

2. SYSTEMATIC CATALOGUE

2.1 Order Ophidiiformes

Ordinal name: Ophidiodei Mead et al. (1964).

Number of recognized suborders: 2.

Diagnosis and description: Pelvic fins with 0 to 2 soft rays in each (in some species a basal spine-like splint may be present) inserted at about level of opercle or farther anteriorly, placed close together (except for *Tauredophidium*); dorsal and anal fins with long bases, extended to and often joined with caudal fin, all rays soft; dorsal and anal fin pterygiophores more numerous than adjacent vertebrae; nostril paired on each side of head.

Key to suborders

- 1a. Oviparous, males lacking a developed external intromittent organ; anterior nostril well above upper lip (Fig. 15a) in most (variable in some cusk-eels); basibranchial tooth patches present or absent; pelvic fins at about level of preopercle or farther anterior in position, when present; caudal fin usually present and connected with dorsal and anal fins **Ophidioidei**
- 1b. Viviparous, males with variously developed external intromittent organ; anterior nostril immediately above upper lip (Fig. 15b) in most (variable in Aphyonidae and a few bythitid genera); basibranchial tooth patches absent; pelvic fins at about level of opercle in position, when present; caudal fin connected with dorsal and anal fins or free **Bythitoidei**

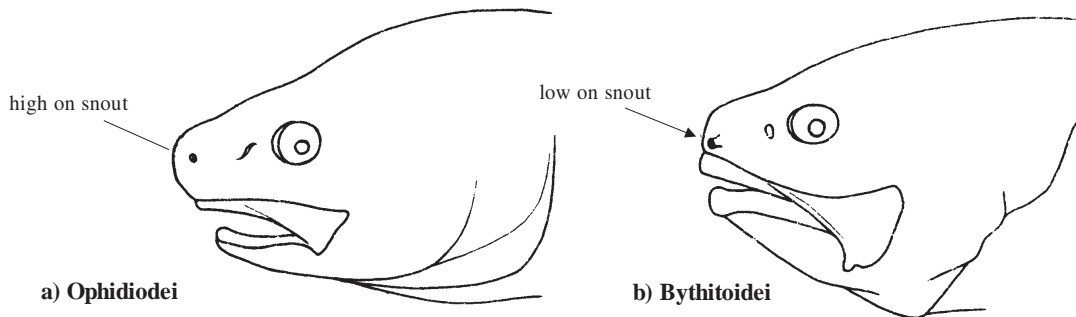


Fig. 15 Position of anterior nostril in 2 suborders of ophidiiform fishes (from Cohen and Nielsen, 1978)

2.2 Suborder Ophidioidei

Number of recognized families: 2.

Diagnosis and description: See above key to suborders.

Key to families

- 1a. Supramaxilla absent; anal-fin rays longer than opposing dorsal-fin rays **Carapidae**
- 1b. Supramaxilla present; dorsal-fin rays usually equal to or longer than opposing anal-fin rays **Ophidiidae**

2.3 Family Carapidae

Family: Carapidae Jordan and Fowler (1902).

FAO name: Pearlfishes.

Number of recognized genera: 7.

Diagnosis and description: Body elongate, compressed to rounded and eel-like; **supramaxilla absent; anal-fin origin advanced, under vertebrae 1 to 13**; scapula and coracoid fused; upper distal radial of pectoral fins enlarged; hyomandibula with large foramen; **larvae with highly modified first dorsal-fin ray (vexillum)**.

Habitat, distribution, and biology: Shallow to moderately deep dwelling benthic fishes of shelves and slopes with greatest diversity in shallow tropical waters of the Indo-West Pacific. A few species have free-living adults but most are commensals in the body cavity of invertebrates, primarily holothurians (sea cucumbers). Specialized biology of some sea cucumber commensals includes male-female pairing within a host, parasitism of the host's gonads and respiratory tree, and cannibalism. Larvae, called vexillifers, are highly specialized and apparently capable of long distance dispersal.

Interest to fisheries: A bycatch in some sea cucumber fisheries, but otherwise of no interest.

Key to genera

- 1a. Pelvic fins present *Pyramodon*
- 1b. Pelvic fins absent. → 2
- 2a. Dorsal-fin origin anterior to anal-fin origin; 24 to 27 pectoral-fin rays; precaudal vertebrae 13 to 15 *Snyderidia*
- 2b. Dorsal-fin origin over or posterior to anal-fin origin; 0 to 26 pectoral-fin rays; precaudal vertebrae 15 to 35. → 3
- 3a. Upper and lower jaws with 1 to several large symphyseal fangs, no cardiform teeth. . . . → 4
- 3b. Upper and lower jaws without enlarged fangs, cardiform teeth present → 6
- 4a. Tunic ridges ventrally or laterally on posterior part of swimbladder. *Echiodon*
- 4b. No ridges on posterior part of swimbladder → 5
- 5a. Large median rocker bone in anterior part of swimbladder, posterior part of swimbladder embedded in hypaxial musculature; males lack expanded plate-like parapophyses on trunk vertebrae *Onuxodon*
- 5b. No median rocker bone in anterior part of swimbladder, posterior part of swimbladder not embedded in hypaxial musculature; males with expanded plate-like parapophyses on trunk vertebrae *Eurypleuron*
- 6a. Swimbladder constricted; maxilla not adnate; developed gill rakers present *Carapus*
- 6b. Swimbladder with terminal membrane or bulb but no constriction; usually with adnate maxilla (except *E. boraborensis*); usually no developed gill rakers (except *E. boraborensis*) *Encheliophis*

List of nominal genera

Carapus Rafinesque, 1810

Cynophidium Regan, 1914 (junior synonym of *Pyramodon*)

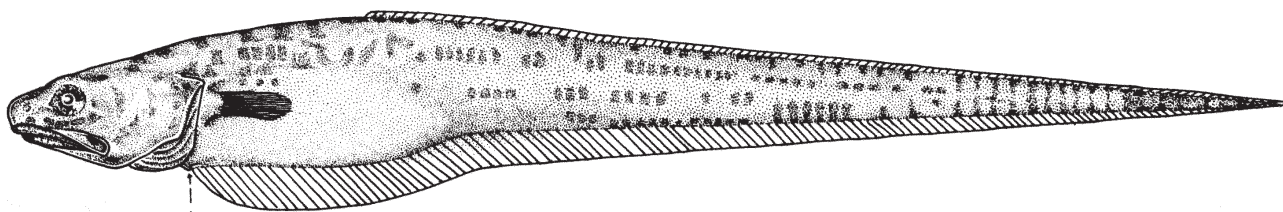
Diaphasia Lowe, 1843 (junior synonym of *Carapus*)
Disparichthys Herre, 1935 (junior synonym of *Carapus* or *Encheliophis*)
Echiodon Thompson, 1837
Encheliophiops Reid, 1940 (junior synonym of *Encheliophis*)
Encheliophis Müller, 1842
Eurypleuron Markle and Olney, 1990
Fierasfer Oken (ex Cuvier, 1817) (junior synonym of *Carapus*)
Helminthodes Gill, 1864 (junior synonym of *Carapus*)
Helminthostoma Günther (ex Cocco, 1870) (unavailable junior synonym of *Carapus*)
Jordanicus Gilbert, 1905 (junior synonym of *Encheliophis*)
Lefroyia Jones, 1874 (junior synonym of *Carapus*)
Leptofierasfer Meek and Hildebrand, 1928 (junior synonym of *Encheliophis*)
Onuxodon Smith, 1955
Oxybeles Richardson, 1846 (junior synonym of *Encheliophis*)
Pirellinus Whitley, 1928 (junior synonym of *Encheliophis*)
Porobronchus Kaup, 1860 (junior synonym of *Carapus*)
Pyramodon Smith and Radcliffe in Radcliffe, 1913
Rhizoiketicus Vaillant, 1893 (junior synonym of *Encheliophis*)
Snyderidia Gilbert, 1905
Vexillifer Gasco, 1870 (junior synonym of *Carapus*)

Carapus Rafinesque, 1810

Type species: *Gymnotus acus* Linneaus, without date, by Opinion 42, International Commission on Zoological Nomenclature.

Synonyms: *Diaphasia* Lowe, 1843, type species *Gymnotus acus* Brünnich, 1768; *Disparichthys* Herre, 1935 (?), type species *Disparichthys fluviatilis* Herre, 1935; *Fierasfer* Oken (ex Cuvier, 1817), type species *Ophidium imberbe* Cuvier, 1815; *Helminthodes* Gill, 1864, type species *Oxybeles lumbricoides* Bleeker, 1854; *Helminthostoma* Günther (ex Cocco, 1870) (unavailable); *Lefroyia* Jones, 1874, type species *Lefroyia bermudensis* Jones, 1874; *Porobronchus* Kaup, 1860, type species *Porobronchus linearis* Kaup, 1860; *Vexillifer* Gasco, 1870, type species *Vexillifer dephilippii* Gasco, 1870.

Number of recognized species: 4.



19.8 mm head length

Fig. 16 *Carapus moulani* (from Markle and Olney, 1990)

Diagnosis and description: Eel-like, moderate to shallow body depth; cardiform teeth present but restricted to upper jaw symphysis; swimbladder constricted forming 2 chambers; lacking enlarged dentary or premaxillary fangs, dentary diastema, pelvic fins and swimbladder rocker bone; juveniles and adults facultative or obligatory commensals with holothurians, asteroids or ascidians; larvae extremely elongate with vexillum well anterior of first dorsal-fin ray and first anal-fin ray; compensatory (shrinking) tenuis stage well developed.

Revisions: Arnold (1956), Markle and Olney (1990).

Geographical distribution: Tropical and subtropical in the Atlantic, Indian and western Pacific.

Habitat and biology: Facultative or obligatory commensals in holothurians, asteroids and ascidians in waters of 1 to 150 m.

Interest to fisheries: None.

Size: At least 251 mm.

Remarks: *Carapus* is very similar to the specialized holothurian commensals, *Encheliophis*.

Key to species

- 1a. Distributed in Indo-West Pacific from Red Sea to Hawaii → 2
- 1b. Distributed in Atlantic and Mediterranean → 3
- 2a. Swimbladder constriction under vertebrae 9 or 10; precaudal vertebrae 15 to 17; primarily commensal in starfish *C. mourlani*
- 2b. Swimbladder constriction under vertebra 13; precaudal vertebrae 19; primarily (?) commensal in tunicates (sea squirts) *C. sluiteri*
- 3a. Pectoral-fin rays 17 to 20; found in western Atlantic, Bermuda and Caribbean Sea *C. bermudensis*
- 3b. Pectoral-fin rays 20 to 24; found in eastern Atlantic and Mediterranean *C. acus*

List of nominal species

- Carapus acus* (Brünnich, 1768). Eastern Atlantic and Mediterranean. Holothurian commensal. Common.
- C. bermudensis* (Jones, 1874). Western Atlantic and Caribbean. Holothurian commensal. Common.
- C. birpex* Arnold, 1956 (junior synonym of *C. acus*).
- C. chavesi* Ancona-Lopez, 1956 (junior synonym of *C. bermudensis*).
- C. cuspis* Arnold, 1956 (junior synonym of *C. acus*).
- C. mayottae* Smith, 1955 (junior synonym of *C. mourlani*).
- C. mourlani* (Petit, 1934). Indian and western Pacific. Asteroid (primarily) and holothurian commensal. Common.
- C. pindae* Smith, 1955 (junior synonym of *C. mourlani*).
- C. recifensis* Ancona-Lopez, 1956 (junior synonym of *C. bermudensis*).
- C. sluiteri* Weber, 1905. Indonesia. Ascidian commensal. Rare.
- C. variegatus* Fowler and Steinitz, 1956 (in part, junior synonym of *C. acus* and *C. mourlani*).
- Disparichthys fluviatilis* Herre, 1935 (larval form, presumed junior synonym of a *Carapus*).
- D. herrei* Schultz, 1938 (junior synonym of *C. bermudensis*).
- Encheliophis tenuis* Putnam, 1874 (junior synonym of *C. acus*).
- Fierasfer dubius* Putnam, 1874 (in part, junior synonym of *C. bermudensis*).
- F. maculata* Swainson, 1839 (junior synonym of *C. acus*).
- Notopterus fontanesii* Risso, 1810 (junior synonym of *C. acus*).
- Ophidium fierasfer* Risso, 1826 (junior synonym of *C. acus*).
- O. imberbe* Cuvier, 1815 (junior synonym of *C. acus*).
- Oxybeles lumbricoides* Bleeker, 1854 (nomen dubium, probable synonym of *C. mourlani*).

Porobronchus linearis Kaup, 1860 (junior synonym of *C. acus*).

Vexillifer dephilippii Gasco 1870 (junior synonym of *C. acus*).

***Echiodon* Thompson, 1837**

Type species: *Echiodon drummondi* Thompson, 1837 by monotypy.

Synonyms: None.

Number of recognized species: 11.

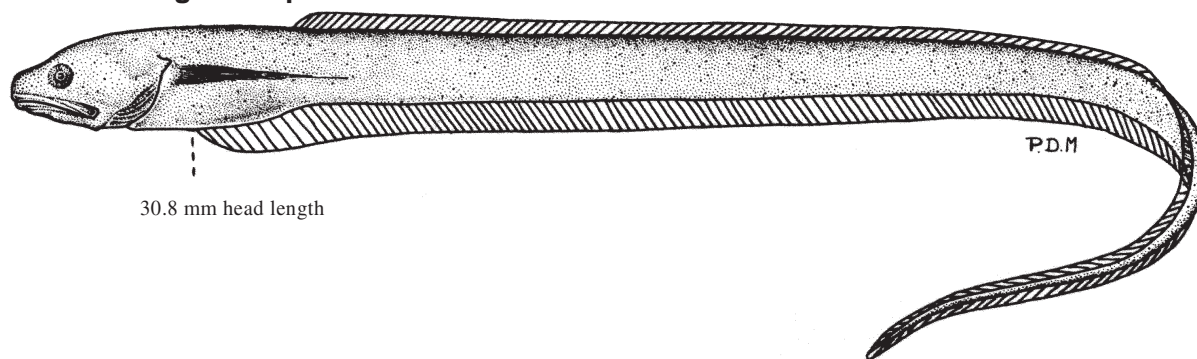


Fig. 17 *Echiodon cryomargarites* (adult) (from Markle and Olney, 1990)

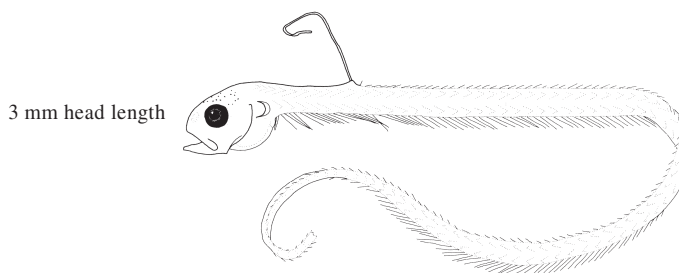


Fig. 18 *Echiodon coheni* (larva) (from Markle and Olney, 1990)

Diagnosis and description: Eel-like, shallow body depth; 1 to several large symphyseal fangs on dentary and premaxilla; lacking cardiform teeth, pelvic fins, and swimbladder rocker bone; a patch of ridges posteriorly on the ventral surface of the swimbladder; juveniles and adults free living or, possibly, facultative commensals with sponges or polychaete worm tubes; larvae elongate with vexillum just anterior of first dorsal-fin ray and directly over to well posterior of first anal-fin ray; compensatory (shrinking) tenuis stage may be present or absent.

Revisions: Arnold (1956), Markle and Olney (1990).

Geographical distribution: Tropical to temperate in all oceans.

Habitat and biology: Free-living or possibly facultative commensals in shelf and slope waters of 18 to 2 000 m.

Interest to fisheries: None.

Size: At least 419 mm total length.

Remarks: One undescribed species known only from larvae; many rare forms in need of more study.

Key to species

- 1a. Dorsal-fin origin over or slightly behind anal-fin origin; 0 to 7 anal-fin rays anterior to dorsal-fin origin → 2
- 1b. Dorsal-fin origin distinctly behind anal-fin origin; 8 to 19 anal-fin rays anterior to dorsal-fin origin → 6

- 2a. More than 30 precaudal vertebrae → 3
- 2b. Less than 30 precaudal vertebrae → 4
- 3a. Vexillum present in adult; 19 or 20 pectoral-fin rays *E. neotes*
- 3b. Vexillum absent in adult; 14 to 17 pectoral-fin rays *E. rendahli*
- 4a. Tunic ridges left of ventral midline of swimbladder; western Pacific off New Zealand
. *E. pegasus*
- 4b. Tunic ridges on ventral midline of swimbladder; Atlantic and Mediterranean → 5
- 5a. Pigmented eye diameter greater than 16% head length; North Sea *E. drummondi*
- 5b. Pigmented eye diameter less than 15% head length; Mediterranean and eastern
Atlantic *E. dentatus*
- 6a. Pectoral-fin rays 26; tunic ridges lateral to ventral midline of swimbladder *E. pukaki*
- 6b. Pectoral-fin rays 15 to 21; tunic ridges on ventral midline of swimbladder → 7
- 7a. Twenty-eight to 35 dorsal-fin rays in front of vertical through back of 30th vertebra . . . → 8
- 7b. Thirty-five to 45 dorsal-fin rays in front of vertical through back of 30th vertebra . . . → 9
- 8a. Forty-five to 47 anal-fin rays in front of vertical through back of 30th vertebra; 16
to 19 anal-fin rays in front of vertical through dorsal-fin origin; Indo-West Pacific
. *Echiodon* species
- 8b. Thirty-nine to 43 anal-fin rays in front of vertical through back of 30th vertebra; 11
or 12 anal-fin rays in front of vertical through dorsal-fin origin; western Atlantic . *E. dawsoni*
- 9a. Fifty-two to 54 anal-fin rays in front of vertical through back of 30th vertebra; 18
to 20 precaudal vertebrae *E. coheni*
- 9b. Forty-six to 50 anal-fin rays in front of vertical through back of 30th vertebra; 21
to 29 precaudal vertebrae. → 10
- 10a. Precaudal vertebrae 21 to 25; eastern Pacific *E. exsilium*
- 10b. Precaudal vertebrae 25 to 29; southern Ocean *E. cryomargarites*

List of nominal species

Echiodon anchipterus Williams, 1984 (junior synonym of *E. coheni*).

E. coheni Williams, 1984. Tropical Indo-West Pacific. Benthic, 75 to 175 m, Rare.

E. cryomargarites Markle, Williams and Olney, 1983. Southern Ocean. Benthic. Uncommon.

E. dawsoni Williams and Shipp, 1982. Tropical Atlantic. Benthic, 75 to 175 m. Uncommon.

E. dentatus (Cuvier, 1829). Mediterranean and eastern Atlantic. Benthic. Uncommon.

E. drummondi Thompson, 1837. Temperate eastern North Atlantic. Benthic. Common.

E. exsilium Rosenblatt, 1961. Tropical eastern Pacific. Benthic. Uncommon.

E. neotes Markle and Olney, 1990. Kermadec Trench, New Zealand. Pelagic? Rare.

E. pegasus Markle and Olney, 1990. New Zealand. Benthic, 117 to 239 m. Rare.

E. pukaki Markle and Olney, 1990. New Zealand. Benthic, 860 m. Rare.

E. rendahli (Whitley, 1941). Southern Australia. Benthic. Uncommon.

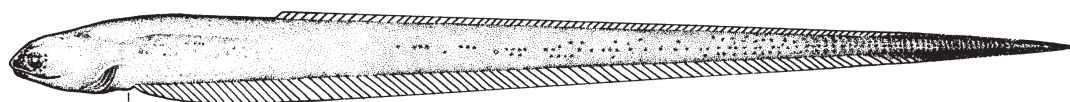
Echiodon species. Temperate western North Pacific. Rare.

Encheliophis Müller, 1842

Type species: *Encheliophis vermicularis* Müller, 1842 by monotypy.

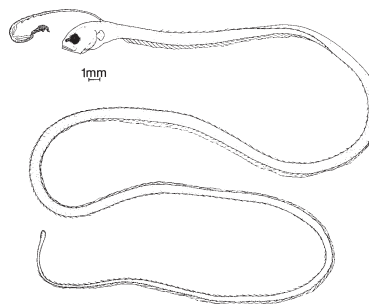
Synonyms: *Disparichthys* Herre, 1935 (?), type species *Disparichthys fluviatilis* Herre, 1935; *Encheliophiops* Reid, 1940, type species *Encheliophiops hancocki* Reid, 1940; *Jordanicus* Gilbert, 1905, type species *Fierasfer umbratilis* Jordan and Evermann, 1903; *Leptofierasfer* Meek and Hildebrand, 1928, type species *Leptofierasfer macrurus* Meek and Hildebrand, 1928; *Oxybeles* Richardson, 1846, type species *Oxybeles homei* Richardson, 1846; *Pirellinus* Whitley, 1928, type species *Oxybeles lumbricoides* Bleeker, 1854; *Rhizoiketicus* Valliant, 1893, type species *Rhizoiketicus carolinensis* Valliant, 1893.

Number of recognized species: 7.



14.0 mm head length

Fig. 19 *Encheliophis vermicularis* (adult) (from Markle and Olney, 1990)



3.7 mm head length

Fig. 20 *Encheliophis/Carapus* sp. (larva) (from Markle and Olney, 1990)

Diagnosis and description: Eel-like, moderate to shallow body depth; maxilla free to adnate; cardiform teeth present; gill rakers not developed in some species; branchiostegal membranes partly or completely united; swimbladder with thin terminal membrane or bulb; lacking enlarged dentary or premaxillary fangs, dentary diastema, pelvic fins, and swimbladder rocker bone; juveniles and adults obligatory commensals or parasites in holothurians or commensal in molluscs; larvae extremely elongate with vexillum well anterior of first dorsal-fin ray and first anal-fin ray; compensatory (shrinking) tenuis stage presumed well developed.

Revisions: Arnold (1956), Markle and Olney (1990).

Geographical distribution: Tropical to temperate Indo-Pacific.

Habitat and biology: One eastern Pacific molluscan commensal; others are holothurian commensals, some forming male-female pairs within a host, while others are cannibals or parasites on host's gonads and respiratory tree. In depths of 1 to 110 m.

Interest to fisheries: None.

Size: At least 334 mm total length.

Remarks: An additional deep-water dwarf form is under study.

Key to species

- 1a. Maxilla free and movable → 2
- 1b. Maxilla adnate or nearly so. → 4

- 2a. Pectoral fins small, less than 29% head length; body thick, robust and highly pigmented; 15 to 17 precaudal vertebrae *E. boraborensis*
- 2b. Pectoral fins large, greater than 39% head length; body not robust and generally unpigmented; 16 to 21 precaudal vertebrae → 3
- 3a. Molluscan commensal; 19 to 21 precaudal vertebrae *E. dubius*
- 3b. Holothurian commensal; 16 to 19 precaudal vertebrae *E. homei*
- 4a. Pectoral fins absent *E. vermicularis*
- 4b. Pectoral fins present → 5
- 5a. Precaudal vertebrae 26 or more; swimbladder long, tubular, extending well beyond twelfth vertebra; 17 to 19 pectoral-fin rays *E. gracilis*
- 5b. Precaudal vertebrae less than 24; swimbladder short, not extending beyond twelfth vertebra; 15 or 16 pectoral-fin rays → 6
- 6a. Dentary and palatine with tightly spaced triangular teeth; 16 vertebrae in front of dorsal-fin origin; probably a dwarf species *E. vermiops*
- 6b. Dentary and palatine with conical teeth; 11 to 14 vertebrae in front of dorsal-fin origin; attains 200 mm total length *E. sagamianus*

List of nominal species

Disparichthys fluviatilis Herre, 1935 (larval form of an *Encheliophis*).

D. lucillae Fowler, 1938 (larval form of an *Encheliophis*).

Encheliophis boraborensis (Kaup, 1856a, Eschmeyer uses Kaup 1856b). Tropical Indo-West Pacific. Holothurian commensal. Uncommon.

E. dubius (Putnam, 1874). Tropical eastern Pacific and Hawaii. Molluscan commensal. Uncommon.

E. gracilis (Bleeker, 1856). Tropical Indo-West Pacific. Holothurian commensal. Uncommon.

E. hancocki Reid, 1940 (junior synonym of *E. vermicularis*).

E. homei (Richardson, 1846). Tropical Indo-West Pacific. Holothurian commensal. Uncommon.

E. jordani Heller and Snodgrass, 1903 (junior synonym of *E. vermicularis*).

E. sagamianus Tanaka, 1908. Japan. Holothurian commensal. Rare

E. vermicularis (Müller, 1842). Indo-Pacific. Holothurian parasite with male-female pairs in each host. Uncommon.

E. vermiops Markle and Olney, 1990. South Africa and Australia. Perhaps a commensal in burrowing holothurians. Rare.

Fierasfer affinis Günther, 1862 (junior synonym of *E. homei*)

F. arenicola Jordan and Gilbert, 1882 (junior synonym of *E. dubius*).

F. caninus Günther, 1862 (nomen dubium for *E. dubius*).

F. frantii Popta, 1912 (larval form of an *Encheliophis*).

F. houlti Ogilby, 1922 (junior synonym of *E. gracilis*).

F. kagoshimanus Steindachner and Döderlein, 1887 (probable junior synonym of *E. boraborensis*).

F. microdon Gilbert, 1905 (junior synonym of *E. dubius*).

F. neglectum Peters, 1855 (junior synonym of *E. homei*).

F. parvipinnis (Kaup, 1856a. Eschmeyer uses Kaup 1856b) (junior synonym of *E. boraborensis*).

F. punctatus Fischer, 1885 (possible larval form of *Encheliophis*).

F. umbratilis Jordan and Evermann, 1902 (junior synonym of *E. gracilis*).

Leptofierasfer macrurus Meek and Hildebrand, 1928 (junior synonym of *E. dubius*).

Oxybeles brandesii Bleeker, 1851 (junior synonym of *E. homei*).

Rhizoiketicus carolinensis Vaillant, 1893 (junior synonym of *E. boraborensis*).

Eurypleuron Markle and Olney, 1990

Type species: *Carapus owasianus* Matsubara, 1953 by original designation.

Synonyms: None.

Number of recognized species: 1.

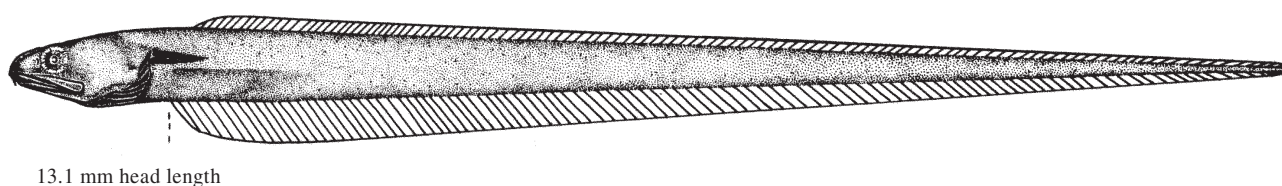


Fig. 21a *Eurypleuron owasianum* (adult) (from Markle and Olney, 1990)

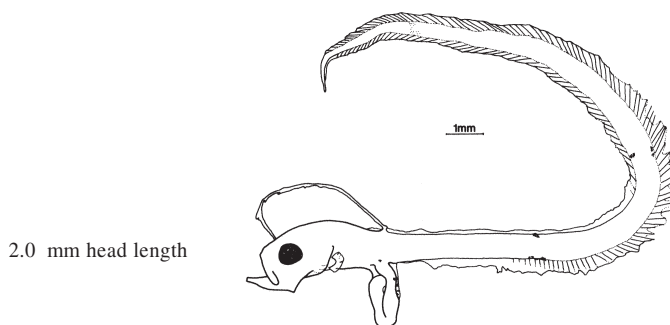


Fig. 21b *Eurypleuron owasianum* (larva)
(from Markle and Olney, 1990)

Diagnosis and description: Eel-like, shallow body depth; **dorsal-fin origin about opposite anal-fin origin; males with expanded parapophyses on vertebrae 5 to 18-20;** lacking cardiform premaxillary teeth, pelvic fins, swimbladder rocker bone, and ventral tunic ridges on posterior swimbladder; **larvae elongate with vexillum just anterior of first dorsal-fin ray and with a looped, trailing gut (exterillum);** unknown if compensatory (shrinking) tenuis stage present.

Revisions: Markle and Olney (1990).

Geographical distribution: Temperate Indo-Pacific off South Africa, Australia, New Zealand, Chile and Japan.

Habitat and biology: Presumably free-living in waters of 1 to 455 m. Uncommon.

Interest to fisheries: None.

Size: At least 236 mm total length.

Remarks: Although Markle and Olney (1990) synonymized the nominal Japanese and South African species, the widely separated populations suggest the need for further evaluation.

List of nominal species

Eurypleuron owasianum (Matsubara, 1953). Information see above.

Carapus cinereus Smith, 1955 (junior synonym of *E. owasianum*).

Onuxodon Smith, 1955

Type species: *Carapus parvibrachium* Fowler, 1927 by original designation.

Synonyms: None.

Number of recognized species: 3.

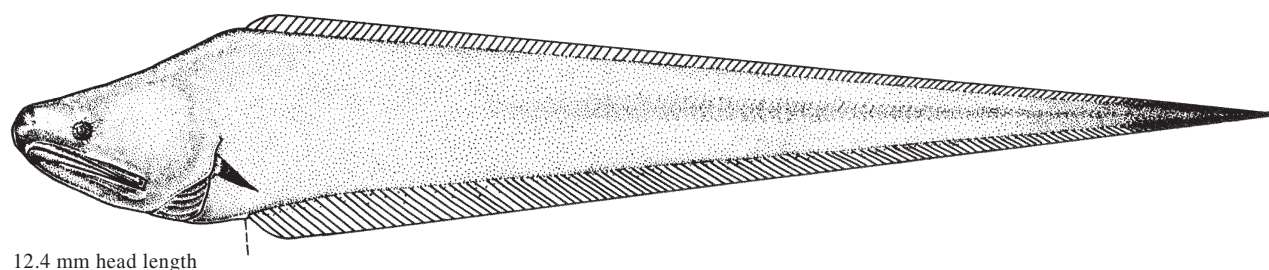


Fig. 22 *Onuxodon parvibrachium* (adult) (from Markle and Olney, 1990)

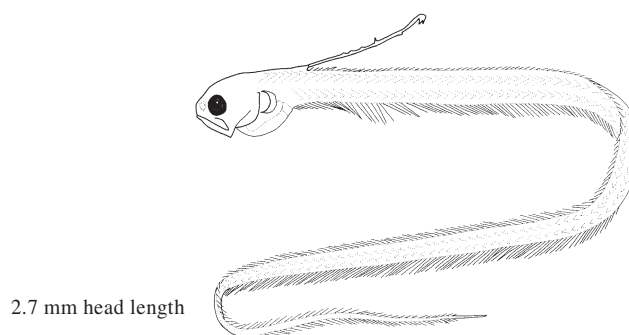


Fig. 23 *Onuxodon fowleri* (larva) (from Markle and Olney, 1990)

Diagnosis and description: Eel-like, shallow to moderate body depth; **adults small, less than 100 mm, trunk compressed; 1 to several large symphyseal fangs on premaxilla and dentary; anterior swimbladder modified into “rockerbone”;** predorsal bone present; pectoral-fin rays supported by numerous small distal radials; **juveniles and adults almost exclusively molluscan commensals; larvae elongate with vexillum adjacent to first dorsal-fin ray and just anterior or directly over vertical through first anal-fin ray;** compensatory (shrinking) tenuis stage presumed present.

Revisions: Markle and Olney (1990).

Geographical distribution: Tropical and temperate Indo-West Pacific, including Hawaii.

Habitat and biology: Molluscan commensals at depths of 1 to 30 m.

Interest to fisheries: None.

Size: At least 99 mm total length.

Remarks: Tenuis stage must exist but none have been identified.

Key to species

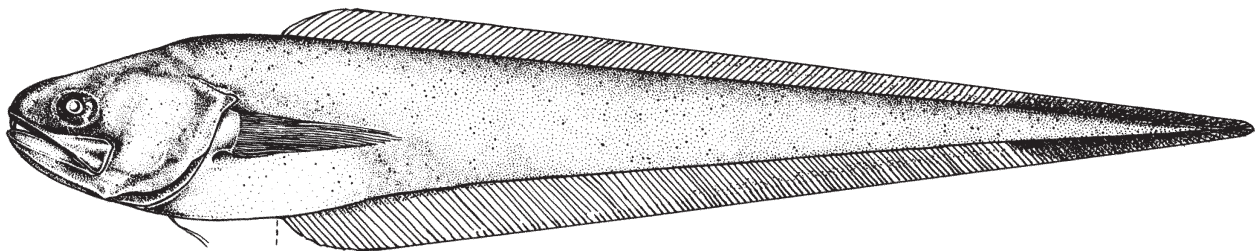
- 1a. Pectoral fins short (16 to 29% head length); eyes small (diameter 8 to 16% head length); precaudal vertebrae 16 to 18; lateralis papillae not visible on head or anterior lateral line *O. parvibrachium*
- 1b. Pectoral fins long (28 to 54% head length); eyes large (diameter 15 to 22% head length); precaudal vertebrae 18 to 22; lateralis papillae noticeable on ventral edge of interopercle, mandible and anterior lateral line → 2
- 2a. Precaudal vertebrae 18 to 20; relatively short and deep-bodied (body depth 11 to 16% total length); restricted to western Australia *O. margaritiferae*
- 2b. Precaudal vertebrae 19 to 22; relatively long and slender (body depth 6 to 10% total length); Indo-West Pacific from South Africa to Hawaii *O. fowleri*

List of nominal species

Onuxodon fowleri (Smith, 1955). Indo-West Pacific from South Africa to Hawaii. Uncommon.
O. parvibrachium (Fowler, 1927). Indo-West Pacific from South Africa to Hawaii. Uncommon.
O. margaritiferae (Rendahl, 1921). Tropical northwestern Australia in western Australian pearl oyster. Uncommon.
Carapus reedi Smith, 1955 (juvenile form of *O. fowleri* or *O. parvibrachium*).

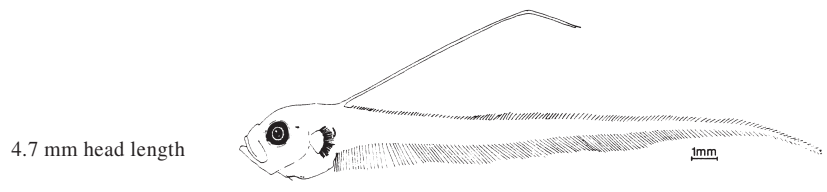
Pyramodon Smith and Radcliffe in Radcliffe, 1913

Type species: *Pyramodon ventralis* Smith and Radcliffe in Radcliffe, 1913 by original designation.
Synonyms: *Cynophidium* Regan, 1914, type species *Cynophidium punctatum* Regan, 1914.
Number of recognized species: 4.



38.3 mm head length

Fig. 24a *Pyramodon ventralis* (adult) (from Markle and Olney, 1990)



4.7 mm head length

Fig. 24b *Pyramodon ventralis* (larva) (from Markle and Olney, 1990)

Diagnosis and description: Eel-like, moderate to relatively deep body depth; **a large single vomerine fang; pelvic-fin rays present**; 3 developed gill rakers; swimbladder large, filling visceral cavity and extending past anus; dorsal and anal fin radials robust and elongate; **dorsal-fin origin anteriad or directly over anal-fin origin**; lacking rokerbone, cardiform teeth, and intrinsic swimbladder constrictions or tunic ridges; **larvae not extremely elongate, with vexillum adjacent to first dorsal-fin ray, with large head and deep body (36 to 106% head length), and enlarged premaxillary cartilage.**

Revisions: Markle and Olney (1990).

Geographical distribution: Tropical and temperate Indo-Pacific.

Habitat and biology: Apparently free living at depths of 120 to 731 m.

Interest to fisheries: None.

Size: At least 360 mm total length.

Remarks: Two species, *Pyramodon ventralis* and *P. lindas*, occur sympatrically off Japan (Machida and Okamura, 1993).

Key to species

- 1a. Margins of dorsal and anal fins edged in black over entire length; head and body generally unpigmented; 21 to 25 pectoral-fin rays *P. lindas*
- 1b. Margins of dorsal and anal fins edged in black over posterior quarter or not at all; head and body lightly to darkly pigmented, especially cheek and pectoral-fin base; 24 to 30 pectoral-fin rays → 2
- 2a. Body darkly pigmented but dorsal- and anal-fin margins unpigmented; 28 to 30 pectoral-fin rays *P. parini*
- 2b. Body lightly pigmented with dorsal- and anal-fin margins pigmented over posterior quarter; 24 to 28 pectoral-fin rays → 3
- 3a. Pectoral fins with 24 to 26 rays; 14 or 15 precaudal vertebrae; anus anterior, distance from snout to anus 99 to 133% head length. *P. ventralis*
- 3b. Pectoral fins with 26 to 28 rays; 17 to 19 precaudal vertebrae; anus more posterior with distance from snout to anus 130 to 151% head length *P. punctatus*

List of species

Pyramodon lindas Markle and Olney, 1990. Northern Australia to Japan. Benthopelagic in 250 to 385 m. Uncommon.

P. parini Markle and Olney, 1990. Tropical South Pacific. Benthopelagic in 185 to 443 m. Rare.

P. punctatus (Regan, 1914). South temperate Indo-West Pacific. Benthopelagic in 120 to 731 m. Rare.

P. ventralis Smith and Radcliffe in Radcliffe, 1913. Tropical and north temperate Indo-West Pacific, including Japan. Benthopelagic in 184 to 364 m. Uncommon.

Snyderidia Gilbert, 1905

Type species: *Snyderidia canina* Gilbert, 1905 by original designation.

Synonyms: None.

Number of recognized species: 1.

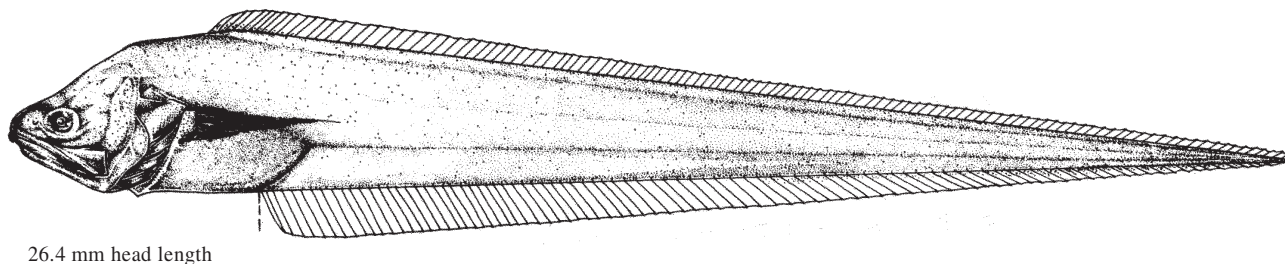


Fig. 25a *Snyderidia canina* (adult) (from Markle and Olney, 1990)

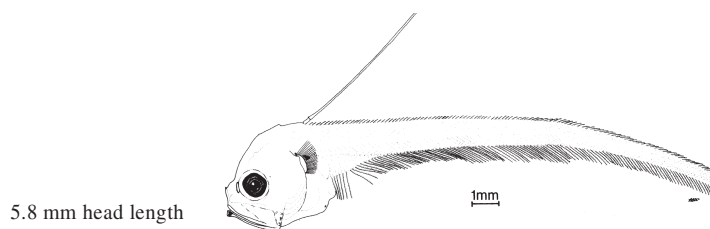


Fig. 25b *Snyderidia canina* (larva) (from Markle and Olney, 1990)

Diagnosis and description: Eel-like, moderate to relatively deep body depth; **dorsal-fin origin anterior to anal-fin origin**; dorsal- and anal-fin radials elongate and frail; swimbladder small, not filling visceral cavity and not reaching past anus; lacking pelvic-fin rays, rockerbone, cardiform teeth, and intrinsic swimbladder constrictions or tunic ridges; **larvae not extremely elongate, with vexillum adjacent to first dorsal-fin ray, with large head and deep body (34 to 95% head length), and with prominent concentration of melanophores at symphysis of lower jaw.**

Revisions: Markle and Olney (1990).

Geographical distribution: Atlantic and Indo-West Pacific.

Habitat and biology: Apparently free-living at 110 to 1 500 m. Uncommon.

Interest to fisheries: None.

Size: At least 268 mm total length.

List of nominal species

Snyderidia canina Gilbert, 1905. Information see above.

S. bothrops Robins and Nielsen, 1970 (junior synonym of *S. canina*).