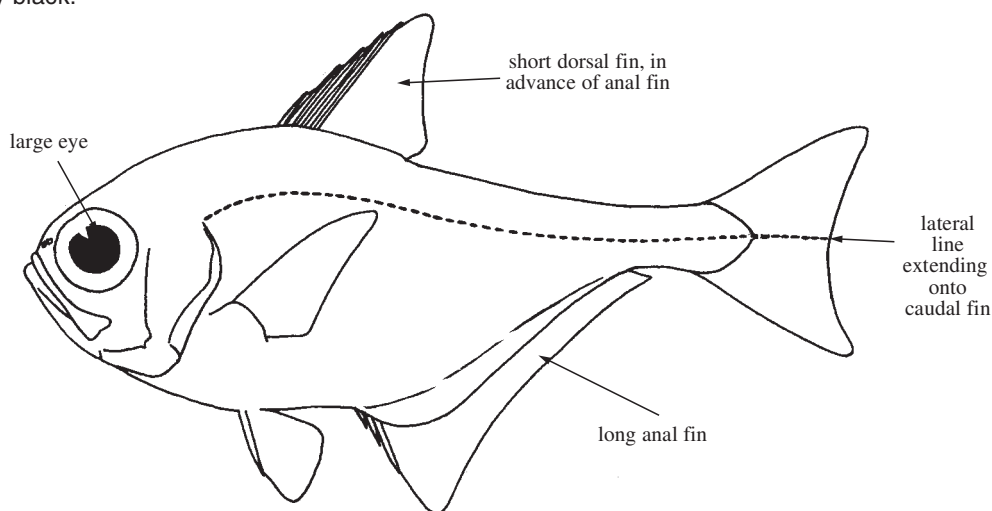


PEMPHERIDAE

Sweepers (bullseyes)

by R.D. Mooi

Diagnostic characters: Small to medium-sized fishes (up to 22 cm), elongate to deep-bodied and compressed. **Eye large**, without adipose lid. Snout short. Opercular spines short and blunt. Gill rakers on first arch long and numerous (more than 20). Branchiostegal rays 7. **Dorsal fin very short, usually higher than long, much shorter than anal-fin base and in advance of anal-fin origin**, with V to VII narrow spines and 7 to 13 soft rays; **anal-fin base long**, the fin with III spines (first spine short and often difficult to see) and 18 to 45 soft rays; caudal fin shallowly forked; pelvic fins with I spine and 5 soft rays; pectoral fins with 16 to 19 rays. At least some scales ctenoid in all species, in some species cycloid scales dominate anterodorsally and laterally; lateral-line scales 44 to more than 80; **lateral line complete, extending far onto caudal fin**; lateral-line scales exposed or covered. Coracoid expanded posteriorly. Some species bioluminescent, with light organs associated with the pyloric caeca and/or rectum. **Colour:** variable, but often pinkish or reddish, flanks silvery, iridescent; dorsal, anal, and caudal fins often bordered or tipped by black.

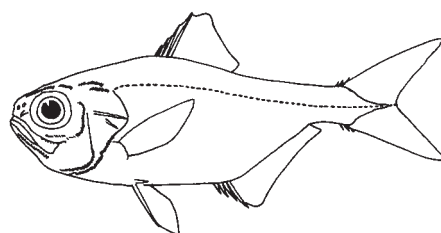


Habitat, biology, and fisheries: Found mainly in tropical and subtropical areas in shallow water (less than 100 m), common on coral reefs. During the day, often found in large schools in caves or protected areas from which they disperse at night to feed on crustaceans and polychaete worms. Many species have bioluminescent organs associated with the pyloric caeca and sometimes the rectum; in at least *Parapriacanthus* the bioluminescent chemistry appears to be obtained from food items. Family of no commercial value, but their local abundance results in capture by trap nets and shrimp trawls, and explains their appearance in fish markets. Used as fish paste non-commercially in at least Japan. Meat of some species reported as tasty.

Remarks: Species generally poorly described with many taxonomic problems. The most obvious of these is among the cycloid-scaled, keeled *Pempheris*. Four species of this group are recognized here (*P. otaitensis*, *P. oualensis*, *P. schwenkii*, *P. vanicolensis*), although a further 4 nominal taxa are reported for the area (*P. adusta* Bleeker, 1877; *P. itoi* Fowler, 1931; *P. mangula* Cuvier, 1829; *P. molucca* Cuvier, 1829). A thorough revision of the family is required. As a result, distributions of individual species are not well known and individual species maps are not provided. Examples of *Pempheris* are reported as far east as Pitcairn Island and are expected throughout the covered area. *Parapriacanthus* has been reported from the Phoenix Islands and westward in the WCP area.

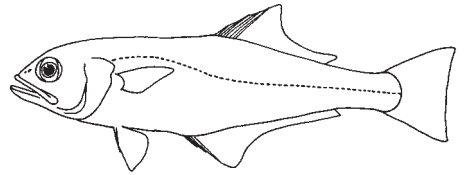
Similar families occurring in the area

Berycidae: similar in having a short dorsal fin in advance of a long-based anal fin and the lateral line extending well onto the caudal fin; easily distinguished by having IV anal-fin spines, pelvic fins with I spine and 7 to 13 soft rays, head ornamentation consisting of serrate ridges and spines, very rough and almost keeled scales, and deeply forked caudal fin.



Berycidae

Leptobramidae: similar in having a short dorsal fin and long-based anal fin; easily distinguished by the dorsal-fin origin being posterior to anal-fin origin and closer to caudal-fin base than snout tip, eye with adipose lid, maxilla extending beyond posterior margin of eye, fewer than 15 gill rakers on first gill arch, steel blue back.



Leptobramidae

Key to the species of Pempheridae occurring in the area

- 1a. Body elongate, its depth less than or equal to head length; anal fin naked or scaly only basally; 28 or fewer soft rays in anal fin; lateral line extending about half-way along middle caudal-fin rays (*Parapriacanthus*) → 2
- 1b. Body deep, its depth greater than head length; anal fin scaly over 1/2 of ray length; 30 or more soft rays in anal fin; lateral line extending to distal tips of middle caudal-fin rays (*Pempheris*) → 4
- 2a. Dorsal fin with VI spines and 10 or 11 soft rays; anal-fin with 26 to 28 soft rays; first gill arch with 7 or 8 gill rakers on upper limb, 19 to 22 on lower limb (Fig. 1) *Parapriacanthus marei*
- 2b. Dorsal fin with V or VI spines and 8 or 9 soft rays; anal fin with 24 or fewer soft rays; first gill arch with 4 to 7 gill rakers on upper limb, 14 to 19 on lower limb → 3
- 3a. Lateral-line scales 54 to 64 (usually 56 to 61); dorsal fin with VI spines (sometimes V); anal fin with 22 to 24 soft rays (usually 23); deeper-bodied, with 2 or more scales between midventral edge of coracoid and midlateral edge of pelvic bone (Fig. 2a) *Parapriacanthus dispar*
- 3b. Lateral-line scales 60 to 79 (usually 62 to 75); dorsal fin with V spines (sometimes VI); anal fin with 18 to 23 soft rays (usually 19 or 20); more elongate body with 1 or 12 scales between coracoid and midlateral edge of coracoid and midlateral edge of pelvic bone (Figs 2b and 3) *Parapriacanthus ransonneti*

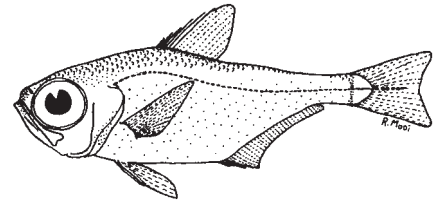
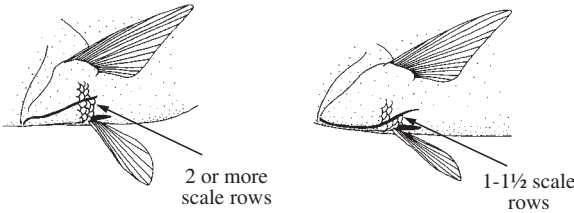


Fig. 1 *Parapriacanthus marei*



a) *Parapriacanthus dispar*

Fig. 2

b) *Parapriacanthus ransonneti*

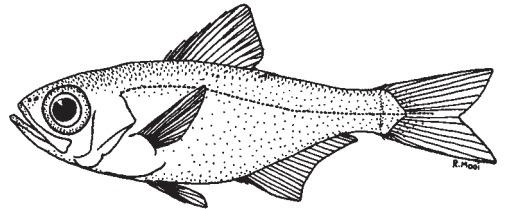


Fig. 3 *Parapriacanthus ransonneti*

- 4a. Scales on flank ctenoid and adherent; lateral-line scales equal in size or slightly larger than surrounding scales, sensory tubes wider than long (Fig. 4a); prepelvic area broad and unkeeled → 5
- 4b. Scales on flank cycloid and deciduous; lateral-line scales smaller than (and partly or mostly concealed by) surrounding scales, sensory tubes longer than wide or wider than long (Fig. 4b); prepelvic area narrow and keeled or broad and unkeeled → 8

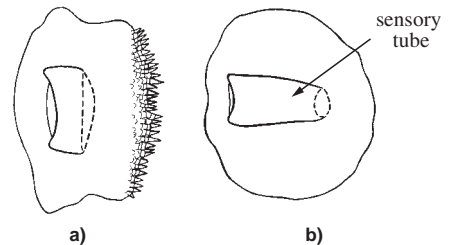


Fig. 4 lateral-line scales

5a. Dark Y-shaped organ visible just anterior to anus (Fig. 5); axillary scale present (shown black in Fig. 2); first gill arch with 5 to 7 (rarely 9) gill rakers on upper limb and 19 to 21 (rarely 22 or 23) on lower limb (total 24 to 29, but usually 26 or 27); lateral-line scales 62 to 74, usually 64 to 69 (Fig. 6). . . . *Pempheris ypsilychnus*

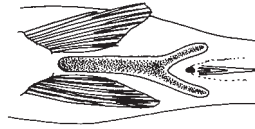


Fig. 5 Y-shaped organ between pelvic fins and anus in *Pempheris ypsilychnus*

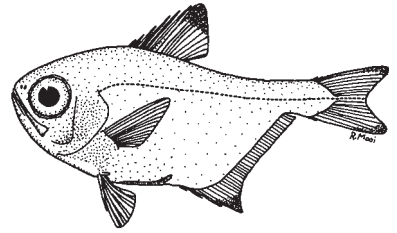


Fig. 6 *Pempheris ypsilychnus*

(Australia only)

5b. No Y-shaped organ visible anterior to anus; no axillary scale; first arch with 9 to 13 gill rakers on upper limb and 21 to 29 on lower limb (total 30 to 42); lateral-line scales 63 to 84 → 6

6a. Variably bronze or silvery brown with dark dorsal-fin tips and anterior anal-fin tips; lateral-line scales 63 to 77 (usually less than 73); anal-fin rays 30 to 36 (usually 34 or 35); first gill arch with 32 to 36 gill rakers (Fig. 7) *Pempheris analis*
(in the area, known from eastern Australia)

6b. Coloration as above, but lateral-line scales 71 to 84; anal-fin rays 33 to 38 (usually 34 or more); first gill arch with 30 to 42 gill rakers → 7

7a. Lateral-line scales 72 to 77; first gill arch with 30 to 34 gill rakers (usually 32 to 33) . *Pempheris japonica*
(Philippines northward)

7b. Lateral-line scales 72 to 84; usually more than 76; first gill arch with 37 to 42 gill rakers . . . *Pempheris rapa*
(French Polynesia)

8a. Dorsal fin with V spines and 10 to 12 soft rays; prepelvic area broad and unkeeled; lateral-line sensory tubes wider than long (Fig. 4a); scales above lateral line 6 to 8; anterior luminous organ present and associated with pyloric caeca; yellowish brown to brownish orange (Fig. 8) *Pempheris affinis*
(southeastern Australia)

8b. Dorsal fin with VI spines and 8 to 10 soft rays; prepelvic area narrow and keeled; lateral-line sensory tubes longer than wide (Fig. 4b); scales above lateral line 3 to 6; anterior luminous organ absent → 9

9a. Lateral-line scales 46 to 54; 3 or 4 scales between lateral line and dorsal-fin origin; 9 to 13 scales between lateral line and anal-fin origin; deep purplish dorsally, almost black posterior to dorsal fin, shading to silvery flanks with pinkish or lavender iridescence, leading edge of dorsal fin dark, base of anal fin dark with remainder of fin pale or lightly pigmented, caudal fin dusky or yellow; usually less than 12.5 cm standard length (Fig. 9) *Pempheris schwenkii*

9b. Lateral-line scales more than 53; 5 or 6 scales between lateral line and dorsal-fin origin; 12 to 16 scales between lateral line and anal-fin origin; body generally coppery or silver iridescent, dorsal fin with dark leading edge and black distal tips to anterior soft rays, anal fin with or without dark base but remainder of fin entirely pigmented or pale with black distal margin, caudal fin often with distinct dark posterior margin; often larger than 12.5 cm standard length. → 10

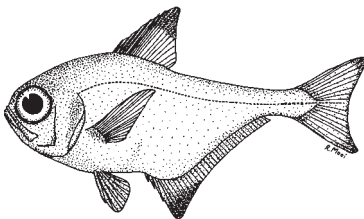


Fig. 7 *Pempheris analis*

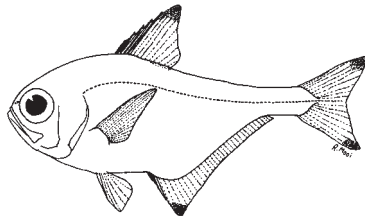


Fig. 8 *Pempheris affinis*

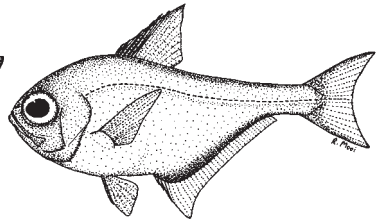


Fig. 9 *Pempheris schwenkii*

- 10a.** Anal fin completely dusky, or mostly dusky except for a pale distal margin; dorsal fin with a dark leading edge that expands distally to produce dark tips on the first 2 or 3 soft rays; pectoral fins usually with distinctly dark base; caudal fin usually without a dark posterior margin (Fig. 10). *Pempheris oualensis*
- 10b.** Anal fin pale or lightly pigmented with a dark distal margin; dorsal fin with a dark leading edge with or without dark tips on the first 5 or 6 soft rays; pectoral fins with or without distinctly dark base → 11
- 11a.** Dorsal fin with dark leading edge, not expanded to produce dark tips on soft rays; pectoral fins usually with a distinct dark base *Pempheris otaitensis*
- 11b.** Dorsal fin with dark leading edge expanding distally to produce dark tips on the first 5 or 6 soft rays; pectoral fin usually without a distinct dark base (Fig. 11) *Pempheris vanicolensis*

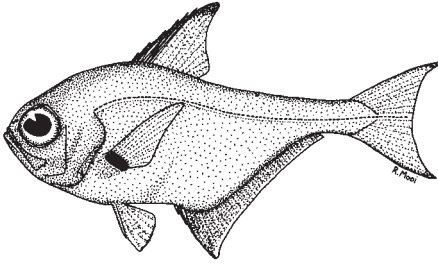


Fig. 10 *Pempheris oualensis*

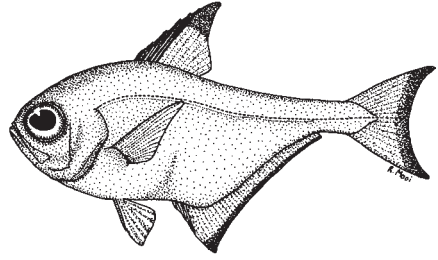


Fig. 11 *Pempheris vanicolensis*

List of species occurring in the area

- Parapriacanthus dispar* (Herre, 1935)
Parapriacanthus marei Fourmanoir, 1971
Parapriacanthus ransonneti Steindachner, 1870
- Pempheris affinis* McCulloch, 1911
Pempheris analis Waite, 1910
Pempheris japonica Döderlein, 1883
Pempheris otaitensis Cuvier, 1831
Pempheris oualensis Cuvier, 1831
Pempheris rapa Mooi, 1998
Pempheris schwenkii Bleeker, 1855
Pempheris vanicolensis Cuvier, 1831
Pempheris ypsilychnus Mooi and Jubb, 1996

References

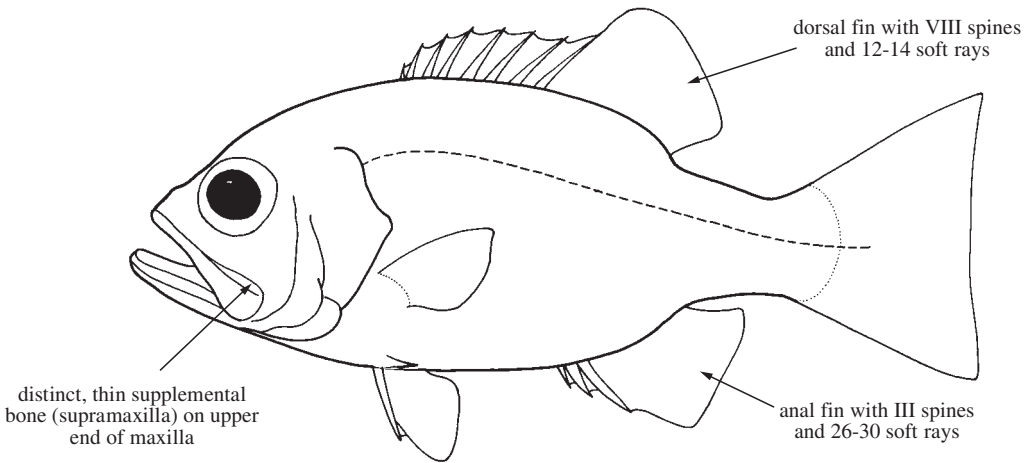
- Mooi, R.D. and R.N. Jubb. 1996. Descriptions of two new species of the genus *Pempheris* (Pisces: Pempheridae) from Australia, with a provisional key to Australian species. *Rec. Aust. Mus.*, 48(2):117-130.
- Tominaga, Y. 1963. A revision of the fishes of the family Pempheridae of Japan. *J. Fac. Sci.*, Tokyo, Sect. 4, 10(1):269-297.
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GLAUCOSOMATIDAE

Pearl perches

by R.J. McKay

Diagnostic characters: Robust to deeply ovate, compressed, marine coastal perch-like fishes (size to about 70 cm). Head large; scales present on entire head except tip of snout, lips, and chin. Preopercle with blunt spines at angle or entire; opercle with 1 blunt spine. Mouth large, oblique, terminal, and protractile; lips thin; **maxilla broad, scaly, with a narrow supplemental (supramaxillary) bone above**, scarcely slipping below preorbital; lower jaw protruding. Teeth pointed or conical, in narrow bands in jaws, **usually without canines**; teeth on vomer, palatines, and tongue. **Dorsal fin single, with VIII graduated spines and 12 to 14 soft rays** (much higher than spines); **anal fin with III short graduated spines and 9 to 12 soft rays**; caudal fin lunate or emarginate, frequently with tips produced or filamentous; pectoral fins short and blunt; pelvic fins small, below base of pectoral fins, with 1 spine and 5 soft rays. Scales ctenoid, small or moderate, a basal sheath present; lateral line continuous, tubes simple, continued onto tail. Haemapophyses of fifth to tenth abdominal vertebrae modified, the sixth to eighth forming flat plates to which the swimbladder is firmly bound. **Colour:** silvery grey to reddish brown with distinct or indistinct stripes following scale rows; usually with 1 or more dark bands on head; a dark or silvery blotch at posterior base of dorsal fin.

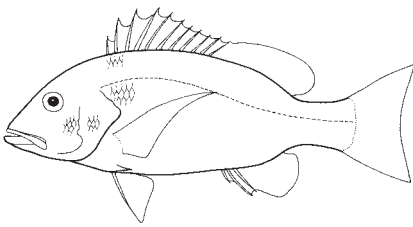


Habitat, biology, and fisheries: Generally frequenting submerged reefs, pinnacles, and rough rocky bottoms in moderately deep water, but moving into shallow water at times. Usually strictly bottom feeders but may move up into the water column to take a bait on occasions. These fishes feed mostly at dawn or dusk and may be taken throughout the day and night in deep water. All are superior table fishes with white flesh of excellent texture and superb flavour. Recognized in Australia to be some of the finest food fishes available.

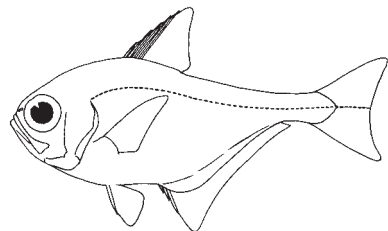
Similar families occurring in the area

Lutjanidae: somewhat similar in shape to pearl perches, but have strong canine teeth on jaws, and differ in lacking a distinct thin supplemental (supramaxillary) bone on the upper edge of the maxilla.

Pempheridae: related to the Glaucosomatidae in having the same structure of the swimbladder, and the modification of the haemapophyses of the fifth to tenth abdominal vertebrae, but differ in having more anal-fin elements (i.e. spines plus soft rays: 17 to 45 versus 9 to 12), less dorsal-fin spines (IV to VI versus VIII or IX), and lack a supplemental (supramaxillary) bone.



Lutjanidae



Pempheridae

Key to the species of Glaucosomatidae occurring in the area

- 1a. Three dark vertical bands from nape, the first through eye, the second along edge of preopercle and the third down to pectoral-fin base; dorsal, caudal, and anal fins with some filamentous rays; dorsal-fin rays 14; anal-fin rays 12 *Glaucosoma magnificentum*
(northern Australia and southern New Guinea)
- 1b. A single dark vertical band through eye that may disappear with increasing size; dorsal-fin rays 11; anal-fin rays 9 → 2
- 2a. Supraclavicle (shoulder bone) developed into a prominent bony shield (Fig. 1) *Glaucosoma scapulare*
(eastern Australia)
- 2b. Supraclavicle not developed into a bony shield; peritoneum and gill rakers black; lateral line with 49 to 51 pored scales *Glaucosoma buergeri*

supraclavicle covered with black membrane, "pearl-like" when exposed

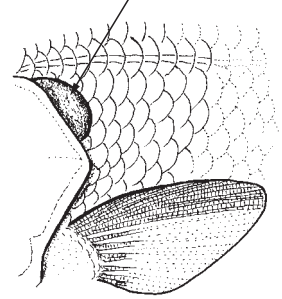


Fig. 1

List of species occurring in the area

The symbol ➡ is given when species accounts are included.

- ➡ *Glaucosoma buergeri* Richardson, 1845
- ➡ *Glaucosoma magnificentum* (Ogilby, 1915)
- ➡ *Glaucosoma scapulare* Ramsay, 1881

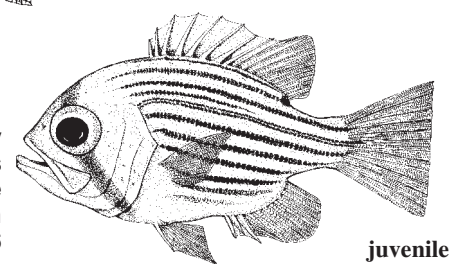
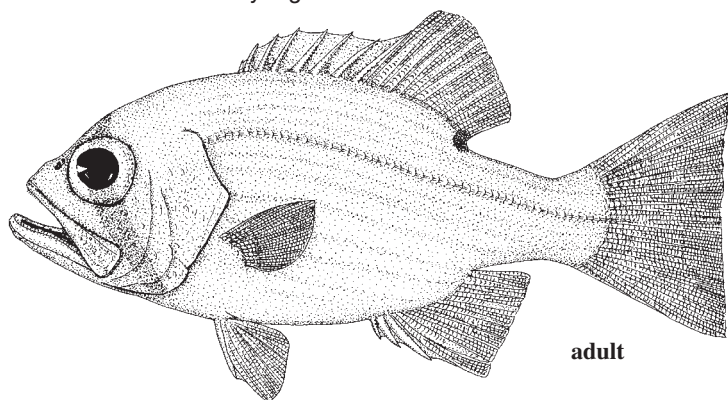
Reference

McKay, R.J. 1997. FAO species catalogue. Vol. 17. Pearl perches of the world (family Glaucosomatidae). An annotated and illustrated catalogue of the pearl perches known to date. *FAO Fish. Synop.*, (125)17:26 p.

***Glaucosoma buergeri* Richardson, 1845**

Frequent synonyms / misidentifications: *Glaucosoma fauvelii* Sauvage, 1881; *G. taeniatus* Fowler, 1934; *G. bürgeri* Richardson, 1845 / *Glaucosoma hebraicum* non Richardson, 1845.

FAO names: En - Grey bigmouth bream.

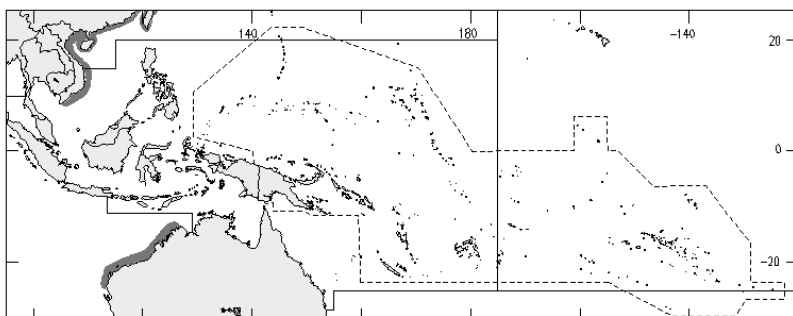


Diagnostic characters: Body robust, moderately compressed, its depth 1.9 to 2.3 times in standard length. Head almost entirely scaled, profile with a slight concavity before eye. Eye large, its diameter 2.9 to 3.7 times in head length; interorbital space convex, its width 3.9 to 4.8 times in head length; suborbital width less than eye diameter (1.9 to 2.7 times in eye diameter) and 6.6 to 7.8 times in head length. Snout short, its length 3.5 to 4.4 times in head length. Mouth large, oblique, reaching to about posterior margin of eye; maxilla scaly, with thin supplemental (supramaxillary) bone above, its width at the end 4.7 to 5.5 times in head length and 1.4 to 1.8 times in eye diameter; teeth small and canine-like (no enlarged canines), in several rows in upper jaw and in a single series at side of lower jaw; a narrow V-shaped band of fine teeth on vomer. First gill arch with 6 to 9 gill rakers on upper limb, 13 to 15 on lower limb. Dorsal-fin spines VIII, increasing in length from a small anterior spine to a long posterior one; soft dorsal-fin rays 11, soft-rayed part of fin much higher than spinous part with anterior ray often produced into a filament; anal fin with III slender spines and 9 soft rays; caudal fin slightly emarginate with pointed tips; pectoral-fin rays 16. Lateral line almost straight, with 49 to 51 (usually 50) tubed scales extending onto caudal-fin base; 12 scale rows between lateral line and origin of dorsal fin. **Colour:** body silvery grey; **about 10 longitudinal thin bands along body, their widths much less than diameter of pupil and less than their interspaces** (bands become indistinct or completely disappear with age); a vertical broad dark band from nape, curving through eye to lower opercular angle and continued on subopercle; back at base of last dorsal-fin ray usually with a dark blotch; **roof of mouth with black mottling, coalescing lines, or completely black; tongue with black mottling; peritoneum black (in dead specimens the black peritoneum may be slightly everted through the anus);** fins greyish. Juveniles with narrow dark bars and eye-stripe well defined.

Size: Maximum total length about 45 cm, commonly to 35 cm; maximum weight 2.5 kg.

Habitat, biology, and fisheries: Coastal waters in moderate depths on the continental shelf, generally close to reefs or rough bottoms. Taken by bottom trawls and line. Marketed fresh, a small quantity is salted.

Distribution: Western Australia from Koks Island (Shark Bay) northwards to Cape Talbot; Japan from Kochi Prefecture (Ryukyu Islands) southwards and along the north China coast to Taiwan Province of China and Viet Nam; probably does not occur in the Philippines.

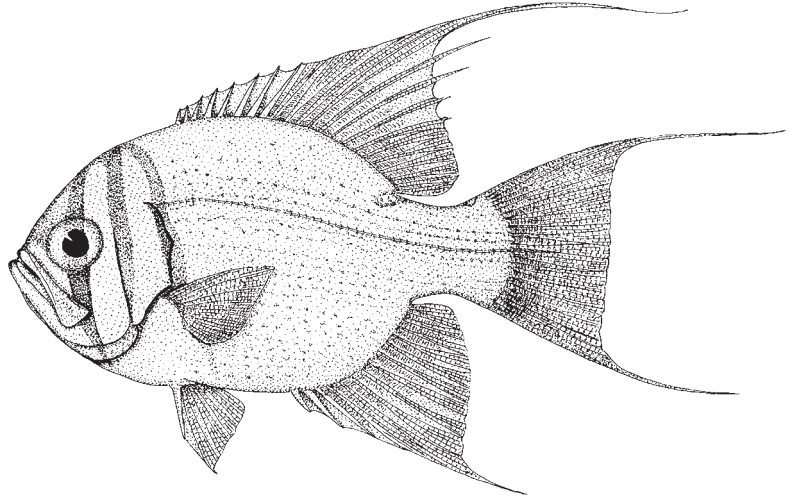


Glaucosoma magnificum (Ogilby, 1915)

Frequent synonyms / misidentifications: None / None.

FAO names: En - Threadfin pearl perch.

Diagnostic characters: Body robust, moderately compressed, its depth 1.6 to 1.8 times in standard length. Head almost entirely scaled, profile evenly rounded. Eye large, its diameter 2.3 to 2.6 times in head length; interorbital space convex, its width 2.9 to 3.2 times in head length; preorbital width less than eye diameter and 7.8 to 9.6 times in head length. Snout short, its length 5 to 5.7 times head length. Mouth large, oblique, reaching to about middle of eye; maxilla scaly, with thin supplemental (supramaxillary) bone above, its width at the end 4.9 to 5.4 times in head length and 1.9 to 2.3 times in eye diameter;

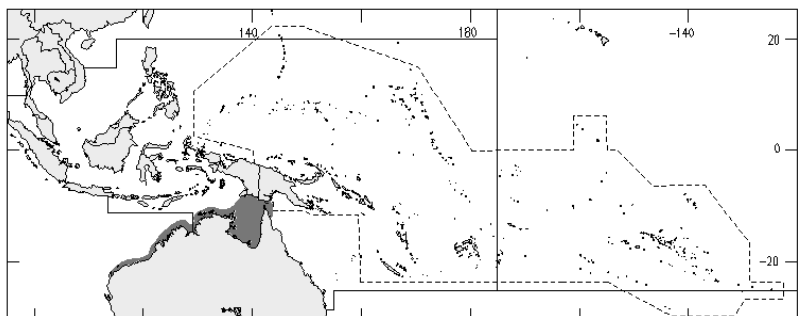


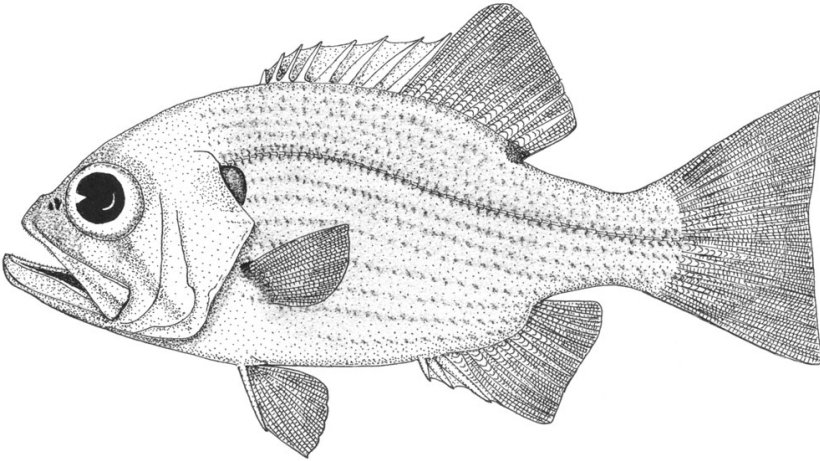
teeth small and canine-like (no enlarged canines), in several rows in upper jaw and in a single series at side of lower jaw; a narrow V-shaped band of fine teeth on vomer. First gill arch with 5 to 10 gill rakers on upper limb, 17 to 19 on lower limb. Dorsal-fin spines VIII, increasing in length from a small anterior spine to a long posterior one; **soft dorsal-fin rays 14, soft-rayed part of fin much higher than spinous part with anterior ray produced into a short filament, the third ray prolonged into a long simple filament which extends past caudal fin, and the fifth ray also extended beyond hypural joint; anal fin with III slender spines and 12 soft rays, the second ray prolonged beyond caudal-fin base; pectoral fins with 15 or 16 rays, the supraclavicle not noticeably enlarged, covered with silvery membrane; caudal fin slightly emarginate with long filamentous tips. Lateral line almost straight, with 46 to 48 tubed scales extending onto caudal-fin base; 14 to 16 scale rows between lateral line and dorsal-fin origin; dorsal and anal fins with bases scaly and small interradial scales extending onto proximal half of fins. **Colour:** body silvery grey to reddish brown with middle of scales golden to yellowish; upper surface of head lavender; a broad dark brown band running through eye to lower margin of opercle and onto subopercle; a second narrower band from nape down posterior edge of preopercle; a third narrow band from nape behind second band and curving on upper sides of back down the posterior margin of opercle to the pectoral fins; in life, with a dark or lavender edged bright silvery spot on each side of base of last dorsal-fin ray and another on posterior dorsal surface of caudal peduncle; roof of mouth with dark bluish to black shading on posterior part; tongue pale to dusky; gill rakers pale, dusky, or black with pale tips; peritoneum brown; fins greyish, filaments dark.**

Size: Maximum total length about 32 cm, commonly to 20 cm.

Habitat, biology, and fisheries: Coastal waters in moderate depths on the continental shelf, generally close to submerged reefs or rough bottom. Feeds on crustaceans; small cuttlefish are also taken. Taken by bottom trawls; the larger specimens are considered good eating.

Distribution: From Exmouth Gulf in Western Australia across northern Australia to Cape York in Queensland. Almost certainly also in New Guinean waters.



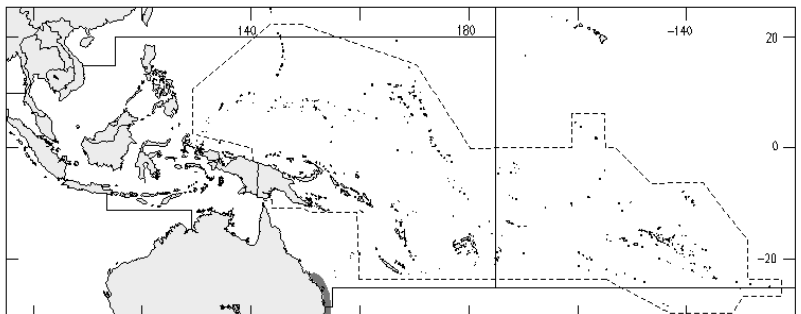
Glaucosoma scapulare* Ramsay, 1881*Frequent synonyms / misidentifications:** None / None.**FAO names:** En - Pearl perch.

Diagnostic characters: Body robust, moderately compressed, its depth 2.4 times in standard length. Head almost entirely scaled, profile with a slight concavity before eye, its length 2.6 times in standard length. Eye large, its diameter 3.2 times in head length; interorbital space convex, its width 4 times in head length; preorbital width less than eye diameter, 7.7 times in head length and 2.4 times in eye diameter. Snout short, its length 4 times in head length. Mouth large, oblique, reaching to about posterior margin of eye; maxilla scaly, with thin supplemental (supramaxillary) bone above, its width at the end 5.3 times in head length and 1.7 times in eye diameter; teeth small and canine-like (no enlarged canines), in several rows in the upper jaw and in a single series at side of lower jaw; a narrow V-shaped band of fine teeth on vomer. First gill arch with 6 gill rakers on upper limb, 15 to 17 on lower limb. Dorsal-fin spines VIII, increasing in length from a small anterior spine to a long posterior one; soft dorsal-fin rays 11, soft-rayed part of fin much higher than spinous part; anal fin with III slender spines and 9 soft rays; pectoral-fin rays 16, **the supraclavicle (shoulder bone or suprascapular, see Fig. 1 in key) large, dome-shaped and covered with a black membrane when alive, but exposed as a pearly-white smooth bone in the market;** caudal fin slightly emarginate with pointed tips. Lateral line almost straight with 49 to 50 tubed scales extending onto base of caudal fin; 10 scale rows between lateral line and dorsal-fin origin. **Colour:** body silvery grey, scales with a small indistinct golden brown spot at base; head and back with lavender reflections; in juveniles only, an indistinct curved brown band from nape passing through eye to lower opercular angle and continued on subopercle; supraclavicle deep iridescent blue-black, becoming pearl white when the thin membrane is removed; scales of back and upper sides with a small indistinct golden brown to dark fawn spot; dorsal surface at base of last dorsal-fin ray usually with a dark blotch; pectoral fins hyaline with a small brown or black spot on inner base (axillary spot); membranes of dorsal and caudal fins pale, rays white; anal fin hyaline, rays silvery or pale fawn; pelvic fins hyaline, rays milk-white.

Size: Maximum total length about 70 cm, commonly to 35 cm.

Habitat, biology, and fisheries: Coastal waters in moderate depths to 90 m on the continental shelf, generally close to submerged reefs or rough bottom. The species is stated to be a midwater-feeder moving well up from the bottom in a shoal to take a bait during the night until about 10.00 p.m. Most fishes are taken on the bottom during the day. Taken by handline. The pearl perch is highly regarded as a food-fish in Queensland and New South Wales.

Distribution: From Rockhampton in Queensland southwards to Port Jackson in New South Wales.



LEPTOBRAMIDAE

Beach salmon

by R.D. Mooi

A single species in this family.

Leptobrama muelleri Steindachner, 1878

Frequent synonyms / misidentifications: None / None.

FAO names: En - Beach salmon.

Diagnostic characters: Body moderately slender, compressed. Head somewhat short. **Eye with adipose lid.** Maxilla extending beyond posterior margin of eye. Teeth small and pointed, forming relatively broad toothed surfaces on vomer, palatines, meso- and ectopterygoids, and jaws. Branchiostegal rays 6. **Few (9 to 11), short gill rakers on first gill arch, absent on remaining arches.**

Dorsal-fin origin far back on body, closer to caudal-fin base than snout tip; dorsal fin with IV spines and 16 to 18 soft rays; **anal-fin origin in advance of dorsal-fin origin, and fin long based** with III spines, **26 to 30 soft rays.** Scales ctenoid, median fins in scale sheaths; lateral-line scales 75 to 77. Unusual internal features include 9 spineless pterygiophores anterior to dorsal fin (some of these may be supraneurals); cranium with 5 well-developed longitudinal ridges. **Colour:** back steel blue; sides and belly silvery white; dorsal fin with black tip anteriorly (at least in males).

Similar families occurring in the area

Pempheridae: similar in having a short dorsal fin and long-based anal fin, but easily distinguished by having origin of dorsal fin in advance of anal-fin origin; dorsal-fin height greater than length of dorsal-fin base, or fin almost as high as long; not more than 13 soft rays in dorsal fin; large eye without adipose lid; short maxilla not reaching beyond eye; numerous elongate gill rakers (usually more than 20, always more than 15).

Carangidae: similar in having an adipose lid over eye, a relatively long-based anal fin, and some species elongate; in addition, if the inconspicuous first dorsal-fin spines of some species were overlooked, it would appear that they have a posteriorly positioned dorsal fin; most similar is *Scomberoides*. However, carangids are very different upon close examination by having 2 dorsal fins, the first anterior with IV to VIII spines; usually more than 18 soft rays in dorsal fin; anal fin with III spines, the first 2 separate and more anteriorly positioned; scales small and cycloid; narrow caudal peduncle; caudal fin widely forked.

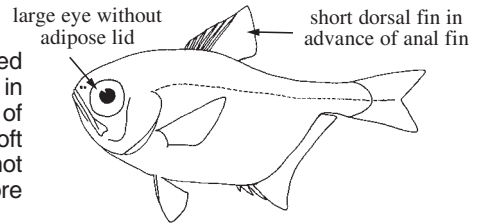
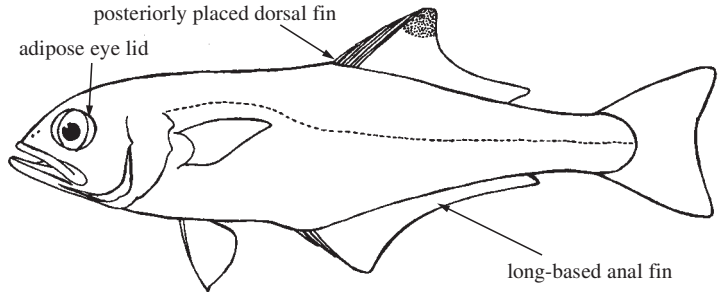
Size: Maximum total length 43 cm at a maximum weight of 900 g.

Habitat, biology, and fisheries: Marine and brackish water, occasionally entering rivers. Feeds on small fishes of inshore waters, as well as on shrimps. No commercial catch, although apparently provides good angling.

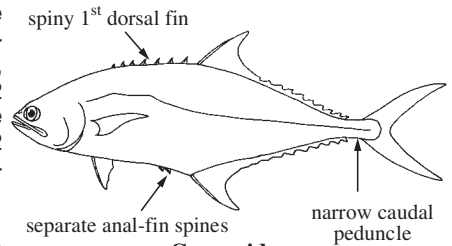
Distribution: Southern Papua New Guinea and northern Australia, including Queensland, Northern Territory, and Western Australia.

Reference

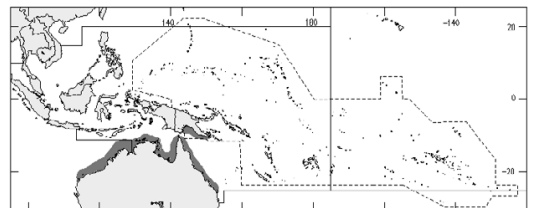
Tominaga, Y. 1965. The internal morphology and systematic position of *Leptobrama muelleri*, formerly included in the family Pempheridae. *Japan. J. Ichthyol.*, 12(3/6):33-56.



Pempheridae



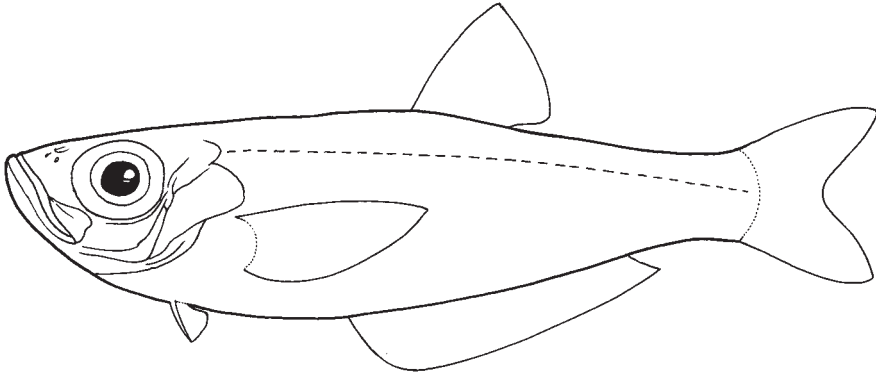
Carangidae



BATHYCLUPEIDAE**Bathyclupeids**

by J.R. Paxton

Diagnostic characters: Moderate-sized (to 30 cm) perciform fishes, body moderately to distinctly elongate, very compressed. Head moderate to large, **dorsal profile horizontal**. **Eye very large, its diameter greater than snout length**. **Mouth large, oblique to almost vertical**, jaws not reaching level of anterior margin of pupil. Small teeth in bands on jaws and palatine, inconspicuous V-shaped patch on vomer. Gill rakers lath-like, 15 to 19 on first gill arch. **Fin spines very weakly developed; a single short-based dorsal fin near middle of body and over middle of anal fin**, with I spine and 8 to 10 soft rays; anal fin with I spine and 24 to 39 soft rays; **pelvic fins subjugular, anterior to level of pectoral-fin base, very short**, with I spine and 5 soft rays; **pectoral fins very large, reaching level of dorsal-fin origin, with 26 to 30 rays**. Scales large, cycloid on body and nape, head naked; lateral-line scales with several small pores. Total vertebrae 31 (*Bathyclupea gracilis*). **Colour:** dorsal dark, ventral silvery.



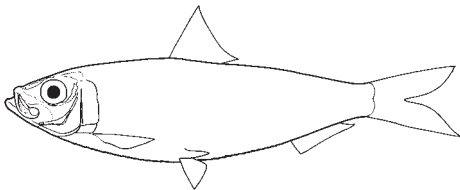
Habitat, biology, and fisheries: Deep-sea fishes of slope and oceanic waters, meso- and bathy-, or benthopelagic; mature adults unknown. Carnivores, mostly feeding on small crustaceans. Rare deep-sea fishes of no commercial importance.

Remarks: One genus with 7 nominal species restricted to tropical and subtropical latitudes in the world ocean, except the eastern Pacific and northeastern Atlantic. The family requires revision; some of the species listed below may be synonyms.

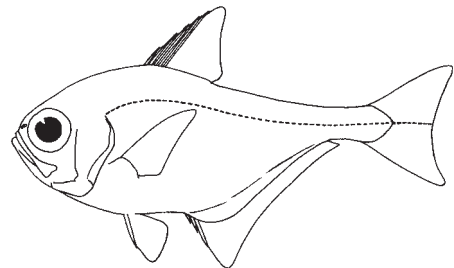
Similar families occurring in the area

Clupeidae: no fin spines; pelvic fins behind level of pectoral-fin base.

Pempheridae: pelvic fins moderate in length, behind level of pectoral-fin base; dorsal-fin origin anterior to anal-fin origin.



Clupeidae



Pempheridae

List of species occurring in the area

- Bathyclupea gracilis* Fowler, 1938
- Bathyclupea malayana* Weber, 1913
- Bathyclupea megaceps* Fowler, 1938

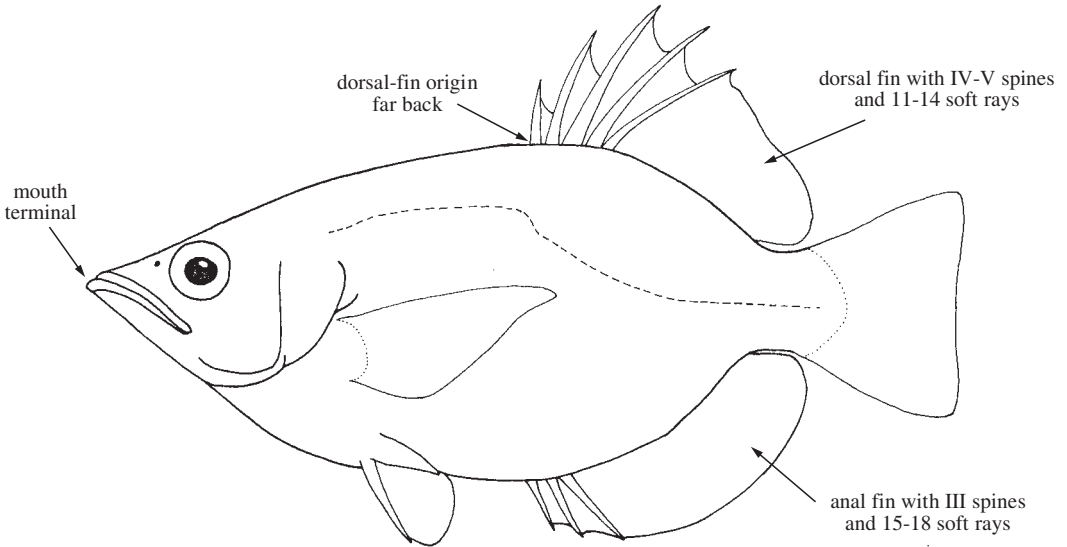
Reference

Dick, M.M. 1972. A review of the fishes of the family Bathyclupeidae. *J. Mar. Biol. Ass. India*, 14(2):539-544.

TOXOTIDAE**Archerfishes**

by G.R. Allen

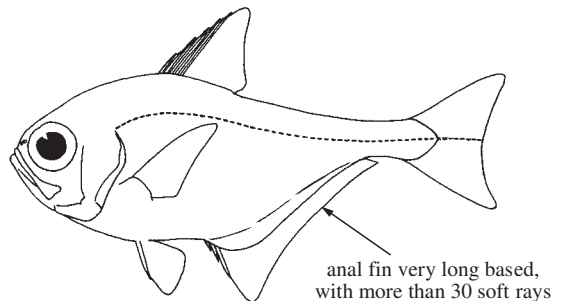
Diagnostic characters: Oval or rhomboidal-shaped, moderately compressed, small to medium-sized (to about 50 cm) percoid fishes; longitudinal axis from tip of snout to middle of caudal fin passing through centre of eye. Eye large, about equal to snout length. Mouth moderately large, protractile, with lower jaw protruding; angle of jaw oblique, about 35° to 40° to horizontal; maxilla slender, scaly and without a supplemental bone. Villiform teeth on jaws, vomer, and palatines; **a deep longitudinal groove on roof of mouth, which is converted to a tube when tongue is pressed against it.** First gill arch with 2 to 8 gill rakers on lower limb. **A single dorsal fin with IV to VI stout spines and 15 to 18 soft rays; anal fin with III spines and 15 to 18 soft rays;** pelvic fins with I spine and 5 soft rays; pectoral fins with 11 to 15 rays; caudal fin truncate to slightly emarginate. Branchiostegal rays 7. Scales moderate to relatively large and ctenoid, extending onto head and median fins; cheeks and operculum scaly; lateral-line scales 25 to 47; scale rows on body running horizontally. **Colour:** most species silvery white with a pattern of dark bars, large spots, or irregular stripes on sides.



Habitat, biology, and fisheries: Mangrove shores, brackish estuaries, and fresh waters, always in shallow depths. Usually seen in small aggregations, but sometimes alone, close to the surface. These fishes exhibit one of nature's most remarkable feeding adaptations. When suitable prey is sighted, usually a small insect, the fish rises to the surface and squirts a jet of water by forcefully compressing the gill cover. The water is propelled through the tubular structure formed when the tongue is pressed tightly against a deep groove on the roof of the mouth. The aim is uncannily accurate over a distance of at least 2 m. The victim is knocked into the water from overhanging vegetation and summarily devoured. Archerfishes are sometimes seen in markets and are an important component of artisanal fisheries in many areas, particularly where mangroves are plentiful.

Similar families occurring in the area

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

**Pempheridae**

Key to the species of Toxotidae occurring in the area

- 1a. Dorsal-fin spines IV; 4 or 5 black bars on upper sides (Fig. 1) *Toxotes jaculatrix*
(India to Vanuatu)
- 1b. Dorsal-fin spines usually V; colour variable with either bars, spots, or irregular stripes on sides, or coloration uniform without markings → 2
- 2a. Lateral-line scales usually less than 38 → 3
- 2b. Lateral-line scales usually 30 to 50 → 6
- 3a. General coloration uniform brown or bronze to silvery grey without markings (may have about 10 faint, narrow bars on upper sides in life); pectoral-fin rays usually 14 (occasionally 15); lateral line running in a straight course; gill rakers on lower limb of first gill arch 2 to 4 (usually 3) (Fig. 2) *Toxotes lorentzi*
(fresh water only; northern Australia and southern New Guinea)
- 3b. General coloration consisting of dark bars or relatively large spots on a light background; pectoral-fin rays usually 13 (rarely 11, 12, or 14); lateral line arched over pectoral-fin region; gill rakers on lower limb of first gill arch 5 to 8. → 4

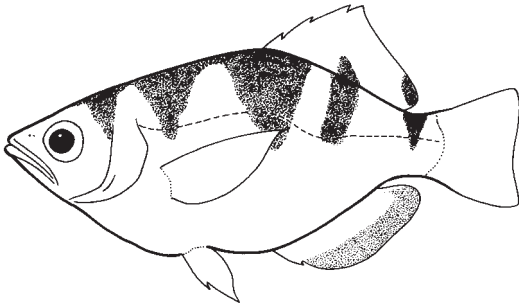


Fig. 1 *Toxotes jaculatrix*

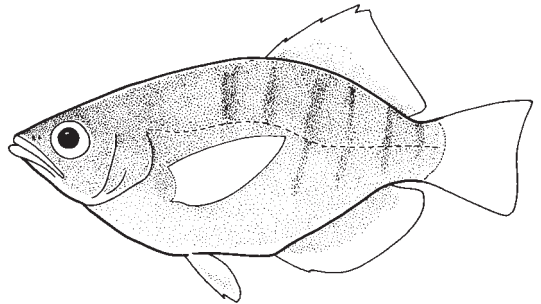


Fig. 2 *Toxotes lorentzi*

- 4a. Colour pattern consisting of 6 or 7, alternating large and small black spots (Fig. 3) *Toxotes chatareus*
(widespread, India to New Guinea and northern Australia)
- 4b. Colour pattern consisting of 4 or 5, wedge-shaped black bars or saddles without intervening small spots (Fig. 4) *Toxotes oligolepis*
(fresh water only; Molucca Islands, Kimberley region of Western Australia, and possibly Philippines)

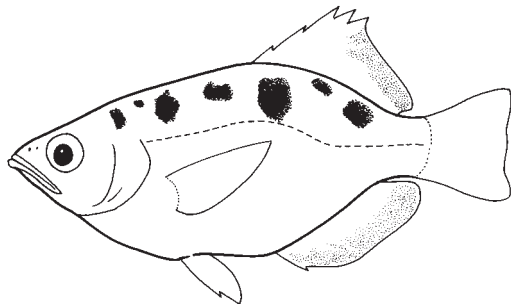


Fig. 3 *Toxotes chatareus*

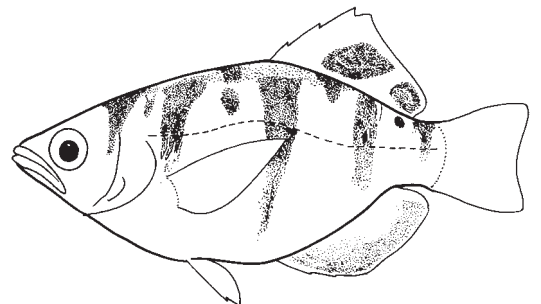


Fig. 4 *Toxotes oligolepis*

- 5a. Colour pattern consisting of irregular horizontal stripes on a light background (Fig. 5) *Toxotes blythi*
(fresh water only; Burma)
- 5b. Colour pattern consisting of 3 or 4 large dark spots or vertical bars along back with a small spot on upper back between each one (Fig. 6) *Toxotes microlepis*
(fresh water only; Thailand, Sumatra, and Borneo)

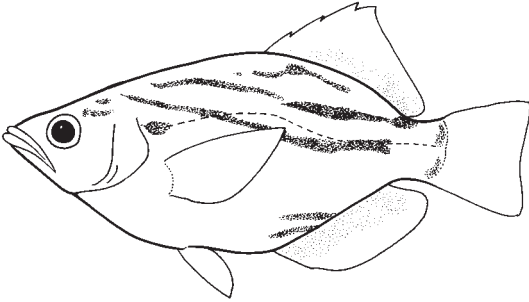


Fig. 5 *Toxotes blythi*

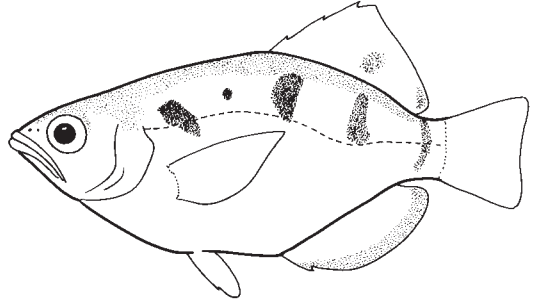




Fig. 6 *Toxotes microlepis*

List of marine-estuarine species occurring in the area

The symbol  is given when species accounts are included.

 *Toxotes chatareus* (Hamilton, 1822)

 *Toxotes jaculatrix* (Pallas, 1767)

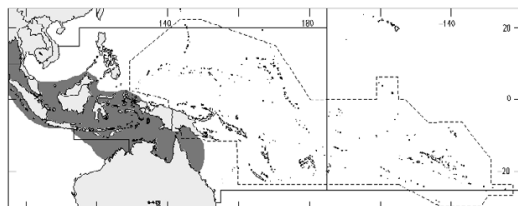
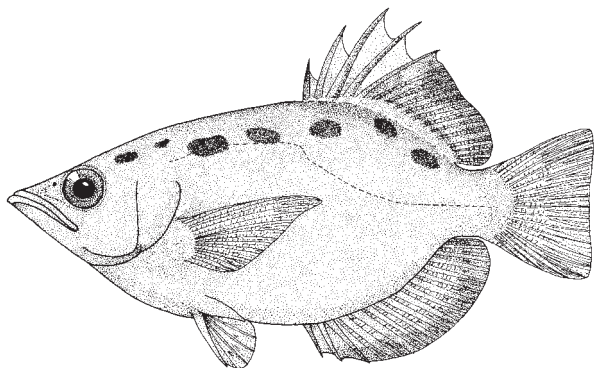
Reference

Allen, G.R. 1978. A review of the archerfishes (family Toxidae). *Rec. Aust. Mus.*, 6(4):355-378.

Toxotes chatareus (Hamilton, 1822)

En - Spotted archerfish; **Fr** - Poisson archer tacheté; **Sp** - Arquero manchado.

Maximum total length about 50 cm, very rarely exceeding 35 cm. Mangrove shores, brackish estuaries, and fresh waters, always in shallow depths. More common in fresh water. In groups or solitary. Feeds on terrestrial insects. Moderately important food fish in some areas; taken by handline, block nets, and gill nets; marketed mostly fresh. Continental shores and archipelagos of the tropical eastern Indian Ocean and western Pacific, from Sri Lanka and India to New Guinea and northern Australia.

***Toxotes jaculatrix*** (Pallas, 1767)

En - Banded archerfish; **Fr** - Poisson archer sellé; **Sp** - Arquero ensillado.

Maximum total length about 30 cm, commonly to about 20 cm. Mangrove shores and brackish estuaries, always in shallow depths. In groups or solitary. Feeds on terrestrial insects. Moderately important food fish in some areas where there are abundant mangroves; taken by handline, block nets, and gill nets; marketed mostly fresh. Continental shores and archipelagos of the tropical eastern Indian Ocean and western Pacific, from India to northern Australia, New Guinea, Solomon Islands, and Vanuatu.

