

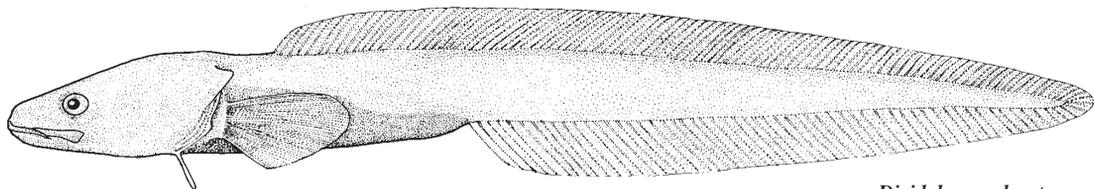
Suborder ZOARCOIDEI

ZOARCIDAE

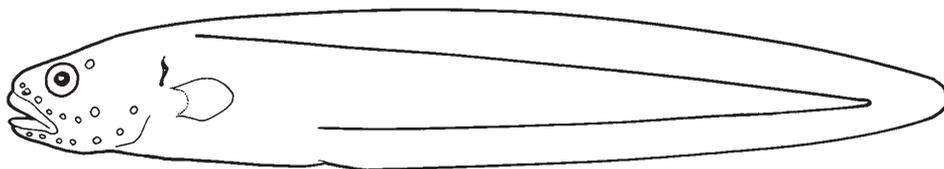
Eelpouts

by M.E. Anderson

Diagnostic characters: Small fishes (size to 20 cm), body shortened, eel-like. Head ovoid or flattened; nostrils single; no spines on head or opercle. No supramaxilla or basibranchial teeth. Gill openings restricted. Branchiostegal rays usually 6. No spines in fins (except few boreal species not occurring in the area); dorsal and anal fins confluent with caudal fin; pectoral fins small; pelvic fins absent or vestigial, with 2 or 3 soft rays. Scales cycloid, minute, imbedded, or absent. Lateral line on body, when present, consisting of superficial, free neuromasts not in a canal. Pyloric caeca, when present, reduced to 2 small nubs. Ovary single. No swimbladder. **Colour:** various, deep-sea species usually uniformly brown or black, often with bluish tinges, to cream white; species in the area uniformly dark brown or black.



Dieidolycus adocetus



Melanostigma vitiazi

Habitat, biology, and fisheries: Most eelpouts are benthic and found on continental slopes to abyssal plains. Two genera, *Lycodapus* and *Melanostigma*, are deep pelagic.

Similar families occurring in the area

Carapidae: anal-fin origin in advance of dorsal-fin origin (except in *Pyramodontinae*) and under pectoral fins; 2 pairs of nostrils; enlarged canines at symphysis of both jaws in some genera; swimbladder present.

Ophidiidae: pelvic fins, when present, under preopercle or chin; 2 pairs of nostrils; swimbladder present.

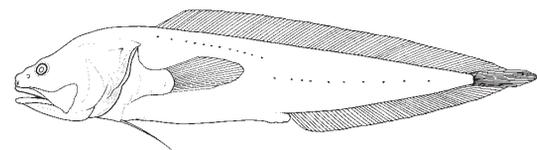
Bythitidae: male with intromittent organ; 2 pairs of nostrils; opercular spine usually strong.

Aphyonidae: male with intromittent organ; 2 pairs of nostrils; eyes degenerate, extremely small.

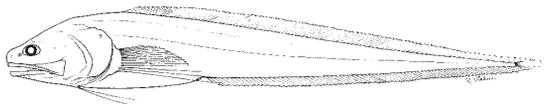
Moridae: 2 dorsal fins; pelvic fins well developed, chin barbel present; caudal fin not confluent with dorsal and anal fins.



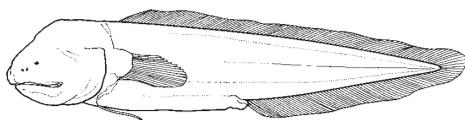
Carapidae



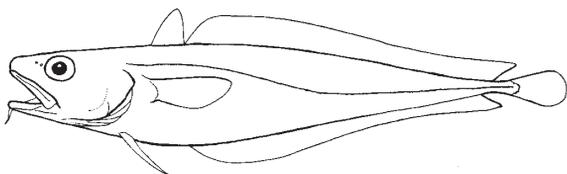
Bythitidae



Ophidiidae



Aphyonidae



Moridae

Key to the genera of Zoarcidae occurring in the area

- 1a.** Pelvic fins present; pectoral-fin rays 13 to 17; gill opening extended to opposite middle pectoral-fin rays; pseudobranch absent; preoperculomandibular pores 8; postorbital pores 2 or 3; vertebrae 75 to 79 *Dieidolycus*
- 1b.** Pelvic fins absent; pectoral-fin rays 5 to 10; gill opening above pectoral fins; pseudo-branch filaments 3 or 4; preoperculomandibular pores 5 to 7; postorbital pores 0 or 1; vertebrae 84 to 95 *Melanostigma*

List of species occurring in the area

Dieidolycus adocetus Anderson, 1994

Melanostigma inexpectatum Parin, 1977

Melanostigma vitiazi Parin, 1979

References

- Anderson, M.E. 1988. Studies on the Zoarcidae (Teleostei: Perciformes) of the southern hemisphere. I. The Antarctic and Subantarctic regions. Biol. Antarct. Seas XIX. *Antarct. Res. Ser.*, 47:59-113.
- Anderson, M.E. 1990. Studies on the Zoarcidae (Teleostei: Perciformes) of the southern hemisphere. III. The southwestern Pacific. *J.L.B. Smith Inst. Ichthyol., Spec. Publ.*, (50):17 p.
- Anderson, M.E. 1994. Studies on the Zoarcidae (Teleostei: Perciformes) of the southern hemisphere. VII. A new species of *Dieidolycus* Anderson, 1988 from the Bismarck Sea. *Rec. Aust. Mus.*, 46:121-124.

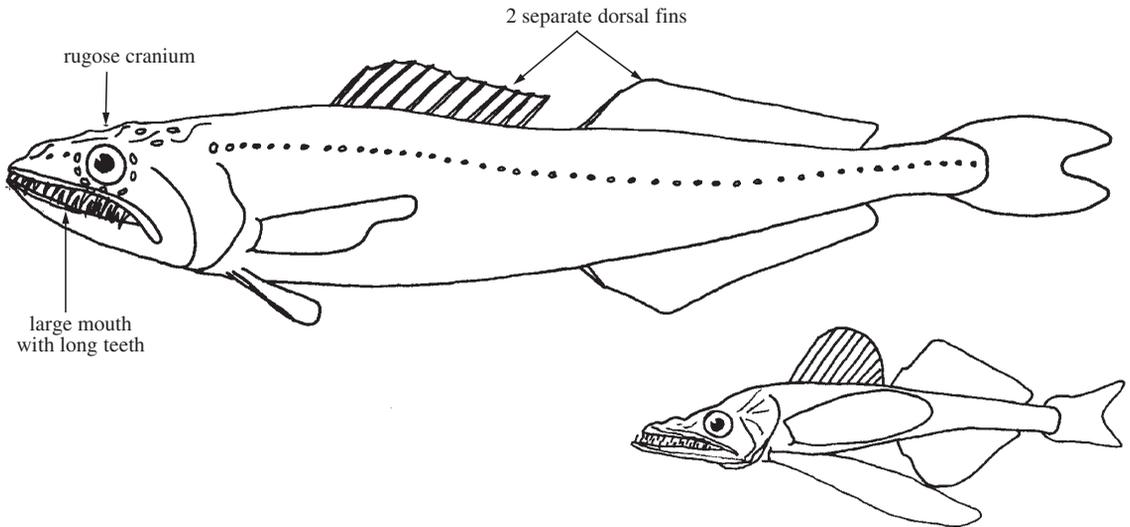
Suborder TRACHINOIDEI

CHIASMODONTIDAE

Swallowers

by R.D. Mooi and J.R. Paxton

Diagnostic characters: Moderate-sized (to about 26 cm) perciform fishes, body elongate. Head with elongate or rounded snout, longer than eye; **cranium rugose and pitted by sensory pores. Mouth large, premaxilla and maxilla non-protractile, slender, firmly connected distally, and extending well beyond posterior margin of eye.** Teeth long, present on jaws and palatines. Branchiostegal rays 6 or 7. **Two separate dorsal fins, first short with VII to XIII flexible spines, second long with 18 to 29 segmented soft rays; anal fin long with I spine and 17 to 29 segmented soft rays.** Body naked (most adults), covered with spinoid scales (most larvae or juveniles), or with a reduced number of rows of prickles (some adults). Photophores present (*Pseudoscopelus*) or absent. Lateral line a series of obvious pores midlaterally along length of body. Skeleton somewhat reduced and attenuate; **left and right pelvic bones separate from one another and not closely associated with pectoral girdles; total vertebrae 33 to 48. Gut highly distensible and capable of holding very large food items; great expansion separates pelvic halves and separates them from pectoral girdle, as well as separating anal fin from hypaxial musculature.** **Colour:** uniformly dark brown or black.

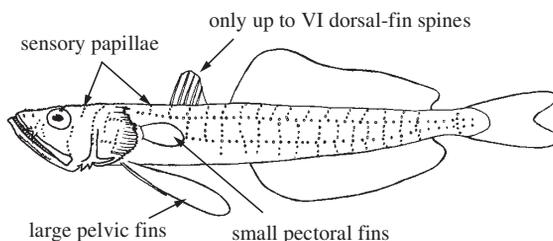
gargaropteron larva of *Kali*

Habitat, biology, and fisheries: Oceanic deep-sea fishes at meso- and bathypelagic depths; juveniles in shallower waters; many species broadly distributed in more than one ocean. Juveniles of a single genus (*Kali*) of modified morphology as a gargaropteron stage (see above figure). Adults fish eaters, often of individuals longer than themselves giving rise to their common name. Rarely taken in deep-water trawls, of no commercial importance.

Remarks: About 17 species in 4 genera are recognized from circumglobal seas. No recent synopsis of the family is available, and the genera *Pseudoscopelus* and *Chiasmodon* require revision; some of the listed species of the former may be synonyms. Two of the genera were revised by Johnson and Cohen (1974).

Similar families occurring in the area

Champsodontidae: only superficially similar in having a large mouth and teeth and separate dorsal fins. Champsodontids differ in having small, rough scales, toothless palatines, pelvic fins that are much larger than pectoral fins (in adults), no distensible gut, paler colour, series of sensory papillae on head and body, and only IV to VI dorsal-fin spines.



Champsodontidae

List of species occurring in the area

- Chiasmodon niger* Johnson, 1864
- Chiasmodon subniger* Garman, 1899
- Dysalotus alcocki* MacGilchrist, 1905
- Kali indica* Lloyd, 1909
- Kali macrodon* (Norman, 1929)
- Kali normani* (Parr, 1931)
- Pseudoscopelus altipinnis* Parr, 1933
- Pseudoscopelus cephalus* Fowler, 1933
- Pseudoscopelus obtusifrons* (Fowler, 1934)
- Pseudoscopelus sagamianus* Tanaka, 1908
- Pseudoscopelus scriptus* Lütken, 1892
- Pseudoscopelus scutatus* Krefft, 1971

References

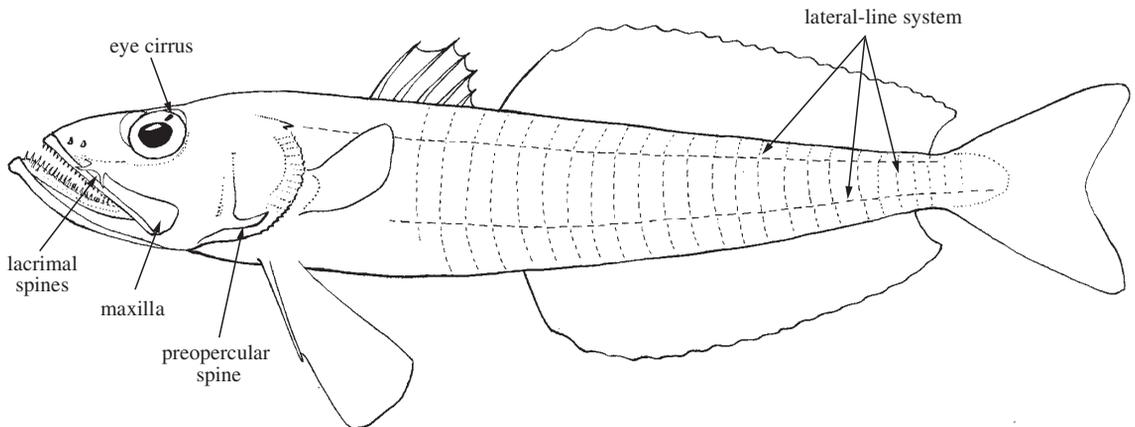
- Johnson, R.K. and M.J. Keene. 1986. Chiasmodontidae. In Smith's sea fishes, edited by M.M. Smith and P.C. Heemstra. Johannesburg, Macmillan South Africa, pp. 731-734.
- Johnson, R.K. and D.M. Cohen. 1974. Results of the research cruises of FRV 'Walther Herwig' to South America. XXX. Revision of the chiasmodontid fish genera *Dysalotus* and *Kali*, with descriptions of two new species. *Arch. Fisch. Wiss.*, 25(1/2):13-46.

CHAMPSODONTIDAE

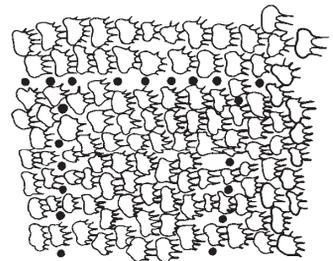
Gapers

by D. Nemeth

Diagnostic characters: Elongate, slightly compressed small perciform fishes (size to about 15 cm). Eyes large, usually with a small posterodorsal cirrus; eye diameter equal or less than snout length. **Mouth large, oblique; maxilla extending posteriorly to below eye or beyond.** Premaxilla and dentary with at least 2 rows of teeth; inner row of **long, depressible, needle-like teeth**; outer row of shorter fixed teeth. Teeth present on vomer but not on palatines. Lacrimal with 2 spines projecting anteroventrally over maxilla and premaxilla. **Preopercle with prominent, posteroventral spine, extending almost 1/2 distance between preopercular margin and pectoral-fin base.** Gill opening large, opercular margin highly fimbriate. Branchiostegal rays 7. First gill arch with 1 or 2 gill rakers on upper limb, 10 to 14 on lower limb. Two dorsal fins, separated by distance less than basal length of first dorsal fin; first dorsal fin with IV to VI spines; second dorsal fin long, with 18 to 23 segmented soft rays. Anal fin spineless, similar in length and shape to second dorsal fin, with 16 to 21 segmented soft rays. Caudal fin forked, with 15 principal rays and 14 to 18 procurrent rays. Pectoral fins small, set high on body, with 12 to 16 rays. **Pelvic fins much larger than pectoral fins**, with I spine and 5 soft rays, third and fourth rays reaching to anus in most species. Body covered with **small, rough, non-overlapping scales**, each with 2 to 9 spinules projecting from posterior margin of broad plate; scale is raised slightly off body; scales present on head, back, and to a varying degree on chin, breast, belly, and sides. **Two horizontal lateral lines composed of numerous small papillae**, extending from opercular margin onto caudal fin; **numerous (20 to 25) transverse rows of these sensory papillae.** Vertebrae 10-12+19-21 = 29-33. Haemal arches expanded anteroposteriorly in 5 species, fusing on ventral midline to form a posteriorly tapering circular tube of haemal rings (haemal canal); an elongate, posterior extension of swimbladder penetrating this canal in *Champsodon atridorsalis*, *C. longipinnis*, and *C. machaeratus*. Haemal arches non expanded in remaining species, forming typical haemal spines. Spine of first haemal arch inserting between third and fourth anal pterygiophores in all species except *C. atridorsalis*, where inserting between second and third anal pterygiophores. **Colour** (in preservation): body brownish dorsally; lateral and ventral parts tan or silvery, with dark spots along midline in some species; distal third of first dorsal fin dark brown or black in *C. atridorsalis* and *C. longipinnis*, speckled in *C. vorax*; upper or both caudal-fin lobes dark brown in many species; dark blotch at caudal-fin base.



Habitat, biology, and fisheries: Gapers have been captured in depths of 34 to 100 m. They sometimes occur in great shoals, evidently rising to the surface at night, and are quite commonly cast ashore during storms. None of the species is fished commercially, but they are often taken along with commercial species; they may also be important prey species for scombrids and other pelagic predators.

scales of *Champsodon*

lateral line papillae depicted as black circles (anterior is to the left)

Similar families occurring in the area

The rough, non-overlapping scales, large preopercular spine, 2 lacrimal spines projecting anteriorly over the maxilla, pelvic fins longer than and inserting in front of pectoral fins, and large mouth with depressible teeth make this family difficult to confuse with other fishes in the area. In addition, the 2 horizontal lateral lines, crossed at regular intervals by vertical lateral lines above, between, and below the horizontal lines is a distinguishing feature for *Champsodon*. These features allow distinction of *Champsodon* from trachinoid (Chiasmodontidae, Uranoscopidae) and blennioid families that share its elongate body shape and long (second) dorsal- and anal-fin bases. *Ruvettus pretiosus* (Gempylidae) also has rough, non-overlapping scales and a similar body shape, but differs from *Champsodon* in the possession of dorsal and ventral finlets and lacking the characters listed above. Other gempylids with similar body shape, 2 lateral lines, and large mouth (*Neoepinnula*, *Rexea*) clearly differ from *Champsodon* in the absence of the large preopercular spine and lacrimal spines, and vertical branches of the lateral line.

Key to the species of Champsodontidae occurring in the area

Remarks on key characters: in describing scale patterns, the term 'breast' is used here to refer to the triangular area just anterior to the pelvic-fin base. The term 'chin' is used here to refer to the ventral region between the dentaries, not the dentary symphysis. Sensory papillae are seen best with specimens immersed in fluid.

- 1a. First arch with 2 gill rakers on upper limb *Champsodon sagittus*
- 1b. First arch with 1 gill raker on upper limb → 2

- 2a. Breast naked or with small central patch of fewer than 10 scales → 3
- 2b. Breast fully scaly → 4

- 3a. Chin scaly; a row of 4 pairs of sensory papillae between parallel bony ridges on dorsal surface of snout; 4 sensory papillae between eyes arranged in semicircle (Fig. 1a); ventral margin of pupil smooth, not indented by tab of iris (Fig. 2a) *Champsodon machaeratus*
- 3b. Chin naked; a row of 5 to 9 pairs of sensory papillae on dorsal surface of head from snout to interorbital; sensory papillae between eyes not arranged in a semicircle (Fig. 1b); ventral margin of pupil indented by tab of iris (Fig. 2b) *Champsodon nudivittis*



Fig. 1 dorsal view of head

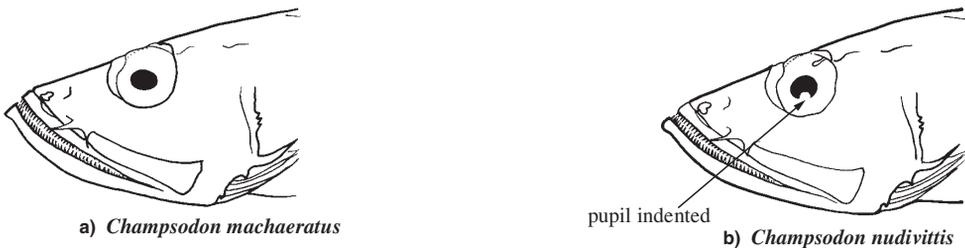


Fig. 2 lateral view of head

- 4a. Belly and sides fully scaly → 5
- 4b. Belly and sides partially scaly or naked → 6

- 5a. Distal third of first dorsal fin black; a row of 5 to 7 pairs of sensory papillae on dorsal surface of head from snout to interorbital; sensory papillae between eyes not arranged in a semicircle (see Fig. 1b); pectoral-fin rays 14 to 16 *Champsodon longipinnis*
- 5b. First dorsal fin pale; a row of 4 pairs of sensory papillae between parallel bony ridges on dorsal surface of snout; 4 sensory papillae between eyes arranged in semicircle (see Fig. 1a); pectoral-fin rays 13 *Champsodon pantolepis*
(known from Japan and north of Dampier in Western Australia; not yet recorded from the area)
- 6a. Ventral margin of pupil smooth, not indented by tab of iris (Fig. 2a); maxilla not extending beyond posterior margin of eye; premaxilla not notched lateral to symphysis (Fig. 3a); region between pectoral- and pelvic-fin bases naked *Champsodon guentheri*
- 6b. Ventral margin of pupil indented by tab of iris (Fig. 2b); maxilla extending beyond posterior margin of eye; premaxilla notched lateral to symphysis (Fig. 3b); region between pectoral- and pelvic-fin bases with patch of scales → 7
- 7a. Transverse row of 10 sensory papillae between posterior margins of pterotic ridges (Fig. 3b); distal third of first dorsal fin jet black *Champsodon atridorsalis*
- 7b. Transverse row of 4 sensory papillae between posterior margins of pterotic ridges (Fig. 3c); tip of first dorsal fin speckled, not solidly dark *Champsodon vorax*

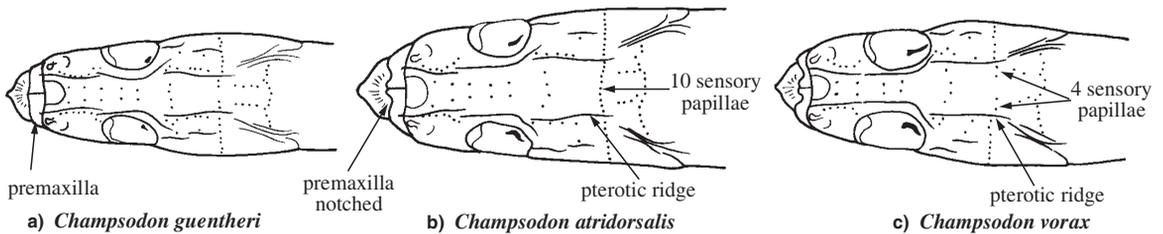


Fig. 3 dorsal view of head

List of species occurring in the area

- Champsodon atridorsalis* Ochiai and Nakamura, 1964
- Champsodon guentheri* Regan, 1908
- Champsodon longipinnis* Matsubara and Amaoka, 1964
- Champsodon machaeratus* Nemeth, 1994
- Champsodon nudivittis* (Ogilby, 1895)
- ? *Champsodon pantolepis* Nemeth, 1994
- Champsodon sagittus* Nemeth, 1994
- Champsodon vorax* Günther, 1867

Reference

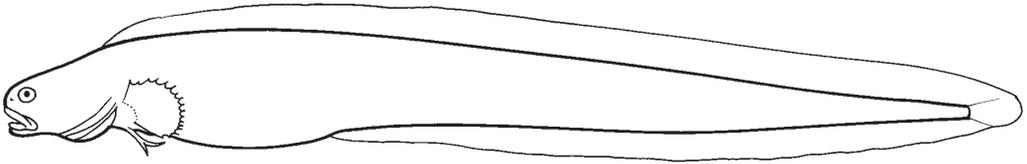
Nemeth, D. 1994. Systematics and distribution of fishes of the family Champsodontidae (Teleostei: Perciformes), with descriptions of three new species. *Copeia*, 1994(2):347-371.

PHOLIDICHTHYIDAE

Convict fish (engineer fish)

by V.G. Springer

Diagnostic characters: Small (to 45 cm) eel-like fishes; body scaleless. A single nostril (anterior). Mouth moderate, extending to or almost to point below posterior margin of eye; teeth on jaws conical, pointed, none on vomer or palatines. Gill openings wide, attached at isthmus. Fins with segmented rays, fin spines absent; dorsal fin and anal fins long, confluent with caudal fin; dorsal fin with 72 to 98 soft rays, the fin origin above, or just behind, posterior margin of operculum; anal fin with 54 to 81 soft rays, the fin origin just behind anus; small pelvic fins of 2 or 3 soft rays, placed below or just anterior to base of pectoral fins; caudal fin small, with 10 rays. Lateral line not or only barely noticeable, consisting of tiny pit organs, beginning high anteriorly and descending to midline posterior to pectoral fin. **Colour:** juveniles pale to almost brilliant white ground with dark pinstripe (*Pholidichthys anguis*) or dark ribbon-like stripe (*P. leucotaenia*) extending along entire midlength of fish; adults with large, dark spots (*P. anguis*) or dark spots and/or bands (*P. leucotaenia*) with pale interspaces on head, body, and fins.

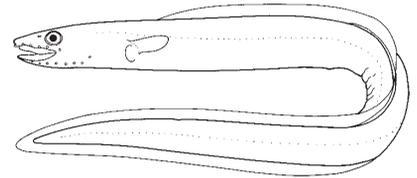


Habitat, biology, and fisheries: Field-collected specimens, with a single exception, are usually postlarvae or juveniles less than 135 mm standard length. Juveniles of *Pholidichthys leucotaenia*, 10 to 20 mm standard length, may occur in swarms on shallow reefs. Larger juveniles are variously taken in rocky areas, often dredged or taken by night light. All of the numerous juveniles, 25 to 105 mm standard length, and the single known adult, 245 mm standard length, of *P. anguis* were taken in trawls over a mud substrate that included patches of sand, shell, rocks, and coral. Commercial importance is very little. Juveniles of *P. leucotaenia* are occasionally sold as aquarium fishes.

Similar families occurring in the area

Eels (order Anguilliformes): differ most obviously from *Pholidichthys* in lacking pelvic fins and in having highly restricted gill openings.

Plotosidae: the colour pattern of small juveniles of *Pholidichthys* closely resembles the similar-sized reef catfish, *Plotosus lineatus*, which differs most obviously from pholidichthyids in having barbels on head, well-developed, posteriorly placed pelvic fins, and a strong spine in the dorsal and pectoral fins.



Congridae



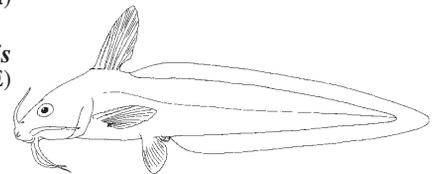
Ophichthyidae

Key to the species of Pholidichthyidae occurring in the area

- 1a.** Dorsal-fin rays 72 to 79; anal-fin rays 54 to 62
 *Pholidichthys leucotaenia*
 (Philippines south to Solomon Islands; absent from Australia)
- 1b.** Dorsal-fin rays 86 to 98; anal-fin rays 70 to 81
 *Pholidichthys anguis*
 (restricted to northern Australia between 128° and 136° E)

List of species occurring in the area

Pholidichthys anguis Springer and Larson, 1996
Pholidichthys leucotaenia Bleeker, 1856



Plotosidae

Reference

Springer, V.G. and H.K. Larson. 1996. *Pholidichthys anguis*, a new species of pholidichthyid fish from Northern Territory and Western Australia. *Proc. Biol. Soc. Wash.*, 109(2):353-365.