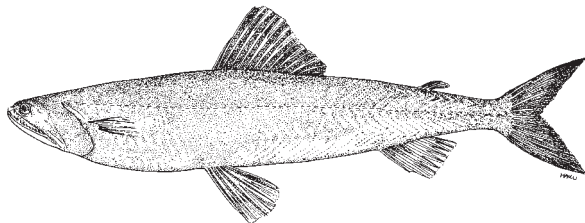
Maximum standard length about 40 cm. A benthic species, inhabits coastal waters and estuaries on soft bottoms. Caught with bottom trawls. From 1990 to 1995, FAO's Yearbook of Fishery Statistics reports a range of yearly catch of *Harpadon nehereus* of around 12 200 to 15 200 t from the area (Indonesia only). Marketed fresh, salted dried, or smoked; extensively used as a relish with curry. Widespread in the Indo-West Pacific from India to the Solomon Islands.



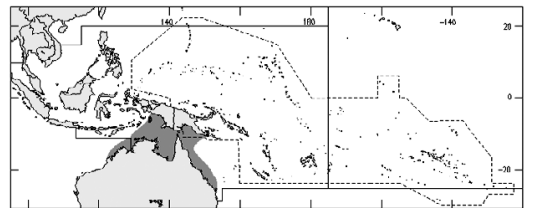
***Harpadon translucens* Saville-Kent, 1889**

En - Glassy Bombay duck.

Maximum standard length about 65 cm. Inhabits coastal waters and estuaries on sand and mud bottoms in 1 to 75 m. Taken in prawn trawls. Unimportant to fisheries. Northwestern Australia, southern New Guinea, and northeastern Australia.

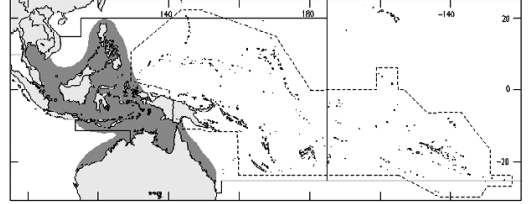
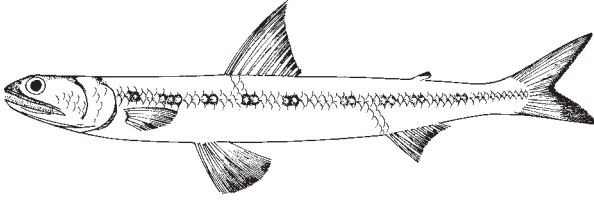


(after Sainsbury et al., 1985)

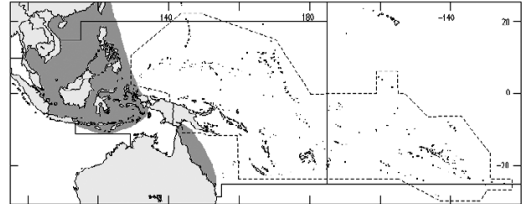
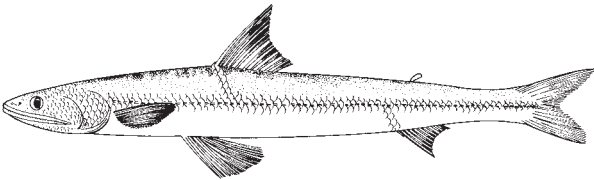


Saurida argentea* Macleay, 1881*En** - Shortfin saury.

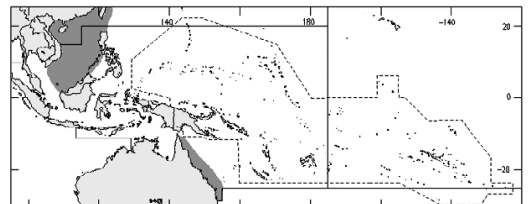
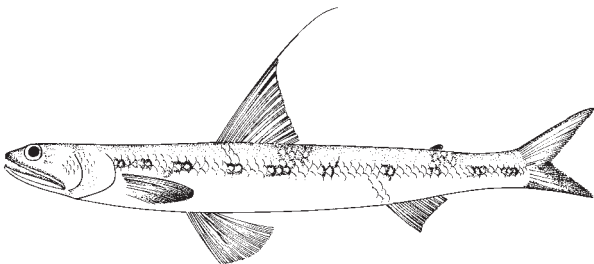
Maximum standard length about 29 cm. Inhabits coastal waters on sand and mud bottoms in depths of 1 to 70 m. Taken in trawl catches, but of minor importance to fisheries. Previously identified as *Saurida micropectoralis*. Widespread in the West Pacific from the Gulf of Thailand to northeastern Australia.

***Saurida elongata* (Temminck and Schlegel, 1846)****En** - Slender lizardfish.

Maximum standard length about 30 cm. Occurs on sand and mud bottoms. Taken in trawl catches, but of minor importance to fisheries. Previously identified as *Saurida microlepis*. Widespread in the West Pacific from the East China Sea to eastern Australia.

***Saurida filamentosa* Ogilby, 1910****En** - Filamentous saury.

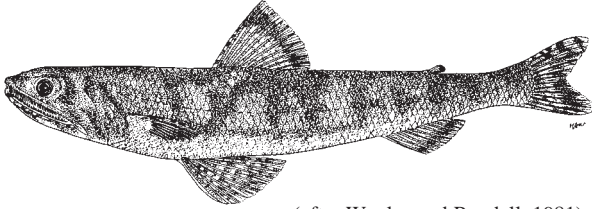
Maximum standard length about 53 cm. Occurs on mud and sand bottoms in depths of 140 to 220 m. Taken in trawl catches, but of minor importance to fisheries. Previously identified as *Saurida wanieo*. Widespread in the West Pacific from the East China Sea to eastern Australia.



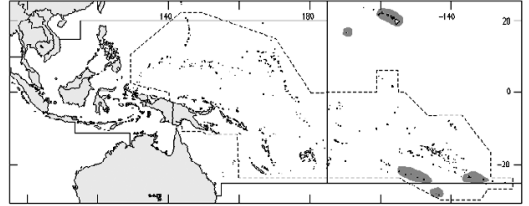
Saurida flamma Waples, 1982

En - Orangemouth saury.

Maximum standard length about 29 cm. Found in deep reef areas on coral and rock near sandy areas in depths of 5 to 30 m. Of no importance to fisheries. Occurs in Hawaii and Oceania (Rapa, Johnston Island, Pitcairn Island, and Austral Islands).



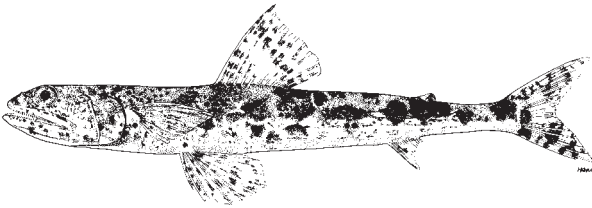
(after Waples and Randall, 1981)



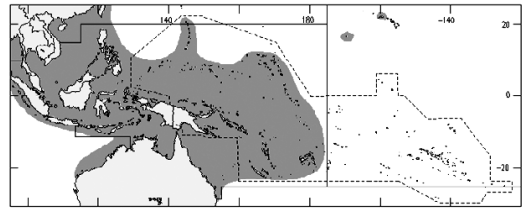
Saurida gracilis (Quoy and Gaimard, 1824)

En - Gracile lizardfish; **Fr** - Anoli grêle; **Sp** - Lagarto grácil.

Maximum standard length about 28 cm. Occurs on soft bottoms in depths of 1 to 12 m. Of minor importance to fisheries. Widespread in the Indo-West Pacific from East Africa, including the Red Sea, to Hawaii.



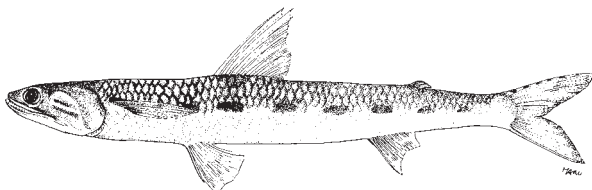
(after Masuda et al., 1984)



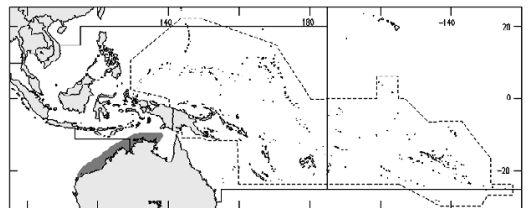
Saurida grandisquamis (Günther, 1864)

En - Grey saury.

Maximum standard length about 28 cm. Occurs on sand and mud bottoms in depths of 20 to 265 m. Often taken in trawls, but only of minor importance to fisheries. Northwestern Australia to Louisiade Archipelago.

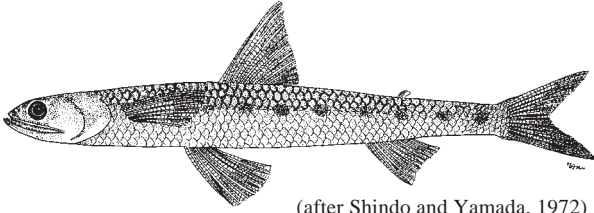


(after Sainsbury et al., 1985)

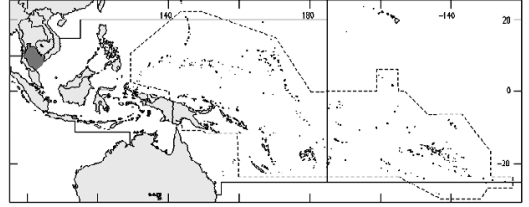


Saurida isarankurai (Shindo and Yamada, 1972)**En** - Shortjaw saury.

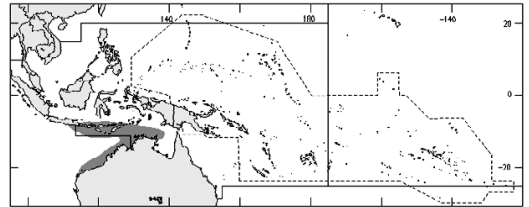
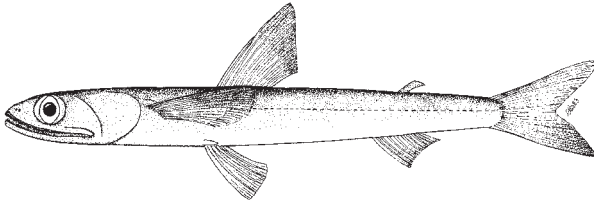
Maximum standard length about 12 cm. Occurs on sand and mud bottoms. Occasionally taken in bottom trawls, of minor importance to fisheries. Known only from the Gulf of Thailand.



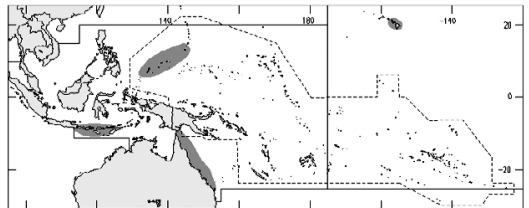
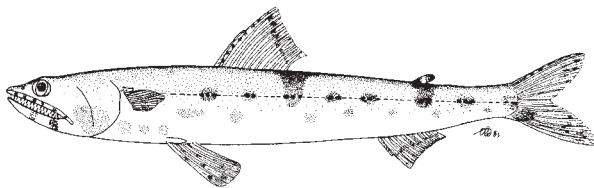
(after Shindo and Yamada, 1972)

***Saurida longimanus*** (Norman, 1939)**En** - Longfin lizardfish; **Fr** - Anoli aile longue; **Sp** - Lagarto aletón.

Maximum standard length about 22 cm. Occurs on sand and mud bottoms in depths of 55 to 280 m. Occasionally taken in bottom trawls, but of minor importance to fisheries. Widespread in the Indian Ocean from the Gulf of Oman to southern Indonesia, northwestern Australia and the Arafura Sea.

***Saurida nebulosa*** (Cuvier and Valenciennes, 1849)**En** - Clouded lizardfish; **Fr** - Anoli nuageux; **Sp** - Lagarto nubífero.

Maximum standard length about 17 cm. Inhabits coastal waters on sand and mud bottoms, often at the mouths of fresh-water streams, in depths between 2 and 60 m. Sometimes found in coral lagoons. No importance to fisheries. Often wrongly identified as *Saurida gracilis*. Widespread in the West Pacific from Mauritius to Hawaii.

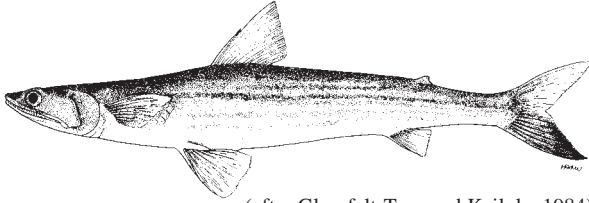


Saurida tumbil (Bloch, 1795)

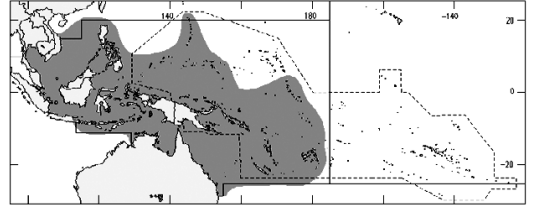
LIG

En - Greater lizardfish; **Fr** - Anoli tumbil; **Sp** - Lagarto tumbil.

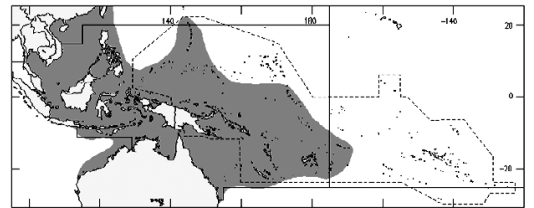
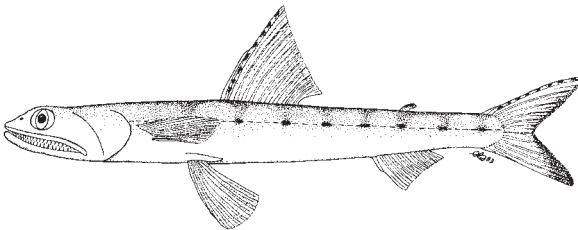
Maximum standard length about 24 cm. Inhabits coastal and estuarine waters on sand and mud bottoms in depths of 20 to 45 m. Often taken in trawl catches, but unimportant to fisheries. Widespread in the Indo-West Pacific.



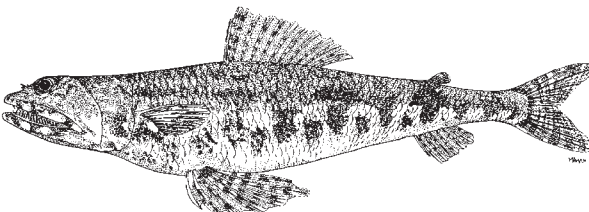
(after Gloerfelt-Tarp and Kailola, 1984)

***Saurida undosquamis*** (Richardson, 1848)**En** - Brushtooth lizardfish; **Fr** - Anoli à grandes écailles; **Sp** - Lagarto escamoso.

Maximum standard length about 28 cm. Occurs on sand and mud bottoms in depths of 20 to 350 m. Often taken in trawl catches, but of minor importance to fisheries. Widespread in the West Pacific from Japan to northwestern Australia.

***Synodus binotatus*** (Schultz, 1953)**En** - Twospot lizardfish; **Fr** - Anoli à deux taches; **Sp** - Lagarto dos manchas.

Maximum standard length about 14 cm. Common in shallow coral reef areas in depths from 1 to 30 m. Minor importance to fisheries. Widespread in the Indo-West Pacific from South Africa to Gambier Island.



(after Waples and Randall, 1988)

