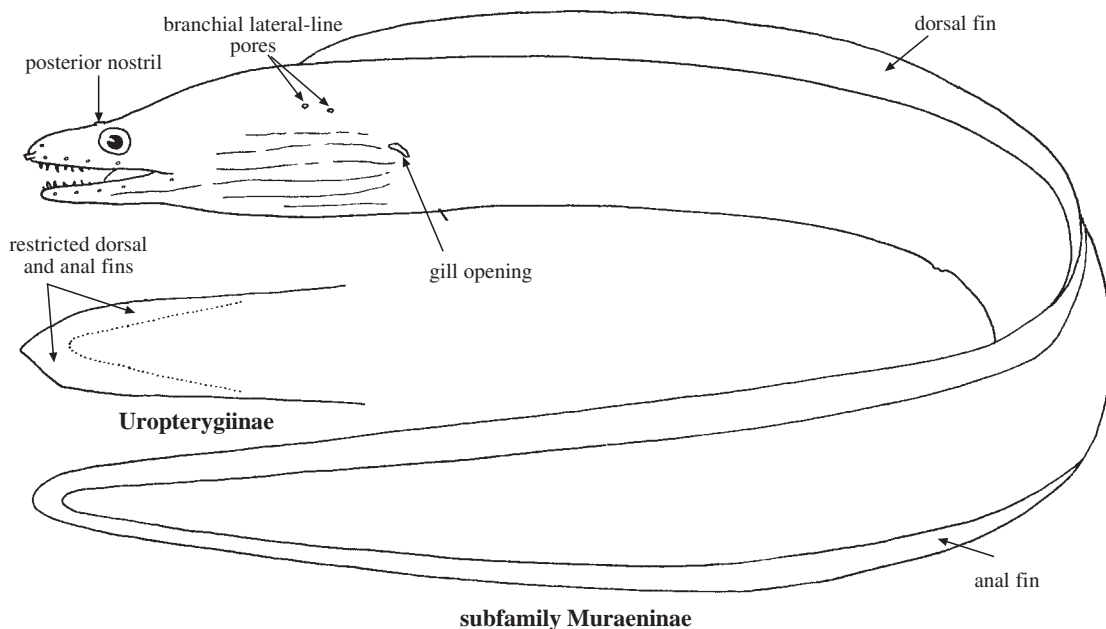


## MURAENIDAE

### Morays

by E.B. Böhlke (subfamily Muraeninae), J.E. McCosker (subfamily Uropterygiinae), and D.G. Smith

**Diagnostic characters:** Small to very large eels (to 375 cm); **body elongate, firm, muscular**, and compressed; many species robust and powerful, some small species nearly worm-like. **Dorsal profile of head above and behind eye raised** due to the development of strong head muscles. Eyes well developed. Snout short to elongate, jaws usually equal. Anterior nostril tubular, near tip of snout. **Posterior nostril high on head, above or before eye, a simple pore or in a tube.** Mouth large, gape usually extending behind posterior margin of eye, lips without fleshy flange. Jaw teeth usually strong, in 1 or more rows, ranging from sharply pointed and depressible canines or fangs to blunt molars, teeth on vomer (roof of mouth) uniserial, biserial, or in a patch. **Gill opening a small round hole or slit** at midside. Dorsal and anal fins variously developed, from dorsal fin beginning on head and anal fin immediately behind anus (subfamily Muraeninae), to both fins restricted to tail tip (subfamily Uropterygiinae); dorsal and anal fins continuous with caudal fin around tail tip; **pectoral and pelvic fins absent.** Scales absent. **Lateral-line pores absent on body except for 1 or 2 above and before gill opening** (tiny dots may be present along lateral line on body, but these are not pores); pores on head almost always limited to 4 along upper jaw, 3 near tip of snout, and 6 on lower jaw; no pores behind eye or in supratemporal commissure. **Colour:** variable, from nearly uniform to distinctive patterns of spots, blotches, bars, and/or reticulations.



**Habitat, biology, and fisheries:** Morays inhabit tropical and subtropical waters; many are found in shallow water rock and coral-reef habitats, some are taken above sand or mud bottoms to depths of 500 m, and a few species are found in brackish coastal waters or in rivers. They are scavengers and predators; if provoked or handled carelessly, their powerful jaws and strong teeth will cause deep lacerations. Morays are caught by spears, hook-and-line, traps, and in trawls. They are not sought commercially, but may be incidentally caught and found in fish markets. They are readily eaten, although consumption of large morays has sometimes resulted in tropical fish poisoning (ciguatera).

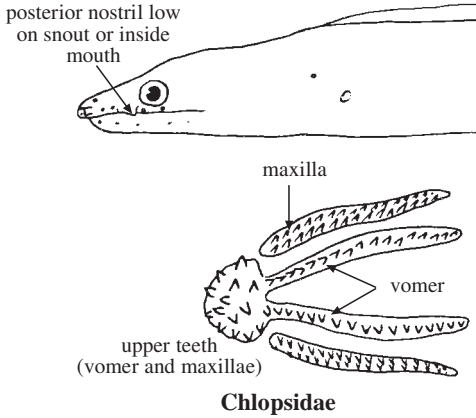
**Remarks:** The taxonomy of Indo-Pacific moray eels remains incomplete and is currently under study; some species are known only from a single inadequately described specimen, and there are a number of undescribed species. Several changes in nomenclature have been made in recent years; additional changes in both generic and specific names are likely to be made in the future.

**Similar families occurring in the area**

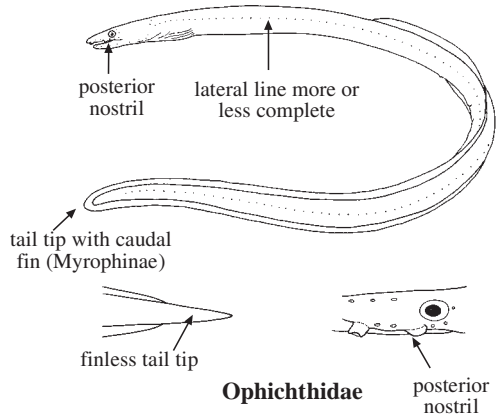
Few eels are likely to be confused with morays. The combination of elevated head profile, lack of pectoral fins, high posterior nostril, and reduced lateral line is not found in any other family.

**Chlopsidae** (formerly *Xenocongridae*): superficially similar to morays, but posterior nostril below mideye level or on lip rather than above eye; pectoral fins sometimes present; vomerine tooth series usually widely divergent rather than lying along midline.

**Ophichthidae**: some lack pectoral fins, but posterior nostril always low on side of the head, on lip, or opening inside mouth; most have a finless tail tip.



**Chlopsidae**



**Ophichthidae**

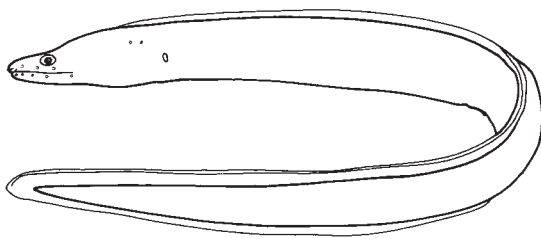
**Identification note**

Morays are notoriously difficult to deal with taxonomically because of their extreme variability and lack of unambiguous specific characters. The keys that follow should allow most adult specimens in the area to be identified, but precise identifications will not always be possible. Both colour pattern and dentition can change greatly with growth, and small juveniles may not display important key characters. Several undescribed species occur in the area, and these are not included. Characters used include fin position, jaws and dentition, position of anus, relative elongation of the body, nostril condition, and colour pattern. Average vertebral counts are given as predorsal-preanal-total; although these are not useful for field identification and are not needed to use the key, they are important characters for defining species and are given for reference.

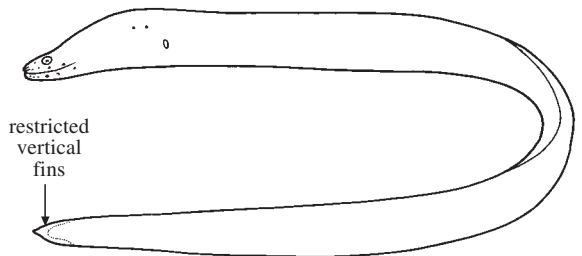
The condition of the vertical fins is not always obvious. In some muraenines, the dorsal fin is covered by such a thick layer of skin that it can easily be overlooked. Conversely, some uropterygiines often have a fold or ridge of skin along the back that superficially resembles a fin, although it has no rays. The easiest way to determine the fin condition is to examine the midventral surface just posterior to the anus. In muraenines the anal fin will be clearly seen. In uropterygiines, the ventral surface of the body here is smooth, with no trace of a fin.

**Key to the subfamilies of Muraenidae**

- 1a. Dorsal-fin origin near or before anus; anal-fin origin just behind anus, visible on midventral surface just behind anus (Fig. 1) . . . . . **subfamily Muraeninae**
- 1b. Dorsal and anal fins restricted to tail tip, no trace of a fin on midventral surface just behind anus (Fig. 2) . . . . . **subfamily Uropterygiinae**



**Fig. 1 Muraeninae**

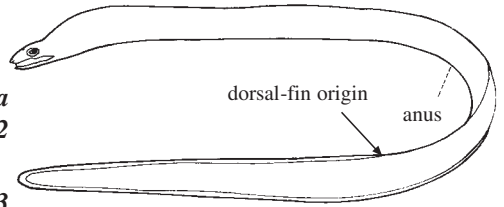


**Fig. 2 Uropterygiinae**

**Key to the species of Muraeninae occurring in the area** (for colour plates see end of this volume)

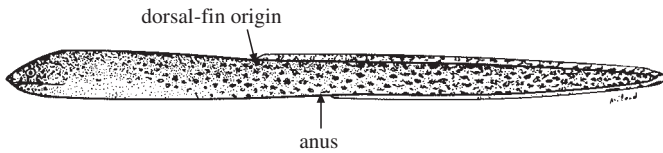
Note: couplet 5 may be the most troublesome of the entire key. It is intended to separate *Gymnomuraena*, *Echidna*, and some species currently placed in *Gymnothorax* from all the others. Some specimens and some species do not fall out clearly on one side or the other of the dichotomy. If a specimen is ambiguous in regard to these characters, it should be run through both alternatives to see if a species can be found that matches it.

- 1a. Dorsal-fin origin behind anus (Fig. 3); body brown with pale (red-orange in life) head and tail tip; vertebrae 73-53-129; to 21 cm . . . . . *Monopenchelys acuta*
- 1b. Dorsal-fin origin before anus . . . . . → 2
- 2a. Dorsal-fin origin more than 1 head length behind gill opening (Fig. 4) . . . . . → 3
- 2b. Dorsal-fin origin before, over, or less than 1 head length behind gill opening . . . . . → 4

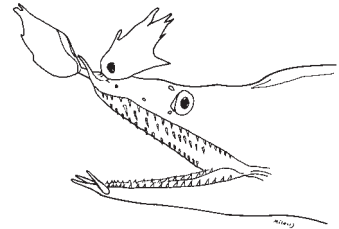


**Fig. 3 *Monopenchelys acuta*** (after Böhlke et al., 1989)

- 3a. Body colour light brown overall; vertebrae 34-52-132; to 20 cm . . . . *Gymnothorax marshallensis*
- 3b. Body colour light brown with diffuse brown mottling forming rows of spots posteriorly; fins pale; snout dusky, head pores and posterior nostril in conspicuous white spots; vertebrae 37-48-118; to 20 cm (Fig. 4) . . . . . *Gymnothorax fuscomaculatus*
- 4a. Anterior nostril with broad, foliose enlargements; lower jaw tip with projecting barbels (Fig. 5); body extremely elongate, ribbon-like; body colour black (juvenile) or bright blue with yellow fins (male), or yellow (female); vertebrae 2-83-271; to 120 cm (Pl. IV, 31 and 32). . . . . *Rhinomuraena quaesita*
- 4b. Anterior nostril simple tube or with only slight modifications to the tip; lower jaw tip without projecting barbels; body length variable; colour variable, but never as above . . . . . → 5

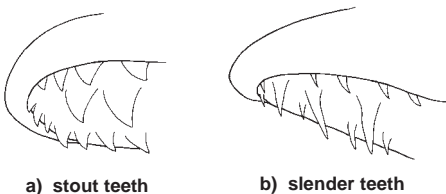


**Fig. 4 *Gymnothorax fuscomaculatus*** (after Schultz, 1953)

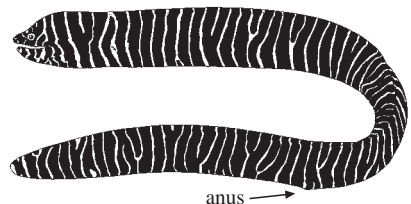


**Fig. 5 *Rhinomuraena quaesita*** (after Weber and de Beaufort, 1916)

- 5a. Teeth relatively stout, some molariform, none long and needle-like; median intermaxillary teeth enlarged, but not fang-like; maxillary teeth usually biserial, the inner and outer rows nearly equal in longitudinal extent (Fig. 6a). . . . . → 6
- 5b. Teeth relatively slender and sharply pointed, sometimes long and needle-like, never molariform; median intermaxillary teeth (when present) usually fang-like and depressible; maxillary teeth biserial or uniserial (Fig. 6b) . . . . . → 17
- 6a. Anus far behind midbody, tail about 30% of total length; body colour dark brown to black with many white or yellow bars; vertebrae 15-82-131; to 125 cm (Fig. 7) . . . *Gymnomuraena zebra*
- 6b. Anus near midbody, tail about 50% of total length; colour variable . . . . . → 7

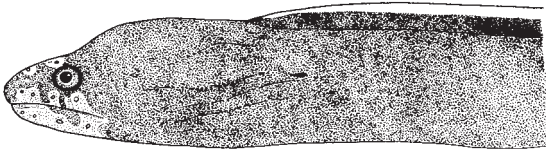


**Fig. 6 teeth in upper jaw**

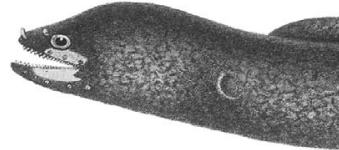


**Fig. 7 *Gymnomuraena zebra***

- 7a. Gill opening in a conspicuous dark spot; body tan to brown (may be yellow in life), sometimes with faint dark or pale reticulations; vertebrae 4-51-135; to 26 cm (Pl. III, 21) . . . . . *Gymnothorax melatremus*
- 7b. Gill opening not in a conspicuous dark spot; body colour variable, uniform brown or with spots, bars, or other markings . . . . . → 8
- 8a. Body uniform brown or grey, without markings (although head may have spots or other markings) . . . . . → 9
- 8b. Body with spots, bars, reticulations, or other markings . . . . . → 13
- 9a. No contrasting colour on head or fins . . . . . → 10
- 9b. Contrasting colour on head or fins . . . . . → 11
- 10a. Body and fins dark brown, head and tail tip sometimes slightly pale; intermaxillary teeth short and somewhat pointed; vertebrae 6-47-114; to 25 cm . . . . . *Gymnothorax herrei*
- 10b. Body dark brown dorsally, pale ventrally; intermaxillary teeth in a molariform patch; vertebrae 6-46-101; to 20 cm . . . . . *Echidna amblyodon*
- 11a. Head and fins uniform light brown except for a dark ring around eye; vertebrae 6-51-123; to 22 cm . . . . . *Echidna unicolor*
- 11b. Head pores and posterior nostril in large white spots; white blotch on lower jaw, just before corner of mouth; fins white-edged; vertebrae 6-51-126; to 53 cm (Fig. 8) . . . . . *Echidna leucotaenia*
- 12a. Dorsal-fin origin behind gill opening; body brown with darker reticulations; head pores and posterior nostril in small white spots; white blotch on jaws below eye, larger on lower jaw; vertebrae 13-53-122; to 35 cm (Fig. 9) . . . . . *Echidna rhodochilus*
- 12b. Dorsal-fin origin before gill opening; body spotted, barred, blotched, or with fine, white reticulations; head colour variable, if white blotches present on jaws then body also has white spots and blotches . . . . . → 13

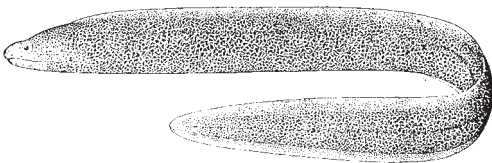


**Fig. 8** *Echidna leucotaenia*  
(after Schultz, 1953)



**Fig. 9** *Echidna rhodochilus*  
(from Bleeker, 1864)

- 13a. Body and fins brown with fine, white, worm-like reticulations; vertebrae 7-48-109; to 44 cm (Fig. 10) . . . . . *Echidna delicatula*
- 13b. Body spotted, barred, or blotched . . . . . → 14
- 14a. Body with overlapping, small brown spots, not strongly contrasting with background; tip of snout and lower jaw paler than rest of head; eye white in life; vertebrae 4-50-132; to 65 cm (Pl. IV, 29) . . . . . *Gymnothorax thyrsoideus*
- 14b. Body with strongly contrasting spots, blotches or bars, usually conspicuous, sometimes obscured in larger specimens but always present at least near tip of tail . . . . . → 15
- 15a. Body dark brown or black with irregular white spots and blotches; vertebrae 5-56-116; to 75 cm (Fig. 11) . . . . . *Echidna xanthospilos*
- 15b. Body with bars or with complex, star-like blotches . . . . . → 16



**Fig. 10** *Echidna delicatula*  
(from Jordan and Seale, 1906)



**Fig. 11** *Echidna xanthospilos*  
(from Bleeker, 1864)

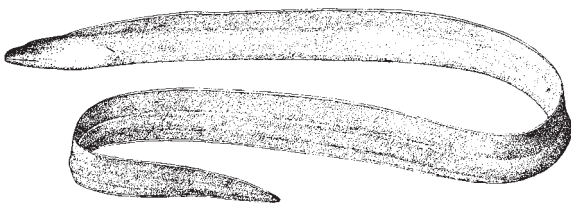
- 16a. Body with 25-30 contrasting dark and pale bars, conspicuous in young, becoming mottled brown and indistinct with age, remaining most distinct near end of tail (Fig. 12); vertebrae 6-52-123; to 55 cm (Pl. I, 3 and 4) . . . . . *Echidna polyzona*
- 16b. Body pale with 2 rows of star-like blotches with pale centres; vertebrae 6-57-123; to 75 cm (Pl. I, 2) . . . . . *Echidna nebulosa*



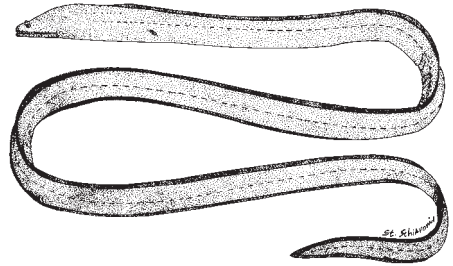
**Fig. 12 *Echidna polyzona***  
(after Jenkins, 1904)

- 17a. Body slender and very elongate, its depth 40 times or more in total length . . . . . → 18
- 17b. Body stout to moderately elongate, its depth 30 times or less in total length . . . . . → 19

- 18a. Anus near midbody, tail about 1/2 total length; dorsal fin elevated; body colour uniform tan or yellow with white margin on fins, small black spots on head and around head pores; vertebrae 6-93-209; to 80 cm (Fig. 13) . . . . . *Pseudechidna brummeri*
- 18b. Anus far anterior to midbody, tail about 60 to 70% of total length; body colour uniform brown, fins not edged in white; vertebrae 10-78-196; to 375 cm (Fig. 14). . . . . *Strophidon sathete*



**Fig. 13 *Pseudechidna brummeri***  
(from Weber and de Beaufort, 1916)

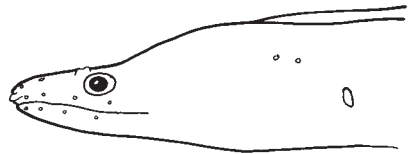


**Fig. 14 *Strophidon sathete***

- 19a. Jaws elongate and arched, meeting only at their tips, elongate canine teeth exposed when mouth closed (Fig. 15) . . . . . → 20
- 19b. Jaws not arched, closing completely or at most only a slight gap, teeth not exposed when mouth closed (Fig. 16) . . . . . → 25

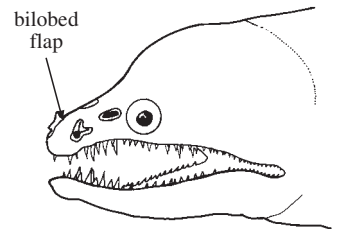


**Fig. 15 *Enchelycore***



**Fig. 16 *Gymnothorax***

- 20a. Anterior nostril with large bilobed flap on posterior margin, posterior nostril in short fringed tube (Fig. 17); body colour uniform dark brown, jaw pores white; vertebrae 6-63-142; to 150 cm . . . . . *Enchelynassa canina*
- 20b. Anterior nostril without large bilobed flap; body colour variable . . . . . → 21
- 21a. Body colour uniform . . . . . → 22
- 21b. Body colour spotted . . . . . → 23



**Fig. 17 *Enchelynassa canina***  
(after Weber and de Beaufort, 1916)

- 22a. Anterior nostril tube flared at end (Fig. 18); body dark brown or grey, fins with white margin; vertebrae 4-62-140; to 120 cm . . . . . *Enchelycore schismatorhynchus*
- 22b. Anterior nostril tube simple; body brown, fins with narrow white (yellow-green in life) margin; vertebrae 10-51-149; to 70 cm (PI. I, 5). . . . . *Enchelycore bayeri*

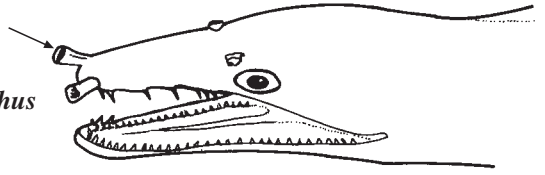


Fig. 18 *Enchelycore schismatorhynchus*  
(after Weber and de Beaufort, 1916)

- 23a. Posterior nostril in a long tube; body and fins with various ocellated spots, some confluent and large, colourful in life; vertebrae 4-46-122; to 90 cm (PI. I, 6) . . . *Enchelycore pardalis*
- 23b. Posterior nostril not tubular . . . . . → 24

- 24a. Dorsal-fin origin shortly behind gill opening; posterior nostril round or oval, without rim; body and fins tan with irregular brown spots; vertebrae 15-63-140; to 53 cm (Fig. 19) . . . . . *Enchelycore kamara*
- 24b. Dorsal-fin origin before gill opening; posterior nostril oval, with raised, fringed rim; body pale brown with fine, irregular spots; fins pale; head pores and nostril a little darker; vertebrae 8-60-150; to 60 cm (Fig. 20) . . . . . *Enchelycore bikiniensis*

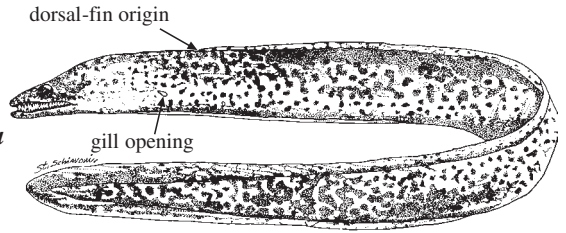


Fig. 19 *Enchelycore kamara*  
(after Böhlke and Böhlke, 1980)

- 25a. Intermaxillary teeth in 5 longitudinal rows, consisting of a median row of depressible fangs and 2 lateral rows on each side; maxillary teeth in 2 or more rows, inner teeth slightly larger than outer, the inner row at least half the longitudinal extent of the outer row and often equal (Fig. 21a). . . . . → 26
- 25b. Intermaxillary teeth in 2 or 3 longitudinal rows, consisting of a median row of depressible fangs (sometimes absent) and a single outer row on each side; maxillary teeth uniserial or with a few much longer teeth medial to the main series (Fig. 21b) . . . . . → 30

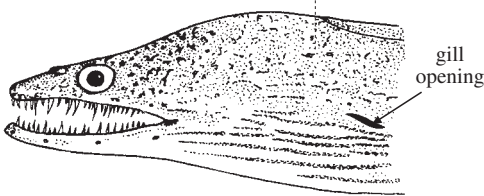


Fig. 20 *Enchelycore bikiniensis*  
(after Schultz, 1953)

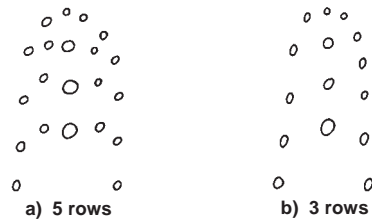


Fig. 21 intermaxillary teeth

- 26a. Inner row of maxillary teeth approximately half the longitudinal extent of outer row; body grey-brown with numerous small, irregular pale spots and slashes; vertebrae 10-57-126; to 60 cm; usually found in estuarine areas (Fig. 22) . . . . . *Gymnothorax tile*
- 26b. Inner row of maxillary teeth equal or nearly equal in longitudinal extent to outer row; colour not as above . . . . . → 27



Fig. 22 *Gymnothorax tile*  
(from Bleeker, 1864)

- 27a. Dorsal fin begins over or slightly behind gill opening, concealed by thick skin and sometimes difficult to see; juveniles more or less uniform grey, adults with large, irregular, brown spots forming longitudinal streaks on head; vertebrae 13-70-143; to 70 cm; adults found in brackish or fresh water (PI. IV, 25) . . . . . *Gymnothorax polyuranodon*
- 27b. Dorsal fin begins before gill opening; colour variable, but not as above; found in marine habitats, often on coral reefs. . . . . → 28
- 28a. Body dark brown or black with small, dark-edged, white spots; tip of tail white or yellow; no dark spots; inside of mouth white; vertebrae 5-51-130; to 100 cm (PI. III, 22) . . . . . *Gymnothorax meleagris*
- 28b. Body colour variable, if covered with small white spots, then some dark spots also present, especially anteriorly; tip of tail sometimes pale but not abruptly white . . . . . → 29
- 29a. Body irregularly spotted or mottled, head generally uniform brown or at most indistinctly mottled, a narrow dark ring around eye; pale spots on tail often extended into irregular bars; ground colour usually dark brown, occasionally light brown or grey; vertebrae 5-47-112; to 35 cm; found throughout the area (PI. II, 9) . . . . . *Gymnothorax buroensis*
- 29b. Body colour highly variable, sometimes covered with small white spots with dark spots superimposed, sometimes irregularly mottled; head spotted; pale spots on tail not extended into irregular bars (except occasionally on fins); vertebrae 5-48-120; to 57 cm; antitropical, not found within about 15° of the equator (PI. II, 13) . . . . . *Gymnothorax eurostus*
- 30a. A prominent black patch behind eye; body colour uniform or indistinctly mottled . . . . . → 31
- 30b. No black patch behind eye; body colour variable . . . . . → 32
- 31a. Black patch extending as a prominent slash to a point just behind corner of mouth; gill opening in a black spot; posterior nostril and jaw pores same colour as head; vertebrae 3-52-128; to 55 cm (Fig. 23) . . . . . *Gymnothorax breedeni*
- 31b. Black patch behind eye only; gill opening with body colour; posterior nostril and jaw pores white; vertebrae 8-61-131; to 50 cm (Fig. 24) . . . . . *Gymnothorax monostigma*



Fig. 23 *Gymnothorax breedeni*

(after McCosker and Randall, 1977)

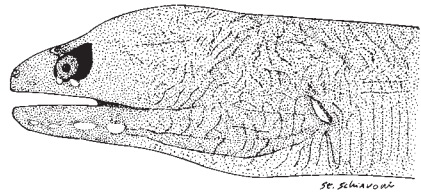
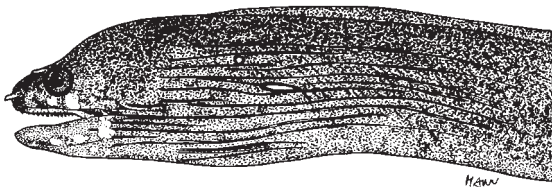


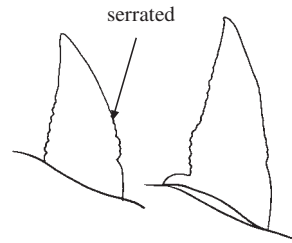
Fig. 24 *Gymnothorax monostigma*

- 32a. Body colour uniform or nearly so . . . . . → 33
- 32b. Body colour barred, spotted, or otherwise patterned . . . . . → 39
- 33a. Anus usually behind midbody, preanal length 1.7 to 2 times in total length; fins with white margin . . . . . → 34
- 33b. Anus usually before midbody, preanal length more than 2 times in total length; fins with or without white margin. . . . . → 35
- 34a. Depth at anus 18-32 times in total length; body colour light brown, jaw pores white; vertebrae 5-92-189; to 100 cm (PI. I, 7) . . . . . *Gymnothorax albimarginatus*
- 34b. Depth at anus 35-48 times in total length; body colour pale yellow-tan; vertebrae 6-78-168; to 47 cm . . . . . *Gymnothorax phasmatodes*

- 35a. A single lateral-line pore above and before gill opening; head and body brown, jaw pores white, dark ring around eye; vertebrae 4-51-142; to 40 cm; found only in the southern-most islands of the area (Fig. 25) . . . . . *Gymnothorax australicola*
- 35b. Two lateral-line pores above and before gill opening; colour variable. . . . . → 36
- 36a. Three infraorbital pores; eye closer to snout tip than to corner of mouth; body light grey to tan, fins darker, especially posteriorly; vertebrae 9-63-158; to 65 cm. . . . *Gymnothorax dorsalis*
- 36b. Four infraorbital pores; eye not closer to snout tip than to corner of mouth; body brown . . . . → 37
- 37a. Fins with white margin; head pores white; vertebrae 4-59-146; to 50 cm . . *Gymnothorax angusticauda*
- 37b. Fins without white margin; head pores not white . . . . . → 38
- 38a. Body relatively short and stout; teeth finely serrate (Fig. 26); body and fins dark brown becoming darker posteriorly; vertebrae 6-44-121; to 37 cm . . . . . *Gymnothorax pindae*
- 38b. Body more elongate; teeth smooth; body light brown, fins slightly darker; vertebrae 5-59-141; to 80 cm . . . . . *Gymnothorax monochrous*

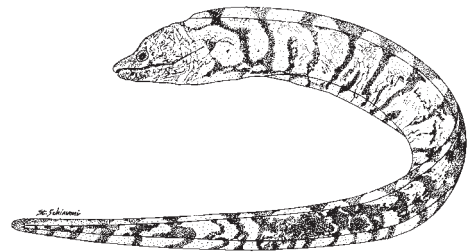


**Fig. 25** *Gymnothorax australicola*  
(after Randall and McCosker, 1975)



**Fig. 26** teeth

- 39a. Body with vertical bars. . . . . → 40
- 39b. Body with spots or complex colour pattern . . . . . → 45
- 40a. Bars narrow, not much wider than eye diameter; usually found in depths greater than 100 m. . . . . → 41
- 40b. Bars wider than eye diameter; in depths of less than 100 m . . . . . → 42
- 41a. Head and body between bars covered with a fine, dark brown meshwork; adjacent bars on tail merge with each other on basal part of anal fin; anal fin with a broad white margin; vertebrae 5-54-137; to 100 cm (PI. I, 8) . . . . *Gymnothorax berndti*
- 41b. Head plain; adjacent bars on tail do not merge with each other on basal part of anal fin; anal fin without a white margin; vertebrae 5-58-148; to 90 cm (Fig. 27) . . . . . *Gymnothorax pikei*



**Fig. 27** *Gymnothorax pikei*

- 42a. Bars on head connect across ventral midline to form complete rings; vertebrae 4-51-130; to 50 cm (PI. II, 12) . . . . . *Gymnothorax enigmaticus*
- 42b. Bars on head, when present, do not connect across ventral midline . . . . . → 43
- 43a. Thirty or more bars; vertebrae 6-55-137; to 47 cm (PI. IV, 27) . . . *Gymnothorax punctatofasciatus*
- 43b. Fewer than 30 bars. . . . . → 44
- 44a. Approximately 17 to 20 bars; teeth smooth; vertebrae 5-52-131; to 80 cm (PI. IV, 28) . . . . . *Gymnothorax rueppelliae*
- 44b. Approximately 12 or 13 bars; teeth serrate in large specimens; vertebrae 4-62-149; to 70 cm . . . . . *Gymnothorax chlamydatus*
- 45a. Body with spots. . . . . → 46
- 45b. Body with complex colour pattern of fine spots, reticulations, or irregular blotches. . . . . → 54



- 46a. Head, body and fins densely covered with small, overlapping brown spots, gill opening dark; margin of fins pale (yellow-green in life) in small specimens, usually obscure in large ones; vertebrae 6-58-136; to 120 cm (Pl. II, 15) . . . . . *Gymnothorax flavimarginatus*
- 46b. Body with discrete spots against a contrasting background . . . . . → 47
- 47a. Body with pale spots on a dark background . . . . . → 48
- 47b. Body with dark spots on a pale background . . . . . → 50
- 48a. Body dark brown with widely spaced, fine white spots, size and pattern of spots more or less uniform over length of body; anus behind midbody; vertebrae 6-61-134; to 40 cm . . . . . *Gymnothorax moluccensis*
- 48b. Body light brown, spots small anteriorly, becoming larger posteriorly, or coalescing to form irregular bars; anus at or before midbody . . . . . → 49
- 49a. Spots closely spaced anteriorly, separated by a distance less than diameter of spot; posteriorly spots coalescing to form irregular vertical bars; vertebrae 2-52-142; to 62 cm (Pl. II, 11). . . . . *Gymnothorax elegans*
- 49b. Spots widely spaced anteriorly, separated by a distance greater than diameter of spot; posteriorly spots slightly larger and closer together but remain separated; vertebrae 4-53-137; to 100 cm (Pl. III, 23) . . . . . *Gymnothorax nudivomer*
- 50a. Gill opening in a conspicuous dark blotch; body light brown with numerous dark spots, which appear distinct and separated in young but become large, diffuse and mottled in adults; vertebrae 6-60-141; to at least 220 cm (Pl. III, 19) . . . . . *Gymnothorax javanicus*
- 50b. Gill opening not within a dark blotch; colour variable . . . . . → 51
- 51a. Spots large and polygonal, pale interspaces narrow, appearing as a reticulum; vertebrae 5-60-141; to 180 cm (Pl. II, 14) . . . . . *Gymnothorax favagineus*
- 51b. Spots smaller and well separated, interspaces relatively large in comparison to the spots and not appearing as a reticulum. . . . . → 52
- 52a. Two or 3 oblique rows of spots behind eye; a row of spots along base of anal fin; spots on posterior part of dorsal fin forming oblique streaks; vertebrae 5-53-132; to 80 cm (Fig. 28) . . . . . *Gymnothorax fimbriatus*
- 52b. Spots behind eye not arranged in 2 oblique rows; spots on posterior part of dorsal fin (when present) not forming oblique streaks. . . . . → 53
- 53a. Spots arranged irregularly, not forming rows; posterior nostril a simple pore; vertebrae 5-61-144; to 180 cm (Pl. III, 17 and 18). . . . . *Gymnothorax isingteena*<sup>1/</sup>
- 53b. Spots arranged in 2 or 3 rows; posterior nostril in a short, flared tube; vertebrae 4-56-129; to 55 cm (Fig. 29) . . . . . *Gymnothorax reevesii*<sup>2/</sup>

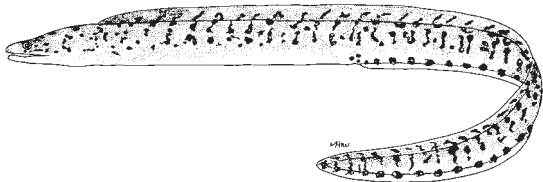


Fig. 28 *Gymnothorax fimbriatus*  
(after Cheng and Weng, 1967)

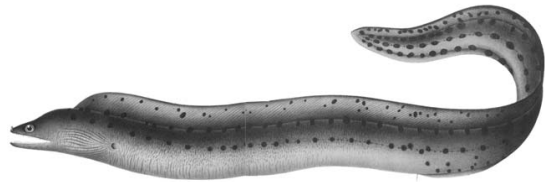


Fig. 29 *Gymnothorax reevesii*  
(from Bleeker, 1864)

1/ Previously recorded as *Gymnothorax melanospilus*.  
2/ Previously recorded as *Gymnothorax bullatus*.

54a. Dorsal-fin origin above or slightly before gill opening; vomerine teeth usually in 2 rows, or at least staggered . . . . . → 55

54b. Dorsal-fin origin well before gill opening; vomerine teeth uniserial . . . . . → 56

55a. Body pale with small, black dots grouped to form rows of highly variable spots, ranging from small spots in small specimens to large, diffuse rosettes in large adults (Fig. 30); vertebrae 9-58-131; to 140 cm (Pl. III, 24). . . . . *Gymnothorax pictus*

55b. Body and fins with a complex pattern of fine, dark reticulations; vertebrae 9-50-115; to 50 cm (Fig. 31) . . . *Gymnothorax richardsoni*

56a. Conspicuous dark spots on head behind eye, some of them elongated or coalesced to form horizontal streaks . . . . . → 57

56b. No conspicuous dark spots behind eye forming streaks . . . . . → 58

57a. A single row of usually 3 elongate spots behind eye; pale streak on dorsal midline of snout; widely distributed throughout the area; vertebrae 6-59-129; to 40 cm (Pl. III, 20) . . . . . *Gymnothorax margaritophorus*

57b. Two or more rows of multiple, elongate, spots behind eye; dorsal midline of snout without a pale streak; found only in northern Australia; vertebrae 4-51-116; to 26 cm (Pl. II, 10) . . . . . *Gymnothorax cribroris*

58a. Pores on upper and lower jaws set in distinct white spots or bars; other conspicuous white marks on head . . . . . → 59

58b. Pores not set in distinct white spots; head without conspicuous white markings. . . . . → 60

59a. White bars enclosing jaw pores and continuing across chin; a distinct brown mark with white borders behind eye; short, black, oblique bars with bright white borders on posterior fins; vertebrae 6-48-126; to 47 cm (Pl. IV, 30). . . . . *Gymnothorax zonipectis*

59b. Pores of upper and lower jaw in small, white spots; a white blotch on posterior part of lower jaw, usually continuing onto upper jaw; a brown spot at corner of mouth; body colour variable, usually with complex, lichen-like blotches; vertebrae 5-49-124; to 50 cm (Fig. 32) . . . . . *Gymnothorax chilospilus*

60a. Body and fins pale with overall dark reticulations; fins with white margins; head dusky; teeth serrate; vertebrae 5-68-156; to 100 cm; known only from deep water off New Caledonia (Fig. 33) . . . . . *Gymnothorax intesi*

60b. Colour not as above; teeth smooth; from shallow water . . . . . → 61

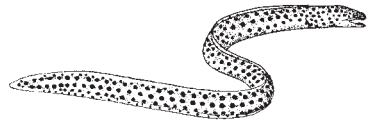
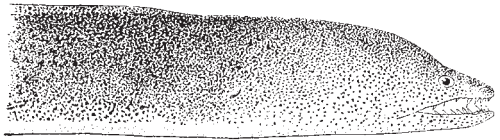
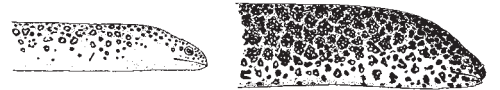


Fig. 30 *Gymnothorax pictus*  
(from Weber and de Beaufort, 1916)



Fig. 31 *Gymnothorax richardsoni*  
(from Weber and de Beaufort, 1916)

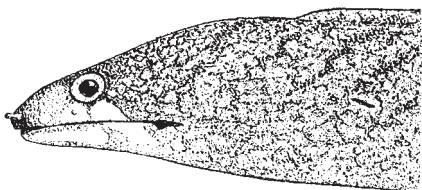


Fig. 32 *Gymnothorax chilospilus*  
(from Weber and de Beaufort, 1916)

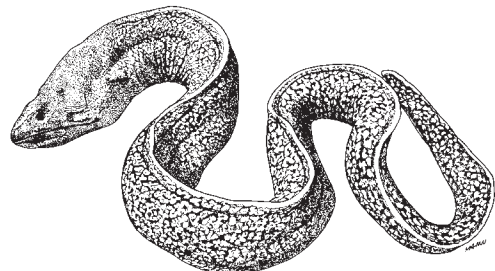
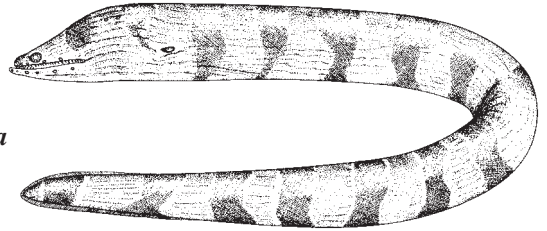


Fig. 33 *Gymnothorax intesi*  
(after Fourmanoir and Rivaton, 1979)

- 61a. Body light brown with dark, vertically elongate blotches, usually somewhat more prominent anteriorly; vertebrae 5-51-131; to 32 cm (Pl. II, 16) . . . . . *Gymnothorax gracilicauda*
- 61b. Body colour not as above . . . . . → 62
- 62a. Anal fin with a prominent pale (yellow) margin; head light brown or tan (yellowish in life), shading into reddish brown on body, with pale reticulations forming polygonal spots in young, becoming diffuse and irregular in larger specimens; a dark slash at corner of mouth; gill opening dark; vertebrae 4-56-135; to 100 cm . . . . . *Gymnothorax formosus*
- 62b. Anal fin without pale margin, body colour not as above . . . . . → 63
- 63a. Body dark with dark rosettes, the pattern rather indistinct, as if composed of tiny, densely packed dots rather than solid lines and spots; vertebrae 5-56-125; to 80 cm (Pl. IV, 26) . . . . . *Gymnothorax pseudothyrsoides*
- 63b. Body dark with an irregular pale reticulum enclosing large, irregular spots, lines and spots appearing solid rather than as aggregations of tiny dots, typically extended into oblique streaks on posterior part of body and dorsal fin; vertebrae 5-53-132; to 100 cm . . . . . *Gymnothorax undulatus*

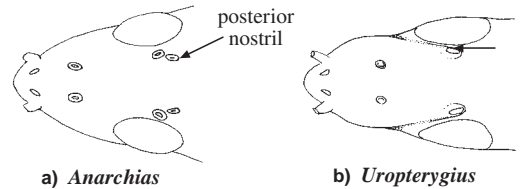
**Key to the species of Uropterygiinae occurring in the area (for colour plates see end of this volume)**

- 1a. Jaws elongate, lower jaw protruding; snout short, eye above anterior third of jaws; adults large and robust, to 150 cm; body pale with irregular dark bars; vertebrae 122-123-150; to 150 cm (Fig. 34) . . . . . *Channomuraena vittata*
- 1b. Jaws not elongate, subequal; snout not reduced, eye above midjaw; adults small to moderate and elongate. . . . . → 2



**Fig. 34** *Channomuraena vittata*

- 2a. A supraorbital pore adjacent to posterior nostril, the 2 appearing as a double pore (Fig. 35a); adults small, not exceeding 30 cm . . . . . → 3
- 2b. No pore adjacent to posterior nostril (Fig. 35b); adults large or small, may exceed 50 cm. . . . . → 5



**Fig. 35** dorsal view of head

- 3a. Pore distinctly separated from posterior nostril by a distance equal to or greater than diameter of pore, the area between pore and nostril pigmented like surface of head; pore anterior to nostril; brown with irregular pale markings; vertebrae 91-93-103 . . . . . *Anarchias cantonensis*
- 3b. Pore immediately adjacent to posterior nostril, separated by a distance less than diameter of pore, the area between pore and nostril not pigmented like surface of head; pore generally medial to or slightly behind nostril . . . . . → 4
- 4a. Pore located distinctly behind posterior nostril; rows of irregular or stellate pale spots on light brown background; vertebrae 108-115-123 (Pl. I, 1) . . . . . *Anarchias seychellensis*
- 4b. Pore located medial to or slightly in front of posterior nostril; uniform dark brown or mottled, sometimes with pale spots, but never as conspicuously marked as above; vertebrae 85-87-97 . . . . . *Anarchias allardicei*

- 5a. Anus far behind midlength, head and trunk about twice as long as tail; adults large, often exceeding 50 cm. . . . . → 6
- 5b. Anus near midlength, head and trunk about equal to tail; adults small to medium in size, few exceeding 50 cm . . . . . → 7

- 6a. Colour uniform light to dark brown, no spots; vertebrae 167-168-174; to at least 100 cm . . . . . *Scuticaria okinawae*<sup>3/</sup>
- 6b. Colour light tan to yellowish, overlain with prominent dark spots or blotches; vertebrae 164-164-173 (Fig. 36); to at least 100 cm . . . . . *Scuticaria tigrina*
  
- 7a. Two lateral-line pores above and before gill opening. . . . . → 8
- 7b. One or no lateral-line pores above and before gill opening. . . . . → 11
  
- 8a. Body light brown with irregular narrow black bars, partially reticulated, often appearing incomplete (Fig. 37); vertebrae 117-119-129; to 50 cm . . . . . *Uropterygius fasciolatus*<sup>4/</sup>
- 8b. Body mottled or plain with white specks or streaks, but without dark bars . . . . . → 9



Fig. 36 *Scuticaria tigrina*

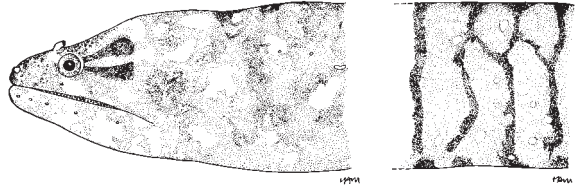


Fig. 37 *Uropterygius fasciolatus*  
(after McCosker and Randall, 1977)

- 9a. Colour tan to dark brown with irregular white bands or spots on head; vertebrae 115-124-138; to 35 cm (Fig. 38). . . . . *Uropterygius kamar*
- 9b. Body uniform or mottled dark brown with numerous tiny white specks on head (Fig. 39); caudal fin pale (yellow in life) . . . . . → 10

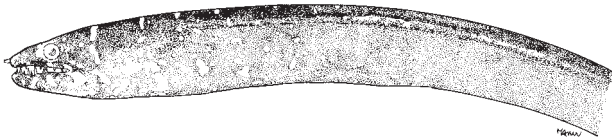


Fig. 38 *Uropterygius kamar*  
(after McCosker and Randall, 1977)

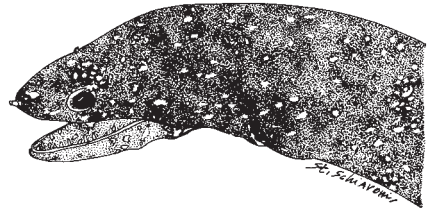


Fig. 39 *Uropterygius xanthopterus*  
(after McCosker and Randall, 1982)

- 10a. Total vertebrae about 119-123; to 30 cm . . . . . *Uropterygius xanthopterus*
- 10b. Total vertebrae about 131-138; to 50 cm . . . . . *Uropterygius alboguttatus*<sup>5/</sup>

- 11a. One or no lateral-line pores above and before gill opening; colour yellow or whitish anteriorly, becoming brown posteriorly, overlain with reticulated broad, darker brown lines; vertebrae 118-124-140; to 70 cm (Fig. 40) . . . . . *Uropterygius nagoensis*
- 11b. One lateral-line pore above and before gill opening; colour variable, but not as above. . . . . → 12

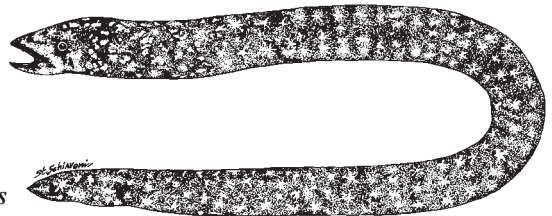


Fig. 40 *Uropterygius nagoensis*  
(after Masuda et al., 1984)

3/ Formerly known as *Scuticaria bennettii*. The holotype of *bennettii* is actually a specimen of *Channomuraena vittata*. The next available name is *Uropterygius okinawae*.  
 4/ *Uropterygius goslinei* McCosker and Randall, 1977 is a synonym.  
 5/ *Uropterygius alboguttatus* has been considered a synonym of *U. xanthopterus*. Although the 2 are very similar superficially, recent studies indicate that they are distinct.

- 12a. Colour uniform tan or brown, without markings. . . . . → 13
- 12b. Colour variable, with spots, reticulations, bars or other distinct markings. . . . . → 15
- 13a. Maxillary teeth biserial; vertebrae 111-114-122; to 35 cm . . . . . *Uropterygius concolor*
- 13b. Maxillary teeth uniserial . . . . . → 14
- 14a. No teeth on vomer; vertebrae 124-126-133; to 20 cm . . . . . *Uropterygius inornatus*
- 14b. Teeth on vomer; vertebrae 145-147-155 . . . . . *Uropterygius sp.*

- 15a. Ground colour light brown to white, scattered with prominent dark, round to oval, well separated spots (similar to Fig. 36); vertebrae 125-126-132; to 70 cm . . . . . *Uropterygius polypilus*
- 15b. Colour variable, with small spots, bands, reticulations, or mottling, but not as above . . . . . → 16
- 16a. Ground colour cream to grey, densely mottled with numerous close-set, dark, rounded spots; vertebrae 125-127-135 (Fig. 41); to 60 cm . . . . . *Uropterygius marmoratus*
- 16b. Colour not as above . . . . . → 17
- 17a. Plain brown anteriorly, spotted with darker brown posteriorly; vertebrae 96-102-116 (Fig. 42); to 20 cm . . . . . *Uropterygius fuscoguttatus*
- 17b. Colour not as above . . . . . → 18

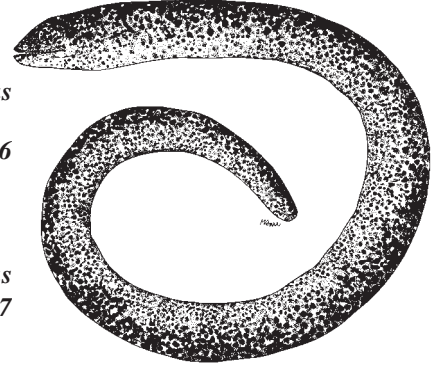


Fig. 41 *Uropterygius marmoratus*  
(after McCosker and Randall, 1982)

- 18a. Teeth multiserial; colour pale to light brown, overlain with small brown spots united into somewhat distinct vertical rows or bars; vertebrae 102-107-120 (Fig. 43); to 70 cm . . . . . *Uropterygius supraforatus*
- 18b. Teeth biserial; colour not as above. . . . . → 19

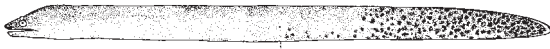


Fig. 42 *Uropterygius fuscoguttatus*  
(after Schultz, 1953)



Fig. 43 *Uropterygius supraforatus*  
(after Schultz, 1953)

- 19a. Posterior nostril over front of eye; eye contained about twice in snout; colour pale to grey, overlain laterally and dorsally with a reticulation of fine, brown, worm-like lines; vertebrae 106-108-117 (Fig. 44); to 30 cm . . . . . *Uropterygius micropterus*
- 19b. Posterior nostril over middle or posterior part of eye; eye contained more than twice in snout; colour not as above. . . . . → 20
- 20a. Colour brown, with irregular darker brown or black blotches, sometimes with pale blotches overlying these; vertebrae 91-94-109 (Fig. 45); to 40 cm . . . *Uropterygius macrocephalus*
- 20b. Colour brown, overlain with a faint reticulum of darker brown; head and sides of lower jaw mottled with white; vertebrae 95-96-109; to 23 cm . . . . . *Uropterygius makatei*<sup>6/</sup>

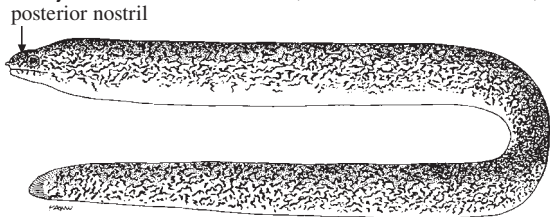


Fig. 44 *Uropterygius micropterus*



Fig. 45 *Uropterygius macrocephalus*  
(after Schultz, 1953)

<sup>6/</sup> The distinction between *Uropterygius macrocephalus*, *U. makatei*, and certain small eels that key out here is not entirely clear. Further studies are needed to sort out this complex.

**List of species occurring in the area** (as of April 1996)

- Anarchias allardicei* Jordan and Starks, 1906  
*Anarchias cantonensis* (Schultz, 1943)  
*Anarchias seychellensis* Smith, 1962
- Channomuraena vittata* (Richardson, 1845)
- Echidna amblyodon* (Bleeker, 1856)  
*Echidna delicatula* (Kaup, 1856)  
*Echidna leucotaenia* Schultz, 1943  
*Echidna nebulosa* (Ahl, 1789)  
*Echidna polyzona* (Richardson, 1845)  
*Echidna rhodochilus* Bleeker, 1863  
*Echidna unicolor* Schultz, 1953  
*Echidna xanthospilos* (Bleeker, 1859)
- Enchelycore bayeri* (Schultz, 1953)  
*Enchelycore bikiniensis* (Schultz, 1953)  
*Enchelycore kamara* Böhlke and Böhlke, 1980  
*Enchelycore pardalis* (Temminck and Schlegel, 1846)  
*Enchelycore schismatorhynchus* (Bleeker, 1853)
- Enchelynassa canina* (Quoy and Gaimard, 1824)
- Gymnomuraena zebra* (Shaw, 1797)
- Gymnothorax albimarginatus* (Temminck and Schlegel, 1846)  
*Gymnothorax angusticauda* (Weber and de Beaufort, 1916)  
*Gymnothorax australicola* Lavenberg, 1992  
*Gymnothorax berndti* Snyder, 1904  
*Gymnothorax breedeni* McCosker and Randall, 1977  
*Gymnothorax buroensis* (Bleeker, 1857)  
*Gymnothorax chilospilus* Bleeker, 1865  
*Gymnothorax chlamydatus* Snyder, 1908  
*Gymnothorax cribroris* Whitley, 1932  
*Gymnothorax elegans* Bliss, 1883  
*Gymnothorax enigmaticus* McCosker and Randall, 1982  
*Gymnothorax eurostus* (Abbott, 1861)  
*Gymnothorax favagineus* Bloch and Schneider, 1801  
*Gymnothorax fimbriatus* (Bennett, 1832)  
*Gymnothorax flavimarginatus* (Rüppell, 1830)  
*Gymnothorax formosus* Bleeker, 1865  
*Gymnothorax fuscomaculatus* (Schultz, 1953)  
*Gymnothorax gracilicauda* Jenkins, 1903  
*Gymnothorax herrei* Beebe and Tee Van, 1933  
*Gymnothorax intesi* Fourmanoir and Rivaton, 1979  
*Gymnothorax isingteena* (Richardson, 1845)  
*Gymnothorax javanicus* (Bleeker, 1859)  
*Gymnothorax margaritophorus* Bleeker, 1865  
*Gymnothorax marshallensis* (Schultz, 1953)  
*Gymnothorax melatremus* Schultz, 1953  
*Gymnothorax meleagris* (Shaw, 1795)  
*Gymnothorax moluccensis* (Bleeker, 1865)  
*Gymnothorax monochrous* (Bleeker, 1856)  
*Gymnothorax monostigma* (Regan, 1909)  
*Gymnothorax nudivomer* (Günther, 1866)  
*Gymnothorax phasmatodes* (Smith, 1962)  
*Gymnothorax pictus* (Ahl, 1789)  
*Gymnothorax pikei* Bliss, 1883  
*Gymnothorax pindae* Smith, 1962  
*Gymnothorax polyuranodon* (Bleeker, 1853)  
*Gymnothorax pseudothyrsoides* (Bleeker, 1852)

*Gymnothorax punctatofasciatus* Bleeker, 1863  
*Gymnothorax reevesii* (Richardson, 1845)  
*Gymnothorax richardsoni* (Bleeker, 1852)  
*Gymnothorax rueppelliae* (McClelland, 1844)  
*Gymnothorax thyrsoideus* (Richardson, 1845)  
*Gymnothorax tile* (Hamilton, 1822)  
*Gymnothorax undulatus* (Lacepède, 1803)  
*Gymnothorax zonipectus* Seale, 1906  
*Monopenchelys acuta* (Parr, 1930)  
*Pseudechidna brummeri* (Bleeker, 1858)  
*Rhinomuraena quaesita* Garman, 1888  
*Scuticaria okinawae* (Jordan and Snyder, 1901)  
*Scuticaria tigrina* (Lesson, 1828)  
*Strophidon sathete* (Hamilton, 1822)  
*Uropterygius alboguttatus* Smith, 1962  
*Uropterygius concolor* Rüppell, 1838  
*Uropterygius fasciolatus* (Regan, 1909)  
*Uropterygius fuscoguttatus* Schultz, 1953  
*Uropterygius inornatus* Gosline, 1958  
*Uropterygius kamar* McCosker and Randall, 1977  
*Uropterygius macrocephalus* (Bleeker, 1865)  
*Uropterygius makatei* Gosline, 1958  
*Uropterygius marmoratus* (Lacepède, 1803)  
*Uropterygius micropterus* (Bleeker, 1852)  
*Uropterygius nagoensis* Hatooka, 1984  
*Uropterygius polyspilus* (Regan, 1909)  
*Uropterygius supraforatus* (Regan, 1909)  
*Uropterygius xanthopterus* Bleeker, 1859

#### INCERTAE SEDIS

*Gymnothorax boschii* (Bleeker, 1853)  
*Gymnothorax dakini* Whitley and Colefax, 1938  
*Gymnothorax garsiae* Whitley and Colefax, 1938  
*Gymnothorax longinquis* (Whitley, 1948)  
*Gymnothorax philippinus* Jordan and Seale, 1907

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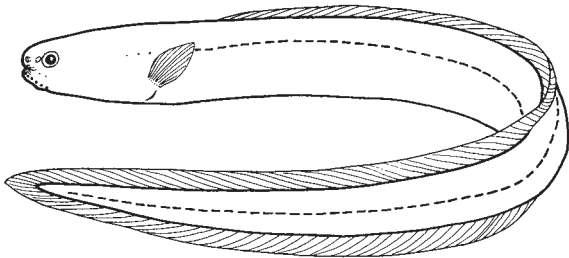
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## SYNAPHBRANCHIDAE

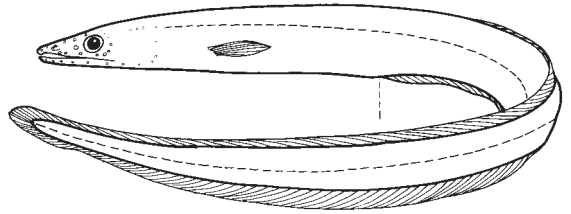
### Cutthroat eels

by D.G. Smith

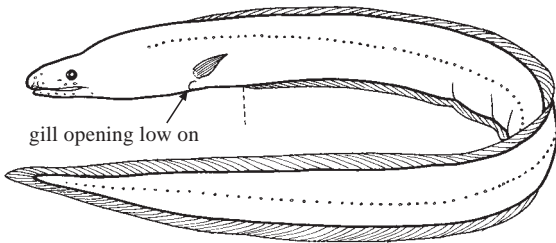
**Diagnostic characters:** Body stout to elongate, anus usually well in front of midbody. Head variable. Eye well developed to reduced. Snout may be short and blunt or moderately elongate. Mouth usually large, gape extending behind rear margin of eye; lips without a fleshy flange; jaws nearly equal, sometimes snout projects slightly beyond lower jaw and sometimes vice versa. Teeth usually small and conical, in 1 to several rows on jaws and vomer; some species have enlarged, compound teeth on vomer, but large fangs never present. Anterior nostril tubular, near tip of snout; posterior nostril on side of snout, at or below mideye level. **Gill opening low on body, below pectoral fins (when present); sometimes the gill openings of the 2 sides united in a ventral slit.** Dorsal and anal fins well developed, confluent with caudal fin. Pectoral fins present or absent. Scales present or absent. Lateral line variable, often complete, sometimes reduced to a few pores at anterior end and sometimes no pores at all. **Colour:** plain brown or grey, sometimes countershaded; no distinctive markings.



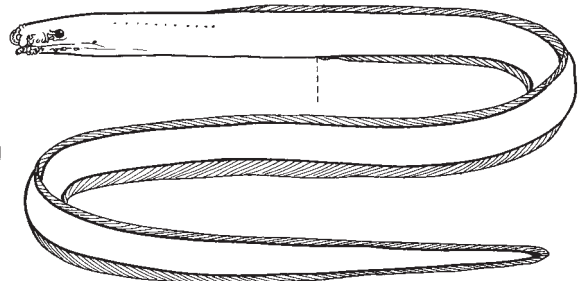
*Simenchelys parasitica* (Simenchelyinae)



*Synaphobranchus kaupii* (Synaphobranchinae)



*Dysomma anguillare* (Ilyophinae)



*Dysomma brevirostre* (Ilyophinae)

(after Robins and Robins, 1989)

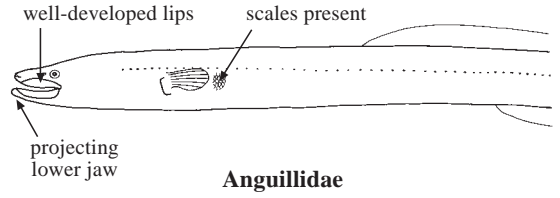
**Habitat, biology, and fisheries:** *Simenchelys* (subfamily Simenchelyinae) is a scavenger, feeding on dead fish and sometimes burrowing into the carcass; this habit led to the mistaken idea that it is a parasite. *Simenchelys* is an inhabitant of cooler water and can be expected at the northern and southern extremities of the area. Representatives of the subfamily Synaphobranchinae live in fairly deep water, and some species are quite common in their depth range. With a few exceptions, species of the Ilyophinae are rare and seldom seen. Many of them seem to live in specialized habitats that are difficult to sample.

**Remarks:** The Synaphobranchidae is divided into 3 subfamilies. The Simenchelyinae contains a single genus and species, *Simenchelys parasitica*. It is distinguished by its peculiar snub-nosed appearance, caused by the extreme shortening of the jaws. Aside from this feature, it is relatively generalized, with a moderately elongate body, well developed fins, and the anus slightly ahead of midbody. It is covered with small, embedded scales. The Synaphobranchinae contains those species most typical of the family. They are relatively generalized eels, except for the tendency of the gill openings on each side to converge toward the ventral midline. Most species have embedded scales, the eye and fins are well developed, and the jaws are moderately elongate. The Ilyophinae is the most speciose and morphologically diverse of the synaphobranchid subfamilies. Ilyophines show great variety in body shape, dentition, presence or absence of pectoral fin, eye size, and ornamentation of the snout. Most lack scales. In some species, the anus is located far forward, nearly under the pectoral fin. A great variety of ilyophine larvae have been collected, most of which cannot be identified with a known adult. This indicates that many species still await discovery.

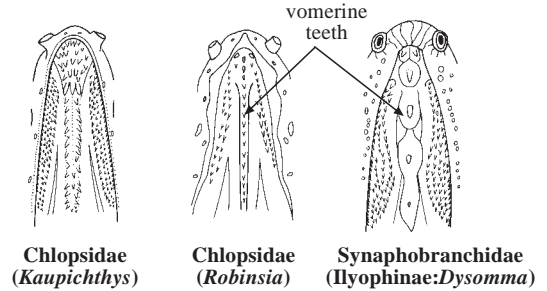
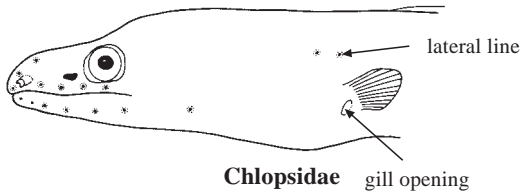


**Similar families occurring in the area**

**Anguillidae:** anguillids are the only other eels that have scales. Anguillids have prominent fleshy flanges on the lips, and the lower jaw projects beyond the upper. Adult anguillids live in fresh water or in estuaries and coastal lagoons, far from the deep water inhabited by the scaled synphobranchids.

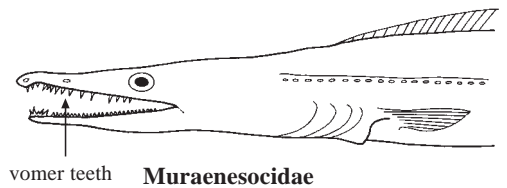
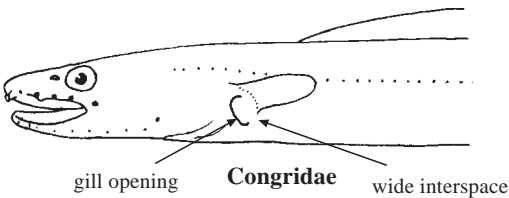


**Chlopsidae:** some ilyophines have a reduced lateral line and resemble chlopsids. Chlopsids also have the posterior nostril low on the side of the snout, further enhancing the resemblance. Most chlopsids have more than 1 row of teeth on the vomer; 1 genus (*Robinsia*) has a single row, but they are simple, not compound. Chlopsids almost always have 1 or 2 pores in the lateral line, at the anterior end of the canal. Of the known ilyophines, *Linkenchelys* (known only from the Atlantic), has 4 or 5 pores, and *Dysomma* has none, but no species has 1 or 2.

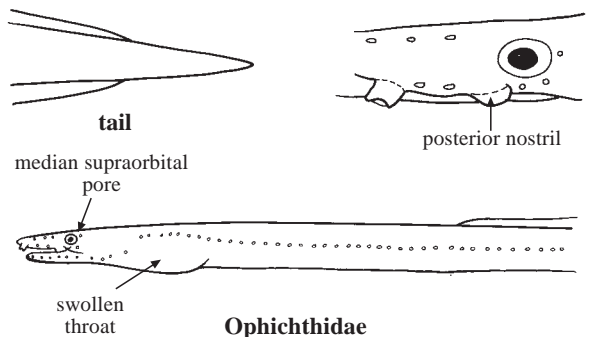


**Congridae:** some of the more generalized synphobranchids may be mistaken for congrids. Congrids lack scales and have the gill opening more lateral in position and closer to the pectoral fins. Many congrids, though not all, have fleshy flanges on the lips. Most have the posterior nostril at or above mideye.

**Muraenesocidae:** muraenesocids have a large mouth and enlarged teeth on the vomer, as do some ilyophines. In muraenesocids, however, the enlarged teeth are single and not compound as in ilyophines.

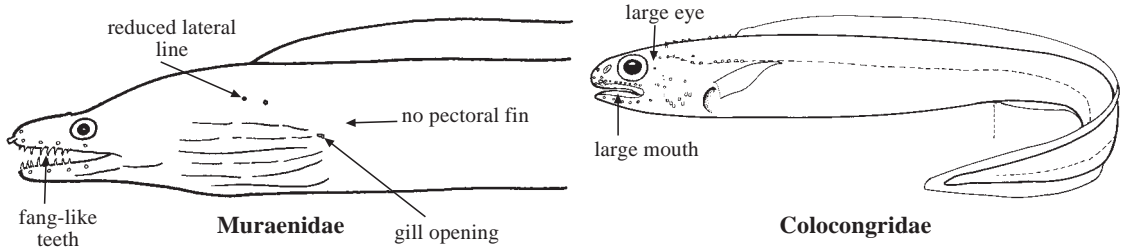


**Ophichthidae:** many ophichthids lack a caudal fin, and the tip of the tail is hard and pointed. Ophichthids have the posterior nostril low on the snout, but in most species it is actually on the lip; in synphobranchids, the nostril is always above the lip. Those ophichthids with the nostril above the lip have a swollen throat, with many overlapping branchiostegal rays detached from the hyal bones and forming a basket-like structure. In synphobranchids, the throat is not swollen; the branchiostegals are less numerous and are attached to the hyal bones. Ophichthids usually have a median supraorbital pore, which synphobranchids lack.



**Muraenidae:** muraenids lack pectoral fins, as do some ilyophines, but the gill opening is very small and pore-like. Muraenids usually have enlarged teeth, but these are on the jaws and intermaxillary plate, and not on the vomer. Muraenids almost always have 1 or 2 pores in the lateral line, at the anterior end of the canal.

**Colocongridae:** colocongrids have a short, blunt snout somewhat like *Simenchelys*, but they have a larger eye and mouth, and the anus is far behind midlength.



**Key to the genera of Synphobranchidae occurring in the Indo-Pacific**

- 1a. Head anterior to eyes extremely short, mouth a sphincter-like slit with gape not extending posterior to anterior nostril (Fig. 1) . . . . . *Simenchelys*
- 1b. Head anterior to eyes moderately long, mouth extends to rear edge of eye or beyond . . . . . → 2
- 2a. Small scales present, rounded to elongate in form, embedded and non-overlapping (Fig. 2). . . . . → 3
- 2b. Scales absent. . . . . → 4

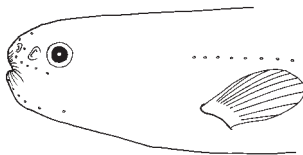


Fig. 1 *Simenchelys*

(after Robins and Robins, 1989)

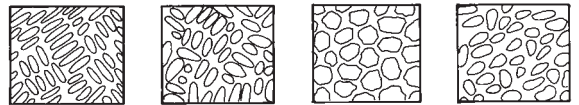


Fig. 2 details of body surface showing patterns of body scales

- 3a. Jaws equal or lower jaw slightly longer; all teeth numerous and very small, no enlarged teeth on vomer (Fig. 3a); gill openings often united ventrally (Fig. 4) . . . . . *Synphobranchus*
- 3b. Upper jaw slightly longer than lower; vomerine teeth distinctly larger than those of maxilla (Fig. 3b); gill openings separate . . . . . *Ilyophis* (in part)

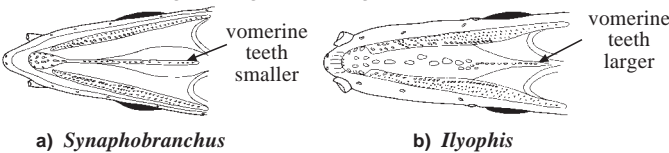


Fig. 3 roof of mouth

(after Robins and Robins, 1989)

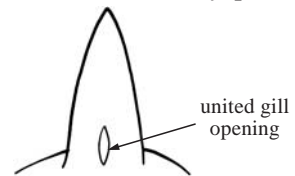


Fig. 4 ventral view of head

- 4a. Pectoral fin absent. . . . . → 5
- 4b. Pectoral fin present . . . . . → 6
- 5a. Dorsal fin begins behind anus; vomerine teeth simple, about 30 in number, only slightly larger than maxillary teeth; found around hydrothermal vents . . . . . *Thermobiotus*
- 5b. Dorsal fin begins in front of anus; vomerine teeth large, compound, 3 to 5 in number (Fig. 5a); found in a variety of habitats . . . . . *Dysomma* (in part)
- 6a. Anus at least 1 head length behind gill opening . . . . . → 7
- 6b. Anus less than 1 head length behind gill opening . . . . . → 8

- 7a. Intermaxillary teeth present; vomerine teeth simple, more than 4 in number, irregularly biserial anteriorly (Fig. 3b) . . . . . *Ilyophis* (in part)
- 7b. No intermaxillary teeth; 4 large, compound vomerine teeth in 1 row (Fig. 5b) . . . . . *Dysommima*
- 8a. About 12 moderate to small teeth on vomer, in 2 rows (Fig. 5c). . . . . *Meadia*
- 8b. Three to 5 large teeth on vomer, in 1 row (Fig. 5a). . . . . *Dysomma* (in part)

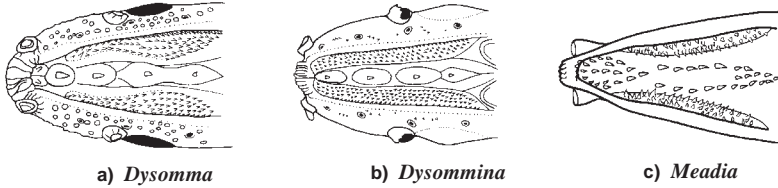


Fig. 5 ventral view of snout and roof of mouth

**List of species**

Note: this list is provisional. Many of the species listed have not been recorded from the area, but they occur elsewhere in the Indo-Pacific and may be found here in the future. Many undescribed species will probably be found as well.

**Subfamily ILYOPHINAE**

- Dysomma anguillare* Barnard, 1923
- Dysomma brevirostre* (Facciola, 1887)
- Dysomma bucephalus* Alcock, 1889
- Dysomma dolichosomatium* Karrer, 1982
- Dysomma fuscoventralis* Karrer and Klauswitz, 1982
- Dysomma goslinei* Robins and Robins, 1976
- Dysomma melanurum* Chen and Weng, 1967
- Dysomma muciparus* (Alcock, 1891)
- Dysomma opisthoproctus* Chen and Mok, 1995
- Dysomma polycatodon* Karrer, 1982
- Dysommima rugosa* Ginsburg, 1951
- Ilyophis arx* Robins and Robins, 1976
- Ilyophis brunneus* Gilbert, 1891
- Meadia abyssalis* (Kamohara, 1938)
- Meadia roseni* Mok, Lee, and Chan, 1991
- Thermobiotes mytelogeiton* Geistdorfer, 1991

**Subfamily SIMENCHELYINAE**

- Simenchelys parasitica* Gill, 1879

**Subfamily SYNAPHOBRANCHINAE**

- Synphobranchus affinis* Günther, 1877
- Synphobranchus bathybius* Günther, 1877
- Synphobranchus brevidorsalis* Günther, 1887
- Synphobranchus bruuni* (Castle, 1964)
- Synphobranchus capensis* (Barnard, 1923)
- Synphobranchus kaupi* Johnson, 1862

**References**

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Robins, C.H. and C.R. Robins. 1976. New genera and species of dysommime and synphobranchine eels (Synphobranchidae) with an analysis of the Dysommindae. *Proc. Acad. Nat. Sci. Philadelphia*, 127(18):249-280.

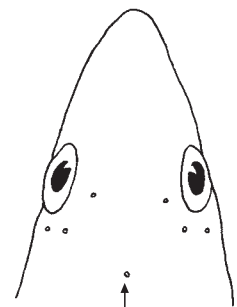
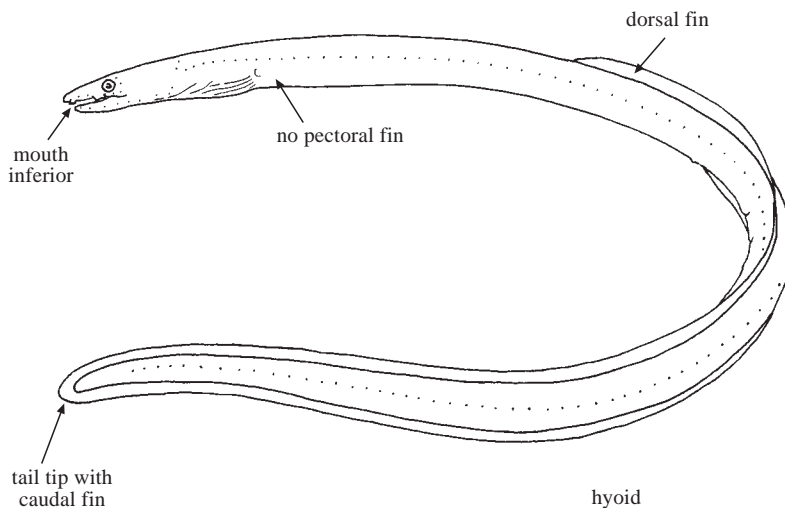
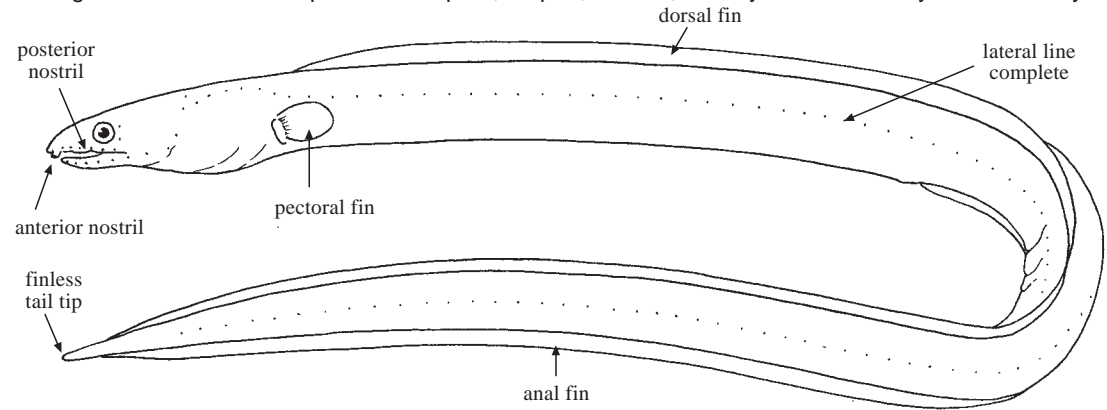
Robins, C.H. and C.R. Robins. 1989. Family Synphobranchidae. In *Fishes of the Western North Atlantic, Part 9*, edited by E.B. Böhlke. *Mem. Sears Found. Mar. Res.*, 1(9):207-253.

## OPHICHTHIDAE

### Snake eels, worm eels

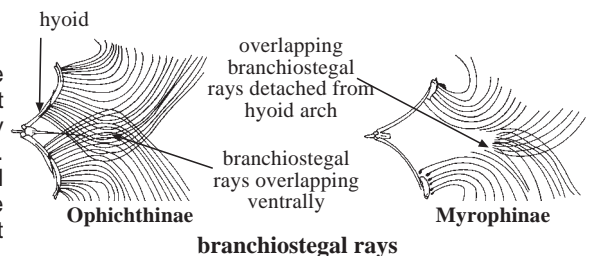
by D.G. Smith and J.E. McCosker

**Diagnostic characters:** Body elongate to very elongate, snake-like or worm-like, cylindrical anteriorly, cylindrical or compressed posteriorly, **tip of tail often hard and pointed**. Eye variable, from well developed to rudimentary. Snout pointed; mouth moderate to large, terminal or inferior. Teeth variable in form, from fang-like to conical to molariform to villiform, in a single or several rows on jaws, absent or in 1 to 3 rows or in a patch on roof of mouth. Anterior nostril tubular, near tip of snout; **posterior nostril low on head, on lip, or opening inside mouth**. Gill opening midlateral to completely ventral, round or slit-like. **Branchial region reinforced by numerous branchiostegal rays, those of the 2 sides overlapping ventrally, often free from attachment to hyoid arch**. Dorsal and anal fins present or absent; caudal fin present or absent, when present confluent with dorsal and anal fins, **when absent tip of tail often hard and pointed**; pectoral fins present or absent. Scales absent. Lateral line complete, usually with well-developed pores on head and body; **right and left sides connected by a frontal and temporal canal on head**; **median pore usually present in frontal canal on top of head**. **Colour:** highly variable, from uniform light or dark to various patterns of spots, stripes, or bars; usually darker dorsally than ventrally.



head in dorsal view  
median supraorbital pore of frontal canal

**Habitat, biology, and fisheries:** The Ophichthidae is a diverse and highly successful family of eels that occurs in a wide variety of habitats from muddy estuaries to coral reefs to the midwater realm. Ophichthids are more characteristic of continental waters than of islands. They are found from the shore to depths of 700 to 800 m or more, but most



branchiostegal rays

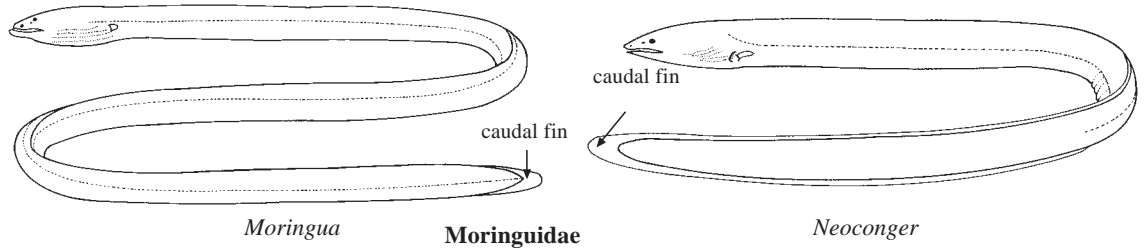
occur in less than 200 m. Their sharp snouts and tails and their muscular, cylindrical bodies are well adapted for burrowing, and many species spend most of their adult lives buried in the bottom sediment. They often come out at night to forage and are sometimes collected at the surface around a night light. One genus, *Benthenchelys*, is entirely pelagic. Like all eels, ophichthids have a pelagic leptocephalus larva. Various species of ophichthids are caught locally throughout the area, but no special fishery exists for them. They are taken by trawl or by hook-and-line and are consumed mainly fresh. Although not particularly aggressive, some of the larger ophichthids can bite if handled carelessly.

**Similar families occurring in the area**

The subfamily Ophichthinae is distinguished from all other eels by the hard, pointed, finless tail tip.

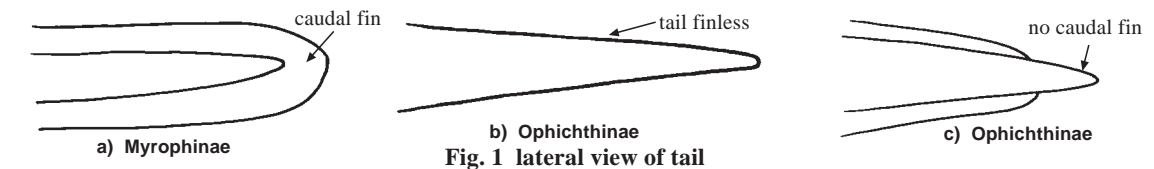
**Congridae:** some congrids, particularly the garden eels (Heterocongrinae), have the caudal fin reduced, but some caudal-fin rays are almost always present. The heterocongrines are distinguished by their short snout and the prominent upturned flange on the upper lip. Members of the subfamily Myrophinae have a caudal fin; they are distinguished from other eels by the presence of a median pore in the transverse frontal canal on the head, and, like the subfamily Ophichthinae, have numerous, overlapping branchiostegal rays.

**Moringuidae:** moringuids are also burrowing eels and may superficially resemble some of the small-eyed, fossorial ophichthids. Moringuids have a caudal fin, however, and they lack the numerous overlapping branchiostegals characteristic of ophichthids.

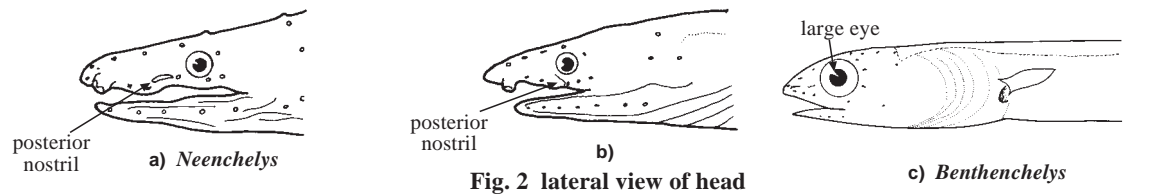


**Key to the genera of Ophichthidae occurring in the area**

- 1a. Dorsal and anal fins continuous with rayed caudal fin around tip of tail (Fig. 1a) . . . . . (subfamily **Myrophinae**) → 2
- 1b. Tip of tail finless externally, the tail tip often hard and pointed (in *Echelus*, dorsal and anal fins meet at tail tip, but free rays not evident) (Fig. 1b, c) . . . . . (subfamily **Ophichthinae**) → 8



- 2a. Posterior nostril above lip, opening entirely outside mouth (Fig. 2a) . . . . . → 3
- 2b. Posterior nostril along upper lip or inside mouth (Fig. 2b) . . . . . → 4
- 3a. Eye nearly equal to snout (Fig. 2c) . . . . . **Benthenchelys**
- 3b. Eye contained 2 or more times in snout length (Fig. 2a, b) . . . . . **Neenchelys**



- 4a. Pectoral fins moderately developed . . . . . *Myrophis*
- 4b. Pectoral fins absent . . . . . → 5
- 5a. Tongue elongate, extending well beyond mouth and with a fleshy appendage; teeth conical and uniserial (Fig. 3) . . . . . *Glenoglossa*
- 5b. Tongue not elongate, not extending well outside mouth; teeth either conical or blunt, uniserial or multiserial . . . . . → 6
- 6a. A prominent median toothed groove on ventral side of snout, bordered by dermal folds, extending anteriorly to anterior nostrils; anterior nostrils elongated tubes, equal to eye in length (Fig. 4a) . . . . . *Schismorhynchus*
- 6b. Ventral side of snout without a prominent median groove bordered by dermal folds; anterior nostrils less than eye in length (Fig. 4b) . . . . . → 7

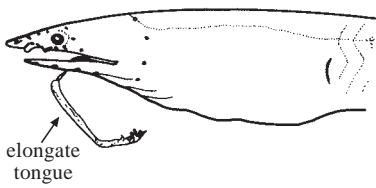


Fig. 3 lateral view of head (*Glenoglossa*)

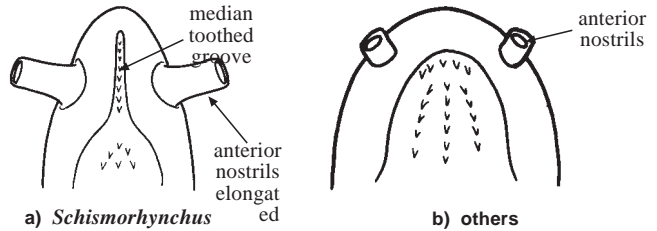


Fig. 4 ventral view of upper jaw

- 7a. Teeth absent on vomer, absent or embedded on intermaxillary, those on maxillary and dentary minute or villiform . . . . . *Schultzidia*
- 7b. Teeth present on intermaxillary, maxillary, dentary, and vomer . . . . . *Muraenichthys*
- 8a. Pectoral fins absent . . . . . → 9
- 8b. Pectoral fins present, though sometimes reduced . . . . . → 17
- 9a. Anal fin absent . . . . . → 10
- 9b. Anal fin present, though sometimes low and inconspicuous . . . . . → 13
- 10a. The only fin a short dorsal fin, beginning on head and ending a few head lengths behind (Fig. 5) . . . . . *Phaenomonas*
- 10b. All fins absent . . . . . → 11
- 11a. Cirri on upper lip (Fig. 6) . . . . . *Cirricaecula*
- 11b. No cirri on upper lip . . . . . → 12

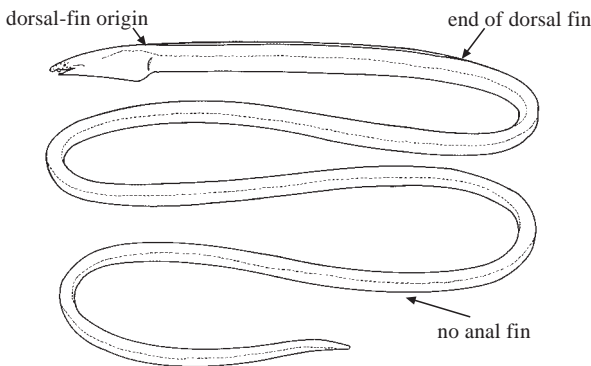


Fig. 5 *Phaenomonas*

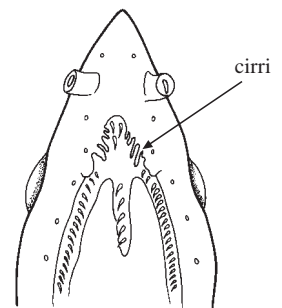


Fig. 6 ventral view of upper jaw (*Cirricaecula*)

- 12a. Posterior nostril opens outside of mouth, on upper lip (Fig. 7a) . . . . . *Apterichtus*
- 12b. Posterior nostril opens within confines of mouth (Fig. 7b) . . . . . *Ichthyapus*
- 13a. Dorsal fin begins well behind gill opening, by a distance equal to or greater than the head length . . . . . *Hemerorhinus*
- 13b. Dorsal fin begins over, slightly behind, or in front of gill opening . . . . . → 14
- 14a. Dorsal fin begins on head, closer to level of eye than to gill opening (Fig. 8) . . . . . *Callechelys*
- 14b. Dorsal fin begins near level of gill opening . . . . . → 15

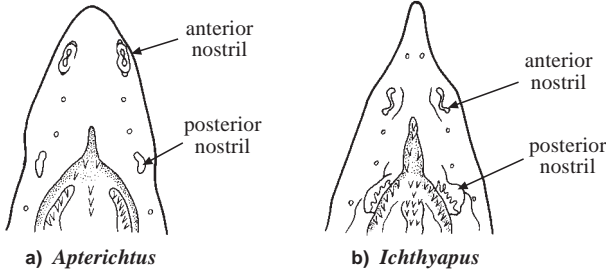


Fig. 7 ventral view of upper jaw

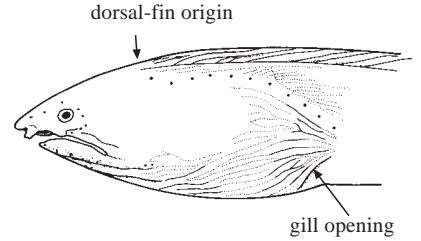


Fig. 8 *Callechelys*

- 15a. Gill openings lateral . . . . . *Yirrkala*
- 15b. Gill openings ventral . . . . . → 16

- 16a. Lateral head profile, seen from above, narrows sharply behind eye, then continues evenly to a pointed snout (Fig. 9a); body stout, its depth less than 30 times in length; vomerine teeth pointed, enlarged. . . . . *Lamnostoma*
- 16b. Lateral head profile, seen from above, narrows evenly to tip of snout (Fig. 9b); body slender, its depth more than 40 times in length; vomerine teeth conical, not enlarged. . . . . *Caecula*

- 17a. Anterior nostrils with conspicuous, leaf-like appendages (Fig. 10); eyes and pectoral fins well developed . . . . . *Phyllophichthus*
- 17b. Anterior nostrils without conspicuous, leaf-like appendages; eyes and pectoral fins variable. . . . . → 18

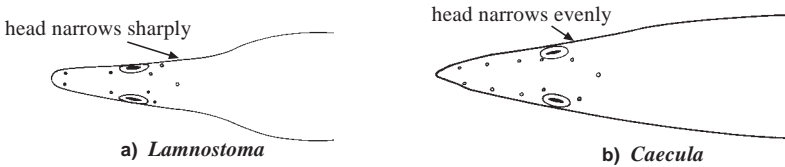


Fig. 9 dorsal view of head

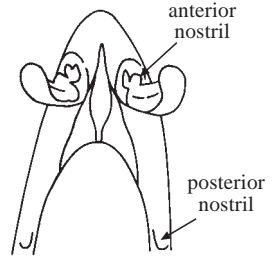


Fig. 10 ventral view of snout

(*Phyllophichthus*)

- 18a. Upper lip fringed with cirri (Fig. 11); eyes and pectoral fins moderately to well developed . . . . . → 19
- 18b. Upper lip not fringed with cirri, although 1 or 2 barbels may be present (Fig. 12); eyes and pectoral fins variable . . . . . → 20

- 19a. Dorsal fin begins in front of gill opening (Fig. 11); tail much longer than head and trunk; canine teeth absent . . . . . *Cirrhimuraena*
- 19b. Dorsal fin begins behind gill opening (Fig. 13); tail about equal to head and trunk; canine teeth in jaws . . . . . *Brachysomophis*

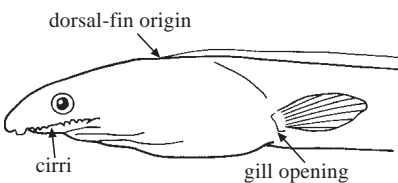


Fig. 11 *Cirrhimuraena*

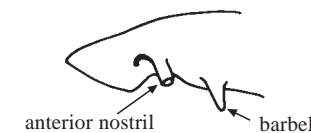


Fig. 12 snout in lateral view

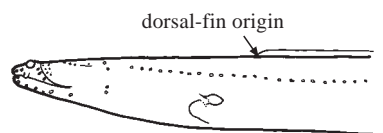
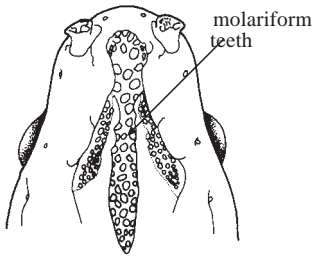


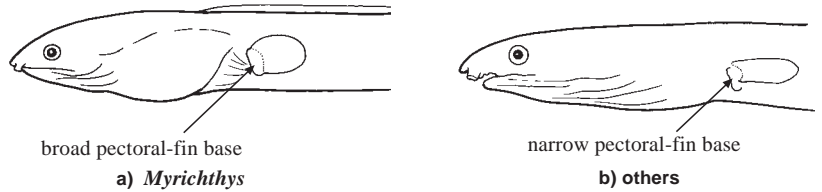
Fig. 13 *Brachysomophis*

- 20a. Dorsal fin begins well in front of gill opening . . . . . → 21
- 20b. Dorsal fin begins over or behind gill opening . . . . . → 23

- 21a. Teeth molariform, multiserial on jaws and vomer (Fig. 14); base of pectoral fin broad, spanning nearly entire rear border of gill opening (Fig. 15a) . . . . . *Myrichthys*
- 21b. Teeth conical, uniserial on jaws, uniserial or biserial on vomer; base of pectoral fin restricted, not spanning entire rear border of gill opening (Fig. 15b) . . . . . → 22



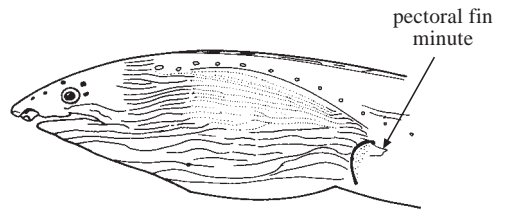
**Fig. 14** ventral view of snout and roof of mouth (*Myrichthys*)



**Fig. 15** anterior part of body (lateral view)

- 22a. Pectoral fins minute; eyes small; colour uniform or bicoloured, not banded or spotted (Fig. 16) . . . . . *Bascanichthys*

- 22b. Pectoral fins and eyes well developed; colour weakly banded and spotted . . . . . *Malvoliophis*

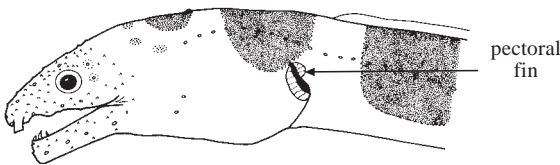


**Fig. 16** *Bascanichthys*

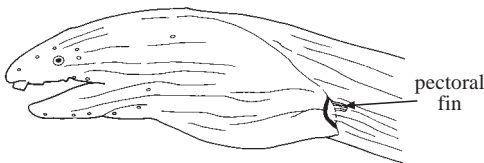
- 23a. Pectoral fins minute, much smaller than gill opening (Figs 17 and 18) . . . . . → 24
- 23b. Pectoral fins moderately to well developed, equal to or greater than gill opening . . . . . → 25

- 24a. Eyes well developed; body marked with brown saddles dorsally (Fig. 17) . . . . . *Evips*
- 24b. Eyes minute; colour uniform brown, without markings (Fig. 18) . . . . . *Allips*

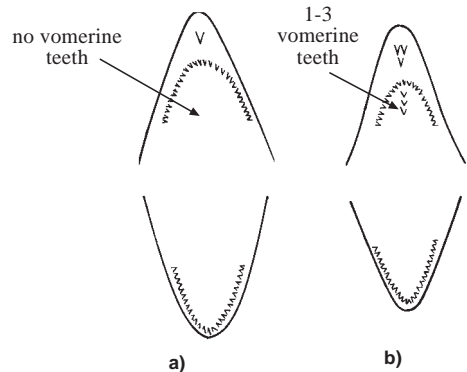
- 25a. Vomerine teeth absent (Fig. 19a), or at most 1 to 3 (Fig. 19b); body overlain with bands or saddles . . . . . *Leiuranus*
- 25b. Vomerine teeth present; colour variable . . . . . → 26



**Fig. 17** *Evips*



**Fig. 18** *Allips*



**Fig. 19** internal view of upper and lower jaws



- 26a. Teeth on jaws and vomer molariform or granular; base of pectoral fins broad, spanning nearly entire rear border of gill opening (Fig. 20) . . . . . *Pisodonophis*
- 26b. Teeth not molariform or granular; base of pectoral fins restricted, not spanning entire rear border of gill opening (Fig. 21). . . . . → 27
  
- 27a. Pectoral fins reduced, about equal to gill opening . . . . . *Elapsopsis*
- 27b. Pectoral fins well developed, greater than gill opening . . . . . → 28
  
- 28a. Snout very long, jaws slender and elongate, incapable of closing completely in adults (Fig. 21) . . . . . *Ophisurus*
- 28b. Snout moderate or short, jaws stout and short, capable of closing completely (Fig. 22) . . . . . → 29

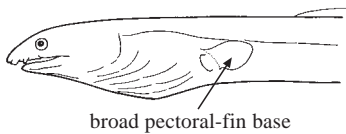


Fig. 20 *Pisodonophis*



Fig. 21 *Ophisurus*

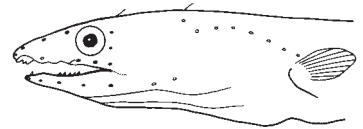


Fig. 22

- 29a. Dorsal and anal fins meet at tail tip, but free rays not evident; teeth conical, small, in irregular bands on jaws and roof of mouth; body brown to grey, darker on back (Fig. 23) . . . . *Echelus*
- 29b. Dorsal and anal fins stop well short of pointed tail tip; teeth conical, in 1 to 3 rows; variable in colour, ranging from uniform brown to spotted and banded (Fig. 24) . . . . . *Ophichthus*



Fig. 23 *Echelus*

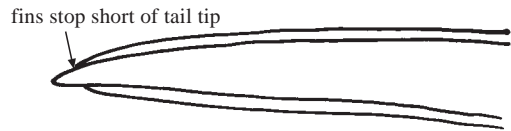


Fig. 24 *Ophichthus*

**List of species occurring in the area**

Note: the following list is provisional. The snake eels and worm eels of the Western Central Pacific are poorly known. Their cryptic habits make them difficult to collect, and many undescribed species undoubtedly exist.

**Subfamily MYROPHINAE**

- Benthenchelys cartieri* Fowler, 1934
- Glenoglossa wassi* McCosker, 1982
- Muraenichthys acutirostris* Weber and de Beaufort, 1916
- Muraenichthys breviceps* Günther, 1876
- Muraenichthys cookei* Fowler, 1928
- Muraenichthys gymnopterus* (Bleeker, 1853)
- Muraenichthys gymnotus* Bleeker, 1854
- Muraenichthys iredalei* Whitley, 1927
- Muraenichthys laticaudatus* (Ogilby, 1897)
- Muraenichthys macropterus* Bleeker, 1857
- Muraenichthys macrostomus* Bleeker, 1864
- Muraenichthys philippinus* Schultz and Woods, 1949
- Muraenichthys schultzei* Bleeker, 1857
- Muraenichthys sibogae* Weber and de Beaufort, 1916
- Muraenichthys thompsoni* Jordan and Richardson, 1908
- Myrophis microchir* (Bleeker, 1864)

*Neenchelys buitendijki* Weber and de Beaufort, 1916  
*Neenchelys daedalus* McCosker, 1982  
*Neenchelys microtretus* Bamber, 1915  
*Neenchelys retropinna* Smith and Böhlke, 1983  
*Schismorhynchus labialis* (Seale, 1917)  
*Schultzia johnstonensis* (Schultz and Woods, 1949)  
*Schultzia retropinnis* (Fowler, 1934)

### Subfamily OPHICHTHINAE

*Allips concolor* McCosker, 1972  
*Apterichtus flavicauda* (Snyder, 1904)  
*Apterichtus klazingai* (Weber, 1913)  
*Bascanichthys filaria* (Günther, 1872)  
*Bascanichthys kirkii* (Günther, 1870)  
*Bascanichthys longipinnis* (Kner and Steindachner, 1867)  
*Bascanichthys pusillus* Seale, 1917  
*Brachysomophis cirrocheilos* (Bleeker, 1859)  
*Brachysomophis crocodilinus* (Bennett, 1833)  
*Brachysomophis sauropsis* Schultz, 1943  
*Caecula pterygera* Vahl, 1794  
  
*Callechelys bitaeniata* (Peters, 1877)  
*Callechelys catostoma* (Forster, 1801)  
*Callechelys marmorata* (Bleeker, 1853)  
*Callechelys papulosa* McCosker, 1998  
*Callechelys randalli* McCosker, 1998  
*Callechelys striata* Smith, 1957  
  
*Cirrhimuraena calamus* (Günther, 1870)  
*Cirrhimuraena cheilopogon* (Bleeker, 1860)  
*Cirrhimuraena chinensis* Kaup, 1856  
*Cirrhimuraena oliveri* (Seale, 1909)  
*Cirrhimuraena paucidens* Herre and Myers, 1931  
*Cirrhimuraena playfairii* (Günther, 1870)  
*Cirrhimuraena tapeinoptera* Bleeker, 1863  
  
*Cirricaecula johnsoni* Schultz, 1953  
*Cirricaecula macdowellii* McCosker and Randall, 1993  
  
*Echelus uropterus* (Temminck and Schlegel, 1846)  
  
*Elapsopsis cyclorhinus* (Fraser-Brunner, 1934)  
*Elapsopsis versicolor* (Richardson, 1844)  
  
*Evips percinctus* McCosker, 1972  
  
*Hemerorhinus heyningi* (Weber and de Beaufort, 1916)  
  
*Ichthyapus vulturis* (Weber and de Beaufort, 1916)  
  
*Lamnostoma kampeni* (Weber and de Beaufort, 1916)  
*Lamnostoma mindora* (Jordan and Richardson, 1908)  
*Lamnostoma orientalis* (McClelland, 1844)  
*Lamnostoma taylori* (Herre, 1923)  
  
*Leiuranus semicinctus* (Lay and Bennett, 1839)  
  
*Malvoliophis pinguis* (Günther, 1872)  
  
*Myrichthys colubrinus* (Boddaert, 1781)  
*Myrichthys maculosus* (Cuvier, 1816)  
  
*Ophichthus altipinnis* (Kaup, 1856)

*Ophichthus apicalis* (Bennett, 1830)  
*Ophichthus asakusae* Jordan and Snyder, 1901  
*Ophichthus bonaparti* (Kaup, 1856)  
*Ophichthus celebicus* (Bleeker, 1856)  
*Ophichthus cephalozona* (Bleeker, 1864)  
*Ophichthus episcopus* Castelnau, 1878  
*Ophichthus erabo* (Jordan and Snyder, 1901)  
*Ophichthus evermanni* Jordan and Richardson, 1909  
*Ophichthus garretti* Günther, 1910  
*Ophichthus grandoculis* (Cantor, 1849)  
*Ophichthus limkouensis* Chen, 1929  
*Ophichthus macrochir* (Bleeker, 1852)  
*Ophichthus macrops* Günther, 1910  
*Ophichthus manilensis* Herre, 1923  
*Ophichthus melanochir* Bleeker, 1865  
*Ophichthus polyophthalmus* (Bleeker, 1864)  
*Ophichthus roseus* Tanaka, 1917  
*Ophichthus rutidoderma* (Bleeker, 1852)  
*Ophichthus rutidodermatoides* (Bleeker, 1852)  
*Ophichthus stenopterus* Cope, 1871  
*Ophichthus urolophus* (Temminck and Schlegel, 1846)  
*Ophichthus woosuitingi* Chen, 1929  
*Ophisurus serpens* (Linnaeus, 1758)  
*Phaenomonas cooperae* Palmer, 1970  
*Phyllophichthus xenodontus* Gosline, 1951  
*Pisodonophis boro* (Hamilton, 1822)  
*Pisodonophis cancrivorus* (Richardson, 1844)  
*Pisodonophis copelandi* Herre, 1953  
*Pisodonophis hijala* (Hamilton, 1822)  
*Pisodonophis hoevenii* (Bleeker, 1853)  
*Pisodonophis hypselopterus* (Bleeker, 1851)  
*Pisodonophis zophistus* (Jordan and Snyder, 1901)  
*Xestochilus nebulosus* (Smith, 1962)  
*Yirrkala chaselingi* Whitley, 1940  
*Yirrkala lumbricoides* (Bleeker, 1864)  
*Yirrkala kaupii* (Bleeker, 1858)  
*Yirrkala maculata* (Klausewitz, 1964)  
*Yirrkala misolensis* (Günther, 1873)

## References

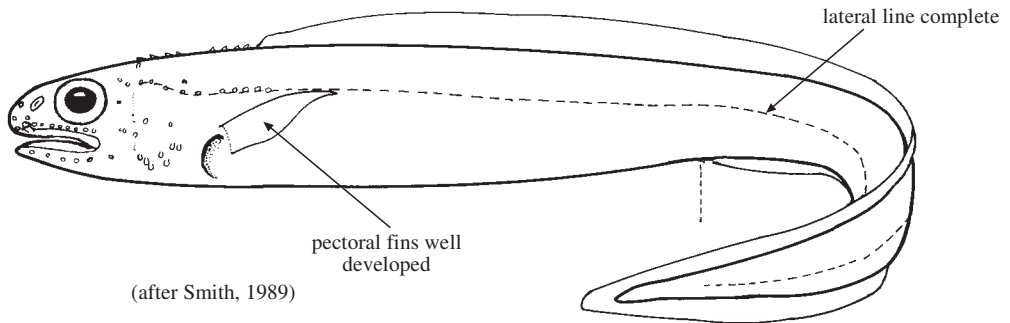
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## COLOCONGRIDAE

### Colocongrids

by D.G. Smith

**Diagnostic characters:** Body short and stubby, deepest shortly behind head, tapering toward tail, strongly compressed posteriorly; anus well behind midlength. Head wide and deep; eye well developed; snout short and bluntly rounded, projects slightly beyond lower jaw. Mouth moderate, gape ends under rear of eye; no fleshy flanges on lips. Teeth small, conical, in 1 to 3 rows on jaws; no teeth on vomer. Anterior nostril a short tube near tip of snout; posterior nostril large, round, with a low, raised rim, at mideye level. Dorsal and anal fins well developed, confluent with caudal fin; dorsal fin begins slightly behind base of pectoral fins. Scales absent. Pectoral fins well developed. Lateral line complete, pores in low tubes; head pores numerous, and except for anteriormost few are tubular. Small dermal papillae on head. **Colour:** brown or grey, without markings; sensory pores and papillae often black.



**Habitat, biology, and fisheries:** The Colocongridae contains a single genus, *Coloconger*, with several species in both the Atlantic and Indo-West Pacific. They live in fairly deep water, approximately 300 to 1 000 m, and seem to prefer open, muddy bottoms. They grow to about 50 cm in length.

#### Similar families occurring in the area

These stubby, short-tailed eels are difficult to confuse with members of other families.

Synphobranchidae: *Simenchelys parasitica* also has a short, blunt snout, but it has embedded scales and its anus is near midlength. Its mouth is much smaller, and it lacks the tubular lateral-line pores.

Congridae: some congrids, especially *Bathymyrus* and *Parabathymyrus*, have short snouts, but they have well-developed flanges on the lips and the anus is slightly before midlength.

**Remarks:** The Colocongridae, with the single genus *Coloconger*, has in the past been included in the family Congridae.

#### List of species occurring in the area

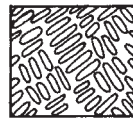
*Coloconger japonicus* Machida, 1984

*Coloconger raniceps* Alcock, 1889

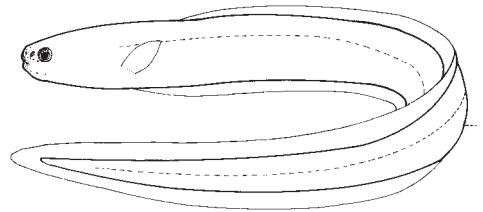
*Coloconger scholesi* Chan, 1967

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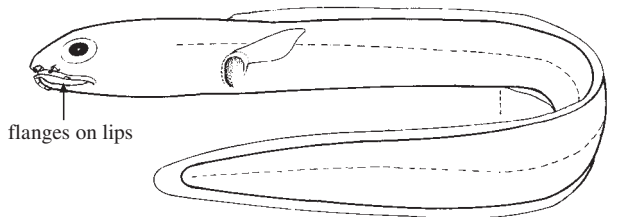


embedded scales



*Simenchelys parasitica*

Synphobranchidae



*Parabathymyrus*

Congridae