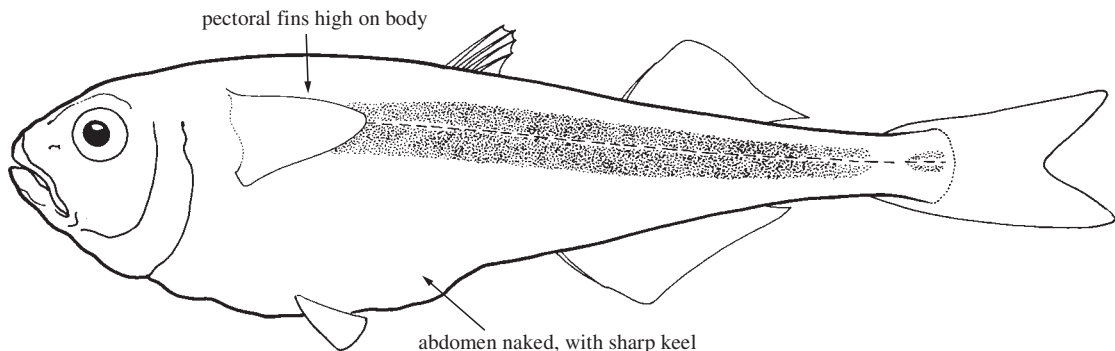


**ISONIDAE**

**Surf sardines**

by W. Ivantsoff

**Diagnostic characters:** Characterized by **highly compressed body, deepest at vertical through of pectoral-fin origin, tapering rapidly towards caudal fin. Ventral edge of abdomen reduced to sharp keel.** Head small, truncated posteriorly. Snout rounded. Mouth strongly oblique to horizontal, with premaxilla extending beyond vertical through anterior margin of orbit. Teeth in jaws small but well defined and curving backward into mouth, those on premaxilla extending outward onto free surface but diminishing in size. Teeth also present on vomer and palatines. Gill rakers moderately long and well developed, greater than diameter of pupil. Two dorsal fins present, with first dorsal fin originating about middle of body, second dorsal fin always originating behind vertical through anal-fin origin. **Pectoral fins short and wide, always set high on body. Body scales cycloid, small, thin, and highly deciduous; area between head and first dorsal fin, sides of head, and anterior part of abdomen naked.** Anus always close to anal fin. **Colour:** usually slightly translucent, very bright silvery in life; midlateral band broad and also silvery but distinctly visible.



**Habitat, biology, and fisheries:** Frequently found in relatively rough surf along beaches or around rocky headlands; occasionally also found in tidal inlets and river mouths. Seemingly delicate fishes, unable to survive where oxygen concentrations are low. There is some evidence that *Iso* spp. hybridize in some parts of their range. They have no commercial value but are probably taken as forage by larger commercial species.


**Similar families occurring in the area**




The Isonidae is distinct by the combination of characters in boldface (see above).

**Key to the species of Isonidae occurring in the area**

- 1a. Midlateral scales always 42 or more; gill rakers on lower limb of first gill arch 9 to 14 . . . . . *Iso rathophilus*
- 1b. Midlateral scales always less than 41; gill rakers on lower limb of first gill arch 12 or less . . . . . → 2
- 2a. Midlateral scales 34 to 39 (mean 37.4); opercular notch absent on upper part of operculum . . . . . *Iso hawaiiensis*
- 2b. Midlateral scales 35 to 41 (mean 38.2); opercular notch present on upper part of operculum . . . . . *Iso nesiotus*

**List of species occurring in the area**

The symbol  is given when species accounts are included.

-  *Iso hawaiiensis* (Gosline, 1952)
-  *Iso nesiotus* Saeed, Ivantsoff, and Crowley, 1993
-  *Iso rathophilus* (Ogilby, 1895)

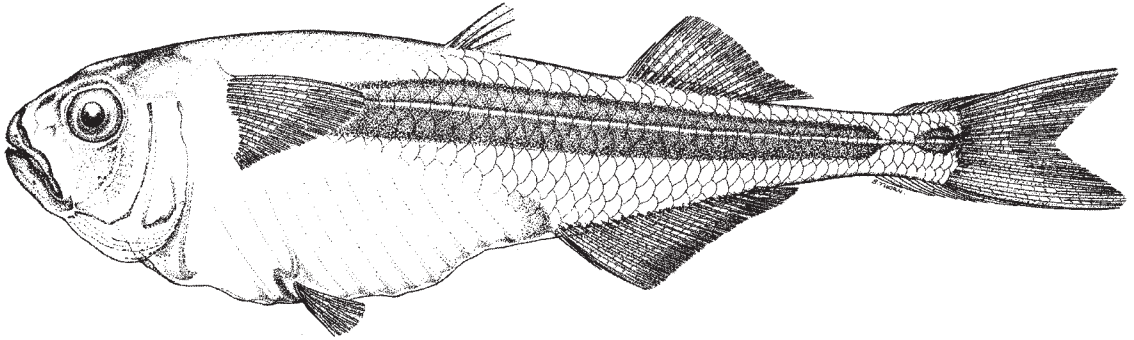
**Reference**

Ivantsoff, W. 1984. Notocheiridae. In *FAO species identification sheets for fishery purposes*. Western Indian Ocean (Fishing Area 51), edited by W. Fischer and G. Bianchi. Vol.3. Rome, FAO (unpaginated).

***Iso rhotophilus*** (Ogilby, 1895)

**Frequent synonyms / misidentifications:** *Tropidostethus rhotophilus* Ogilby, 1895; *Tropidostethops rhotophilus* (Ogilby, 1895) / *Iso flosmaris* (Jordan and Starks, 1901).

**FAO names:** **En** - Surf sardine; **Fr** - Surfette commune; **Sp** - Rompeolas.

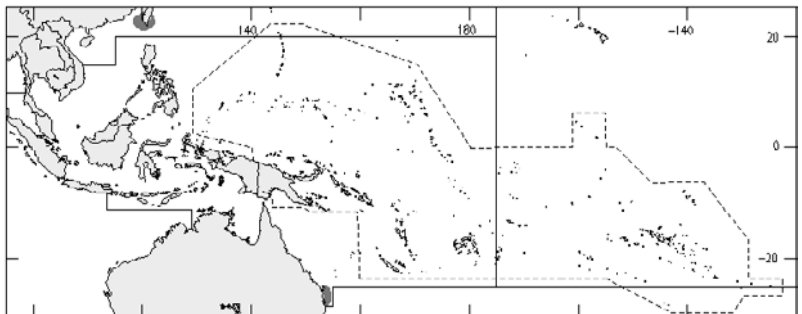


**Diagnostic characters:** Body small, laterally compressed. Head short. Dorsal edge of opercle with notch and small process above it. Mouth small, oblique. **Teeth in jaws** in single row, **covering about half free edge of premaxilla**. Teeth present or absent on vomer, always present on basihyal, but absent on palatines. Ascending process of premaxilla short and pointed, **2 postmaxillary processes scarcely developed**. Dentary highly elevated. Gill slit present behind last gill arch; gill rakers on lower limb of first gill arch 9 to 14. First dorsal fin with III to VI small, weak spines, its origin well behind vertical through tips of pelvic fins. Second dorsal fin with I spine and 10 to 17 soft rays. Anal fin with I spine and 20 to 28 soft rays. Pectoral fins with I spine and 12 to 15 soft rays. Body scales small, cycloid; area between head and first dorsal fin, sides of head, and abdomen naked. **Midlateral scales 42 to 55**. Predorsal scales absent, interdorsal scales 8 to 11. **Colour:** live fish translucent with side of body silvery; broad silvery midlateral band terminating in small oval spot before caudal-fin base.

**Size:** Maximum length about 7.5 cm.

**Habitat, biology, and fisheries:** Most commonly found in surf around rocky headlands and along the shore line, occasionally also in the more still waters of river mouths. The fish are very delicate and do not survive handling. Appears to be able to hybridize with congeners, *Iso flosmaris* and *I. hawaiiensis*. Nothing else is known about this species. Unlikely to have any commercial value.

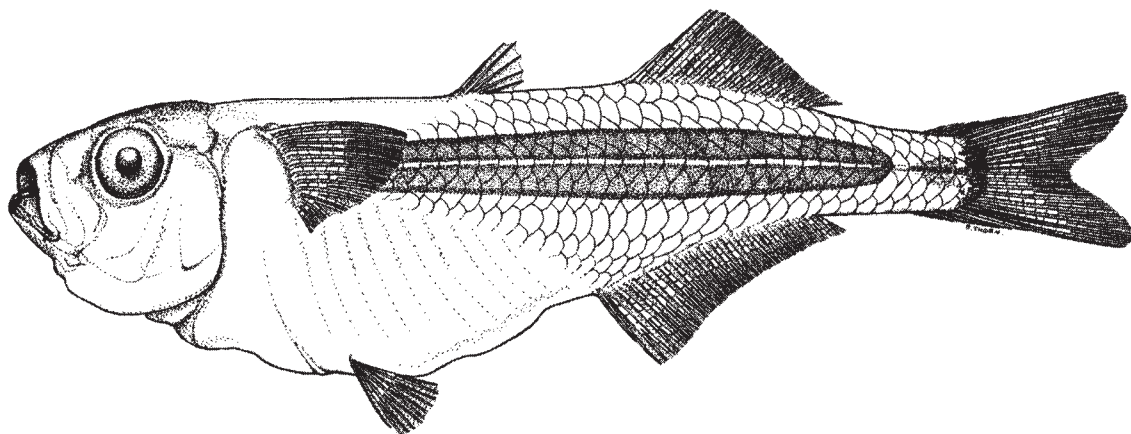
**Distribution:** Around the coasts of Australia, probably throughout the Pacific Ocean as it has been collected as far north as Taiwan Province of China and Japan.



*Iso hawaiiensis* Gosline, 1952

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

**FAO names:** En - Hawaiian surf sardine.

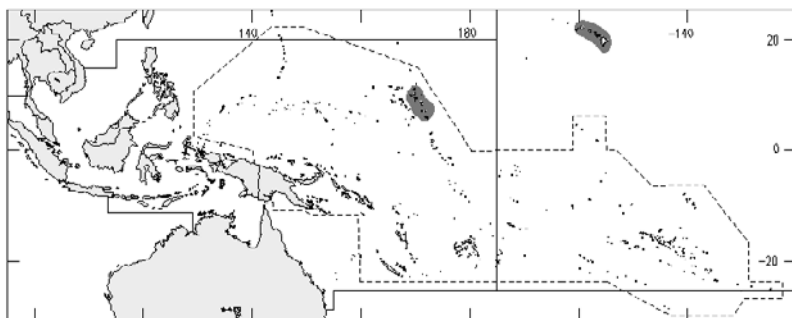


**Diagnostic characters:** Body small, highly compressed laterally. **Dorsal edge of opercle without notch and process.** Mouth small, oblique. **Teeth** in jaws **restricted to first third along free edge of premaxilla;** teeth absent on vomer, palatine, and basihyal. Ascending process of premaxilla short and pointed, dorsal surface of ramus with slight elevation towards middle. Dentary highly elevated. Gill rakers on lower limb of first gill arch 9 to 12. First dorsal fin with IV to VI weak spines; second dorsal fin with I spine and 14 to 16 soft rays; anal fin with I spine and 20 to 25 soft rays; pectoral fins with I spine and 12 to 14 soft rays. Body scales small, deciduous. Midlateral scale count 34 to 39. Predorsal scales absent; interdorsal scales about 8. **Colour:** silvery translucent with broad silver midlateral band terminating in oval spot before origin of caudal fin.

**Size:** Maximum length about 5 cm.

**Habitat, biology, and fisheries:** Inhabits rough surf and waves around rocky headlands and reefs. Nothing is known of the biology of this species. It has no commercial value.

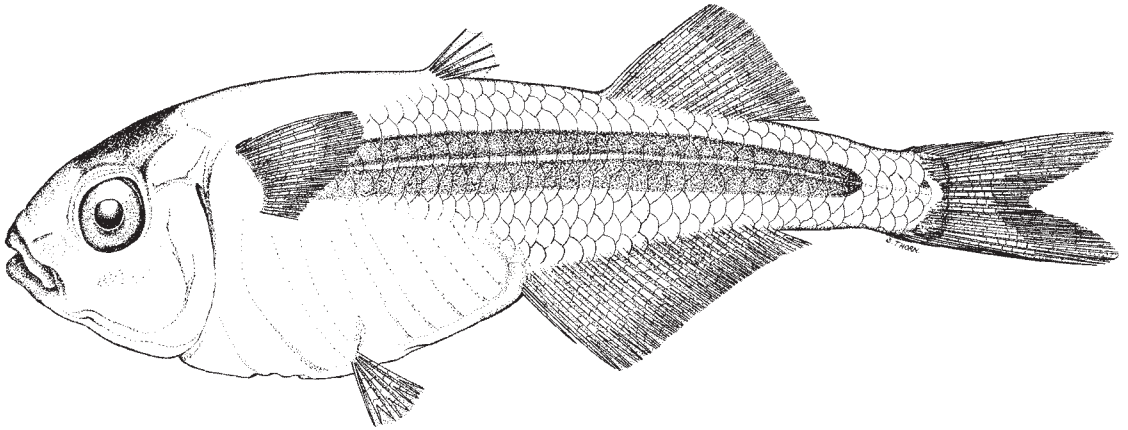
**Distribution:** Presently known from Hawaii, and the Marshall and Rapa islands in the Pacific Ocean.



*Iso nesiotēs* Saeed, Ivantsoff, and Crowley, 1993

**Frequent synonyms / misidentifications:** None / *Iso hawaiiensis* (Gosline, 1952).

**FAO names:** En - Samoan surf sardine.

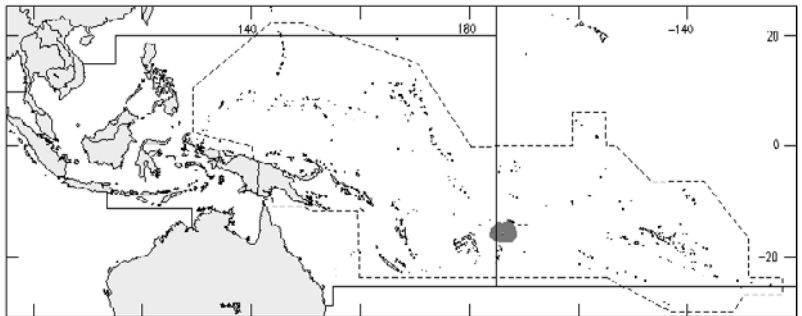


**Diagnostic characters:** Body highly compressed. Head small, with rounded snout. **Dorsal edge of opercle with notch but no process above it.** Mouth small, oblique to horizontal; upper jaw not protractile, lower jaw deeply elevated posteriorly. Teeth on jaws small, curving backwards into mouth. Teeth restricted to anterior fifth of free edge of premaxilla. Teeth absent on vomer and palatines, but present on basihyal. Ascending process of premaxilla short and pointed; its ramus with **slightly rounded elevation representing postmaxillary process.** Dentary highly elevated. Gill rakers on lower limb of first gill arch 9 to 12, moderately long, equal to diameter of pupil. First dorsal fin with IV to VI weak spines, its origin about in line with vertical through tips of pelvic fins. Second dorsal fin with I spine and 13 to 17 soft rays. Anal fin with I spine and 20 to 25 soft rays; pectoral fins with I spine and 12 to 14 soft rays. Body scales small, cycloid, and highly deciduous; sides of head and anterior part of abdomen naked. Midlateral scales 35 to 41. **Colour:** preserved specimens whitish with silvery midlateral band or brownish with darker brown midlateral band; **band ending about half-way along caudal peduncle with no oval spot near base of caudal fin.**

**Size:** Maximum total length about 4 cm.

**Habitat, biology, and fisheries:** Inhabits surf and waves around rocky headlands and reefs. Nothing is known of the biology of this species. It has no commercial value.

**Distribution:** Presently known only from American Samoa and Pitcairn Island.



## TELMATHERINIDAE

### Sailfin silversides

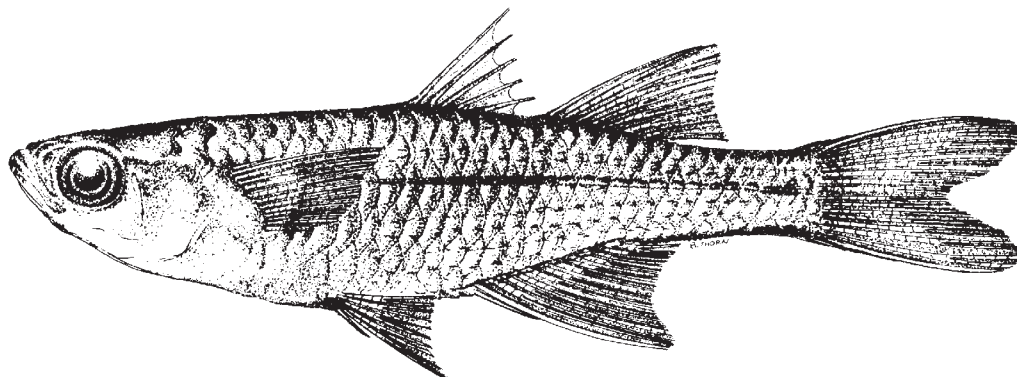
by W. Ivantsoff

**A single species occurring in the area.**

*Kalyptatherina helodes* (Ivantsoff and Allen, 1984)

**Frequent synonyms / misidentifications:** *Pseudomugil helodes* Ivantsoff and Allen, 1984 / None.

**FAO names:** En - Marine sailfin silverside.



**Diagnostic characters:** Body small, laterally compressed. Eyes large. Mouth slightly protrusible and oblique, with free edge of premaxilla reaching just past anterior border of orbit. Teeth in upper jaw large, distribution extending almost to distal end of premaxilla. Teeth in lower jaw curved, villiform, and restricted to medial third, smaller than those in upper jaw. Teeth frequently present on vomer, palatine, mesopterygoid, and basihyal. Ascending process of premaxilla relatively short and broad, lateral process broadly rounded, about 1/2 height of ascending process. Coronoid process of dentary highly elevated. Gill rakers on lower limb of first gill arch 16 to 18, moderately long and slender, but less than 1/2 diameter of pupil. First dorsal fin with III to V weak spines, its origin 1 to 3 scales in front of tips of pelvic fins. **Second dorsal fin lacking spine**, with 7 to 9 soft rays. Anal fin with I spine and 12 to 14 soft rays. Pectoral fins with I spine and 11 or 12 soft rays. Body scales dorsoventrally elongated; 28 to 30 midlateral scales; 5 or 6 scales in transverse rows along side of body. Predorsal scales 11 to 13; interdorsal scales 4 or 5. **Colour:** body translucent with posterior end of swimbladder clearly visible through body wall; preserved specimens yellow-green; eye black; head dark dorsally; lower edge of eye outlined with melanophores; sides of snout, chin, and opercle heavily peppered with large and small melanophores; narrow but well defined middorsal band originating on dorsum of head and extending through bases of dorsal fins to origin of caudal fin; scale pockets on side of body outlined with melanophores; midlateral band originating as single narrow dark line at upper edge of pectoral fin and continuing as 2 narrow bands to caudal-fin base.

#### Similar families occurring in the area

Pseudomugilidae: *Pseudomugil majusculus* looks superficially similar to *Kalyptatherina helodes*, but lacks a spine in the anal and pectoral fins.

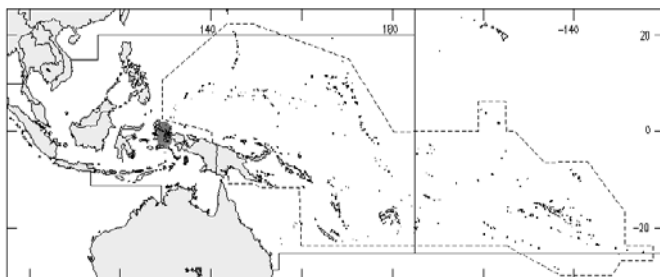
**Size:** Maximum total length not exceeding 4.5 cm.

**Habitat, biology, and fisheries:** Inhabits mangrove swamps close inshore. While the biology of some telmatherinids may be known, nothing is known of the biology of the monotypic *Kalyptatherina helodes*. This species is too small to have commercial value but may be taken as food by young of commercial fish species.

**Distribution:** Misool and Bantana islands northwest Irian Jaya.

#### Reference

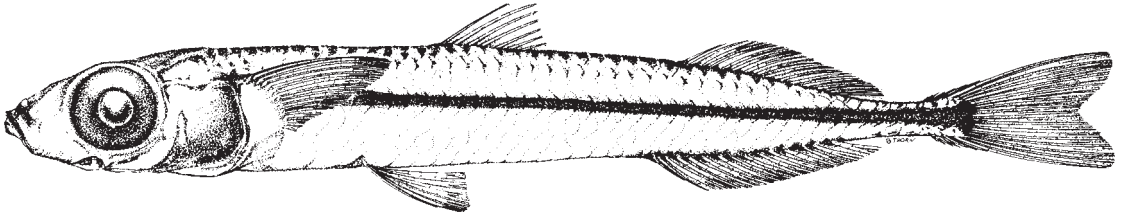
Aarn, W. Ivantsoff, and M. Kottelat. (in press). A new telmatherinid genus from Sulawesi, and a phylogenetic analysis of Telmatherinidae (Teleostei: Atherinomorpha). *Ichthyol. Explor. Freshwaters*.





**DENTATHERINIDAE****Tusked silversides**

by W. Ivantsoff

**A single species occurring in the area.***Dentatherina merceri* Patten and Ivantsoff, 1983**Frequent synonyms / misidentifications:** None / None.**FAO names:** En - Mercer's tusked silverside.

**Diagnostic characters:** Body very small, slender, subcylindrical; **caudal peduncle very slender**. Eye and orbit large. Mouth small. **Labial ligament to about half-way along premaxilla forming cylindrical pouch lateral to ramus of dentary and just below edge of premaxilla**. Premaxilla broad and long, extending just past vertical through anterior border of eye but with anterior two-thirds obscured by anterior process of maxilla and labial pouch. **Premaxilla with ventrally directed tusk-like process**. Gill rakers on lower limb of first gill arch 10 to 12, slender, their length less than 1/2 diameter of pupil. First dorsal fin with V to VIII spines, its origin 1 to 4 scales in front of vertical through tips of pelvic fins. Second dorsal fin with I spine and 12 to 14 soft rays; anal fin with I spine and 14 to 16 soft rays, pectoral fins with I spine and 12 to 14 soft rays. Body scales small, thin, and highly deciduous; lateral body scales ellipsoid or irregular; **40 to 43 midlateral scales; 7 to 9 scales in transverse rows along side of body**. Predorsal scales 14 to 17; **interdorsal scales 8 to 12**. **Colour:** preserved specimens yellow-brown to green-brown; middorsal band extending over width of 1 scale from head to origin of first dorsal fin, wider at this point with this part of line frequently broken into 2 or 3 rows of melanophores, then extending as thin irregular line to origin of caudal fin; caudal fin usually dusky, with 2 triangular marks at its base; midlateral band originating above upper edge of opercle.

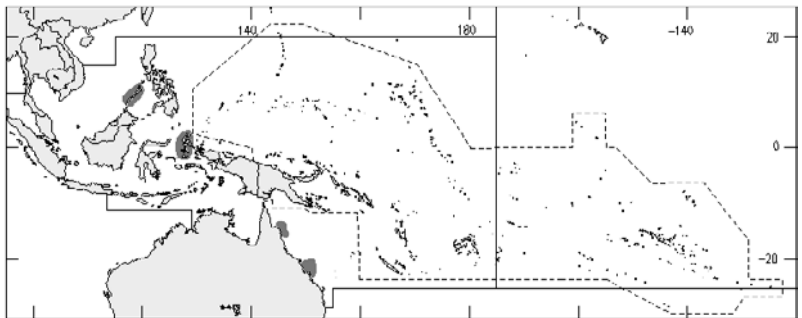
**Similar families occurring in the area**

*Dentatherina merceri* is distinguished from other atheriniform families in the area by the combination of the characters in boldface (see above).

**Size:** Maximum length not exceeding 5 cm, but usually much smaller.

**Habitat, biology, and fisheries:** Found close inshore around islands and over coral reefs. Except for larval biology, little is known about this species. It has no commercial value but may be taken by commercial fishes as food.

**Distribution:** Philippines, New Guinea, Moluccas, and other parts of Indonesia; also around islands of the Barrier Reef in northeastern Australia.

**Reference**

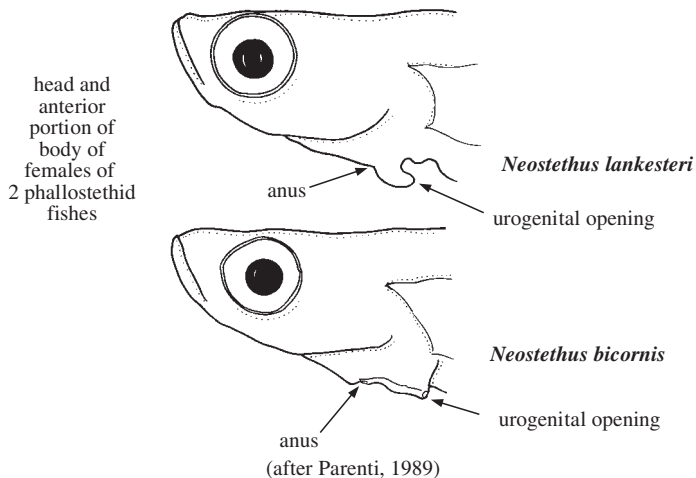
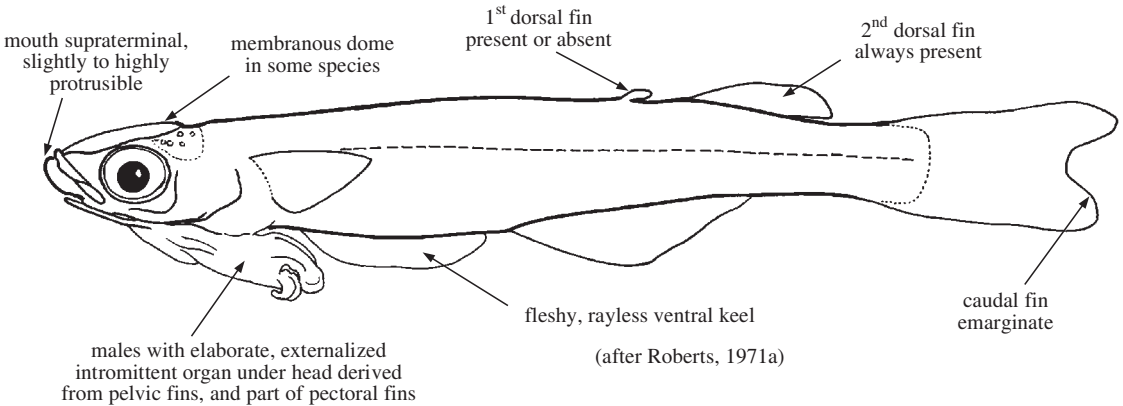
Patten, J.M and W. Ivantsoff. 1983. A new genus and species of atherinid fish from western Pacific. *Japan. J. Ichthyol.*, 29(4):329-339.

## PHALLOSTETHIDAE

### Priapium fishes

by L.R. Parenti

**Diagnostic characters:** Small (to 3.7 cm standard length), laterally compressed, atherinomorph fishes. Eyes large. Mouth supratrterminal, moderate gape, slightly to highly protrusible. Dentition variously reduced; small, unicuspid teeth in single row in outer jaw; enlarged teeth on distal portion of premaxilla in some species. **Single row of small, unicuspid teeth on paradentary bone in some species. Pectoral fins falcate. Caudal fin emarginate, forming incipient lobes. Anus and urogenital openings anterior, under head, may be covered by fleshy hood or papilla in females. Fleshy, rayless keel on ventral surface of body from point perpendicular to pectoral-fin base to beginning of anal fin. Males bilaterally asymmetric; elaborate bony, externalized intromittent organ, priapium, under head with seminal papilla offset to one (aproctal) side of body and anus offset to opposite (proctal) side. First dorsal fin with I or II short spines or thickened rays, or fin absent; second dorsal fin with 5 to 10 soft rays; anal fin with 14 to 28 soft rays; pectoral fins with 9 to 13 soft rays; pelvic-fin rays modified into portion of priapium in males, vestigial or absent in females. Scales cycloid, small to moderate, deciduous; no lateral line. **Colour:** nearly translucent in life with orange blotch on caudal peduncle in some species; scattered minute dark brown to black melanophores on head and body that may be concentrated at base of priapium.**



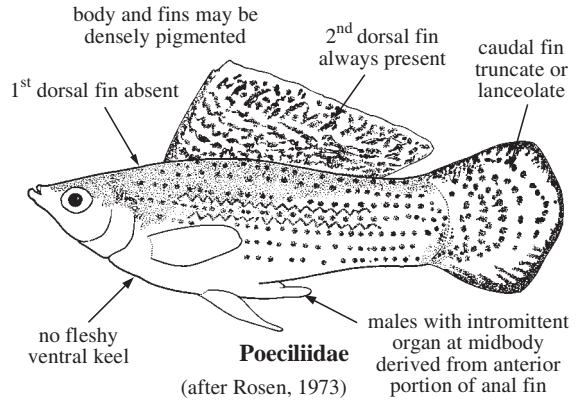
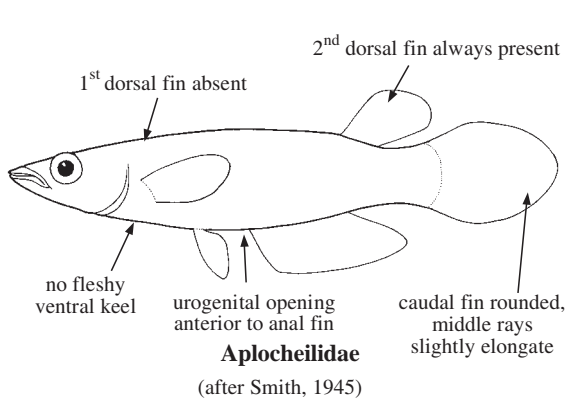
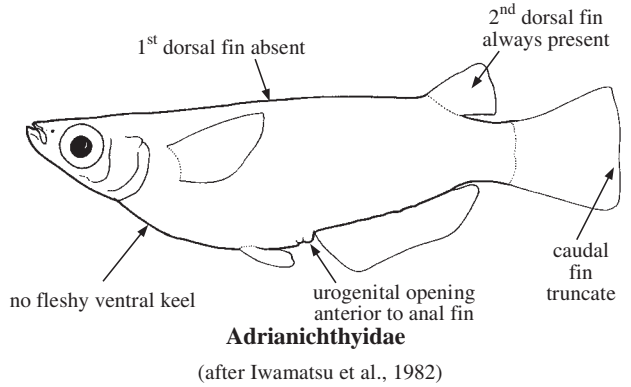
**Habitat, biology, and fisheries:** Fresh to brackish water, species in the area in tidal portions of rivers, including estuaries, and mangroves. Small, surface-feeding, schooling fishes, may be seen in groups near shore. Omnivorous, but feed principally on copepods and mollusc larvae. Oviparous, internal fertilization followed by female laying fertilized eggs.

**Similar families occurring in area**

**Adrianichthyidae:** readily distinguished from male priapium fishes by the absence of a bony externalized intromittent organ, urogenital opening just anterior to anal fin (not under head), caudal fin truncate, and first dorsal fin absent; in addition, the mouth in adrianichthyids is small, terminal, and non-protrusible, whereas it may be highly protrusible in priapium fishes.

**Apocheilidae:** readily distinguished from male priapium fishes by absence of a bony, externalized intromittent organ, with urogenital opening just anterior to anal fin, not under head, caudal fin rounded, no first dorsal fin, and black blotch on middle portions of anterior dorsal-fin rays.

**Poeciliidae:** livebearers of this family in the area may be confused with priapium fishes because of a superficially similar intromittent organ which, in male priapium fishes, is under the head and derived from pectoral and pelvic fins; in male livebearers, the anal-fin rays are modified into an intromittent organ, the gonopodium; livebearing poeciliids bear live young, while priapium fishes lay fertilized eggs; also, livebearing poeciliid species may be more brightly coloured and densely pigmented than priapium fishes which are nearly transparent in life and have sparse pigmentation; finally, livebearers have a rounded or truncate caudal fin and lack the first dorsal fin.

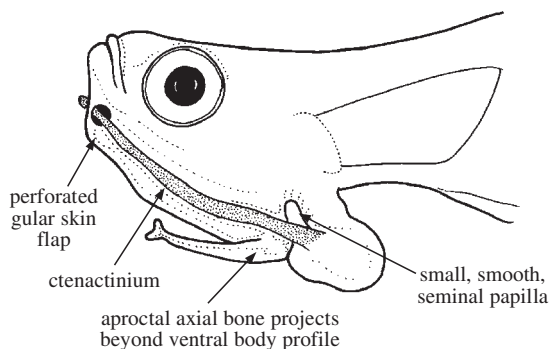


**Key to the genera of Phallostethidae**

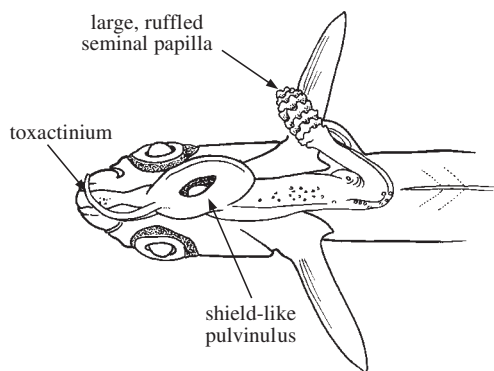
- 1a. No pulvinulus; outer jaws somewhat protrusible; perforated gular flap of skin through which anterior end of first ctenactinium may pass; aproctal axial bone projects beyond ventral body profile (Fig. 1) . . . . . *Gulaphallus*
- 1b. Shield-like pulvinulus present (Fig. 2); outer jaws highly protrusible; no perforation of skin in gular region; aproctal axial bone does not project beyond ventral body profile . . . . . → 2



- 2a. Main externalized bone of priapium a toxactinium that curves to right or to left under head of male (Fig. 2); large, fleshy, smooth, or ruffled seminal papilla (Fig. 2); translucent, membranous dome on dorsal surface of head . . . . . → 3
- 2b. Main externalized bone of priapium a ctenactinium; seminal papilla small; no translucent, membranous dome on dorsal surface of head . . . . . *Neostethus*



**Fig. 1 *Gulaphallus* male (lateral view)**  
(after Parenti, 1989)



**Fig. 2 *Phenacostethus* male (ventral view)**  
(after Roberts, 1971a)

- 3a. Anal-fin rays 26 to 28, vertebrae 40; second ctenactinium serrated; outer jaws equal; no first dorsal fin; second dorsal-fin rays 8 to 10 . . . . . *Phallostethus*
- 3b. Anal-fin rays 14 or 15; vertebrae 33 to 35; second ctenactinium greatly reduced and not serrated; lower jaw projects beyond upper jaw; first dorsal fin present, a single ray; second dorsal-fin rays 5 to 7 . . . . . *Phenacostethus*

**List of species occurring in the area**

- Gulaphallus panayensis* (Herre, 1942)
- Neostethus amaricola* (Villadolid and Manacop, 1935)
- Neostethus bicornis* Regan, 1916
- Neostethus borneensis* Herre, 1939
- Neostethus ctenophorus* (Aurich, 1937)
- Neostethus djajaorum* Parenti and Louie, 1998
- Neostethus lankesteri* Regan, 1916
- Neostethus palawanensis* (Myers, 1935)
- Neostethus robertsi* Parenti, 1989
- Neostethus thessa* (Aurich, 1937)
- Neostethus villadolidi* Herre, 1942
- Neostethus zamboangae* Herre, 1942
- Phallostethus lehi* Parenti, 1996
- Phenacostethus smithi* Myers, 1928
- Phenacostethus trewasasae* Parenti, 1986

**References**

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Roberts, T.R. 1971b. Osteology of the Malaysian phallostethid fish *Ceratostethus bicornis*, with a discussion of the evolution of remarkable structural novelties, in its jaws and external genitalia. *Bull. Mus. Comp. Zool.*, 142:393-418.