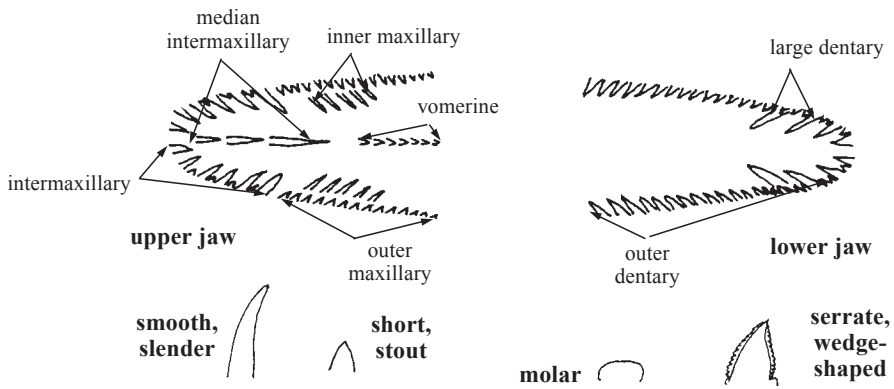
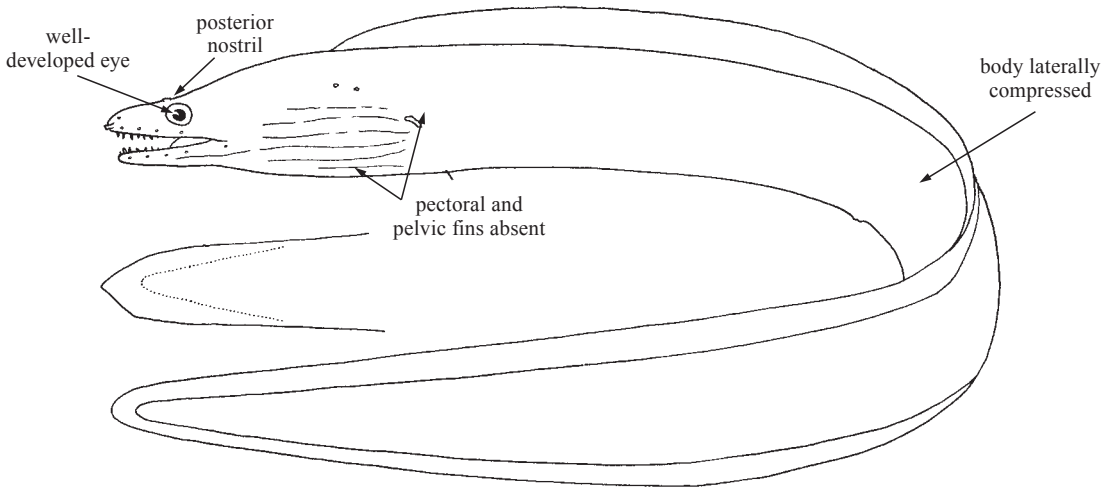


MURAENIDAE

Moray eels

by E.B. Böhlke (deceased), Academy of Natural Sciences, Pennsylvania, USA
 proofs checked by D.G. Smith, National Museum of Natural History, Washington, D.C., USA

Diagnostic characters: Body elongate, muscular, and laterally compressed. Dorsal profile of head above and behind eye often raised due to the development of strong head muscles. Eye well developed, above and near midgape. Snout short to elongate. Anterior nostril tubular, near tip of snout; **posterior nostril above or before eye, a simple pore or in a tube.** Mouth large, gape usually extending behind posterior margin of eye, lips without flanges. Teeth numerous and strong, with smooth or serrate margins, ranging from blunt rounded molars to long, slender, sharply pointed, and sometimes depressible canines; jaws short to elongate, usually about equal. On upper jaw, intermaxillary (anterior) teeth in 1 or 2 peripheral rows and usually a median row of 1 to 3 teeth which are the longest in the mouth (sometimes missing in large specimens); maxillary (lateral) teeth in 1 or 2 rows on side of jaws; vomerine teeth (on roof of mouth) usually short and small, in 1 or 2 rows or in a patch, or sometimes absent. Dentary (lower jaw) teeth in 1 or more rows; in many species in the subfamily Muraeninae the first 4 teeth are larger, sometimes forming a short inner row. **Gill opening a small round hole or slit at midside.** Dorsal and anal fins variously developed, from long fins with dorsal fin usually 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 a few (usually 1 or 2) above and before gill opening;** head pores usually 3 near tip of snout, 4 along upper jaw, 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.



dentition

Habitat, biology, and fisheries: Morays are small to very large eels (to 375 cm total length) inhabiting tropical and subtropical waters. Many are found in shallow-water rock and coral reef habitats, where they find protection in holes and crevices; others live above sand or mud bottoms at depths to 500 m; a few species are found in brackish-water tidal creeks, mangrove areas, or in rivers. They are scavengers and predators, feeding on fish or crustaceans. If provoked or handled carelessly, their powerful jaws and strong teeth will cause deep lacerations, but usually they do not leave their hiding places to attack swimmers. Morays are caught by spear, hook-and-line or longlines, traps, trawls, and occasionally by dredge. They are not sought commercially, but may be incidentally caught and sold in fish markets. They are eaten in many parts of the world, some locally in the area; consumption of morays 4 kg or larger may result in ciguatera poisoning, which is sometimes fatal.

Remarks: The species of morays in the Atlantic are well known, but the generic nomenclature for the family is not established. The generic classification used by Böhlke et al. (1989) is followed for these accounts.

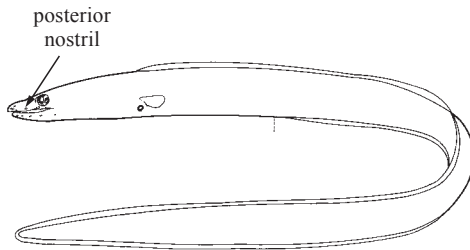
Similar families occurring in the area

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

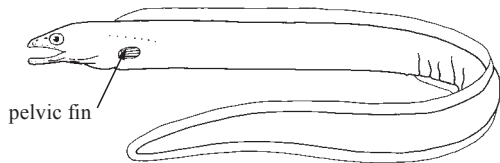
Chlopsidae (formerly Xenocongridae): superficially similar to morays, but posterior nostril below mideye level or on lip rather than above eye; pectoral fins sometimes present; vomerine tooth series widely divergent (except *Catesbya*) rather than along midline.

Myrocongridae: similar in appearance to morays but pectoral fins present.

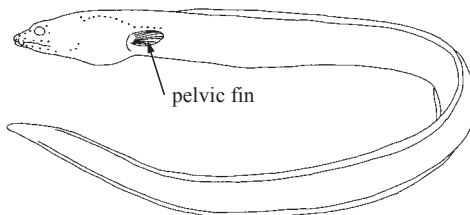
Ophichthidae: somewhat similar in appearance, but posterior nostril always low on side of head, on lip, or opening inside mouth; pectoral fins usually present, caudal fin absent in most.



Chlopsidae



Myrocongridae



Ophichthidae

Identification note: Morays are notoriously difficult to identify because of great variability. Characters used include fin positions, tail length (position of anus), jaws and dentition, nostril condition, and colour pattern. Both colour pattern and dentition may change greatly with growth, and the presence of the fins is sometimes difficult to determine (the beginning of the dorsal fin is sometimes not discernible externally; the anal fin condition can best be determined by its presence or absence just behind the anus). Vertebral counts, while not useful for field identification, are consistent for a species and are important characters for defining species; the mean counts for predorsal-preanal-total vertebrae (**MVF**) are included in the key for reference.

Key to the species of Muraenidae occurring in the area

- 1a. Dorsal fin beginning above and near to well-before anus (usually on head), anal fin beginning just behind anus (subfamily Muraeninae) (Fig. 1) → 2
- 1b. Dorsal and anal fins restricted to and visible only near tail tip (subfamily Uropterygiinae) (Fig. 2) → 20

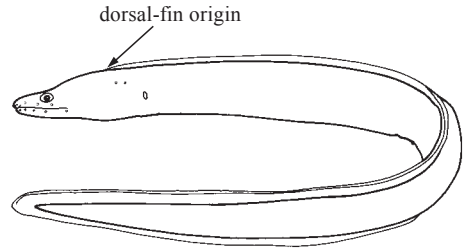


Fig. 1 Muraeninae

- 2a. Dorsal fin beginning above and shortly behind anus; uniform brown with pale head and tail tip (red-orange in life); MVF 73-53-130 *Monopenchelys acuta*

- 2b. Dorsal fin beginning above and before anus; colour variable → 3

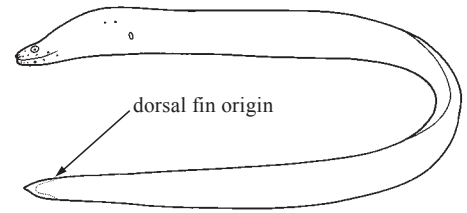


Fig. 2 Uropterygiinae

- 3a. Some teeth rounded or molariform (at least the vomerine teeth), no canine teeth; dark all over with pale chain-like pattern; MVF 6-58-117. *Echidna catenata*

- 3b. No molariform teeth, some canine teeth present; colour variable → 4

- 4a. Jaws elongate and arched, meeting only at their tips; elongate fangs exposed when mouth is closed (Fig. 3) → 5

- 4b. Jaws not arched, closing completely or with slight gap; teeth not exposed when mouth is closed (Fig. 4) → 7



Fig. 3 lateral view of head

- 5a. Posterior nostril large and elongate, before eye; less than 6 inner dentary teeth; brown with pale mottling; MVF 8-60-144. *Enchelycore nigricans*

- 5b. Posterior nostril a rounded pore above anterior margin of eye; more than 6 inner dentary teeth; colour variable → 6

- 6a. Colour uniform brown, jaw pores set in white spots; 6 to 13 inner dentary teeth; MVF 9-48-135 *Enchelycore carychroa*

- 6b. Colour pattern of pale blotches on brown body; jaw pores not noticeably white; 10 to 14 inner dentary teeth; MVF 7-56-154 *Enchelycore anatina*

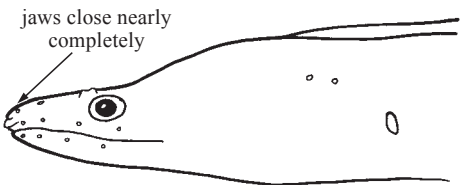


Fig. 4 lateral view of head

- 7a. Posterior nostril in tube; gill opening in black spot → 8
- 7b. Posterior nostril flush or nearly so with head profile; gill opening with body coloration → 9

- 8a. Head dark, body and fins with large dark spots; MVF 4-64-154. *Muraena robusta*

- 8b. Head brown, body and fins with large pale rosettes overlain with small dark spots; MVF 4-56-131 *Muraena retifera*

- 9a. Teeth numerous, no long canines; intermaxillary teeth 5 rows across, maxillary teeth in 2 rows; dark with small white spots (yellow in life) or pale with dark reticulations; MVF 5-49-120 *Gymnothorax miliaris*
- 9b. Teeth not numerous, some long canines; intermaxillary teeth 3 rows across, maxillary teeth in 1 row (few inner teeth in young); colour not as above → 10
- 10a. Snout and jaws elongate; teeth slender and smooth, some as very long canines. → 11
- 10b. Snout blunt, jaws short; teeth wedge-shaped and serrate, no long canines → 14
- 11a. Vomerine teeth in 2 rows; colour uniform dark brown (green in life); MVF 6-60-140 *Gymnothorax funebris*
- 11b. Vomerine teeth in 1 row; colour pattern of blotches, spots, or reticulations → 12
- 12a. Colour pattern of large pale polygons overlain with small dark spots on pale reticulated background; MVF 5-53-138 *Gymnothorax polygonius*
- 12b. Colour pattern of small dark spots or blotches on pale background → 13
- 13a. Contrasting pattern of overlapping small dark spots on pale background; MVF 6-54-138 *Gymnothorax moringa*
- 13b. Diffuse pattern of spots and blotches (purplish in life) on pale background; MVF 5-51-133 *Gymnothorax vicinus*
- 14a. Four pores along upper jaw. → 15
- 14b. Three pores along upper jaw → 16
- 15a. Overall colour pattern on head, body, and tail of pale dendritic marks on brown background; MVF 7-58-135 *Gymnothorax hubbsi*
- 15b. Colour pattern of dark reticulations on pale body and tail, head dusky; MVF 6-68-153 *Gymnothorax maderensis*
- 16a. Head and body spotted dorsally and ventrally; tail dark, with few large white spots → 17
- 16b. Head and body spotted dorsally, pale and unspotted ventrally; tail spotted or patterned, not noticeably dark → 18
- 17a. Dorsal fin with dark margin, with body coloration basally; MVF 6-63-164 *Gymnothorax kolpos*
- 17b. Dorsal fin with bold pattern of white saddle marks on black fin; MVF 6-66-168 *Gymnothorax conspersus*
- 18a. Dorsal and anal fins with body coloration and dark margins; MVF 6-49-142 *Gymnothorax nigromarginatus*
- 18b. Dorsal fin with black and white pattern, anal fin with or without pattern → 19
- 19a. Anal fin without pattern but with dark edge; body with pale polygonal spots separated by narrow reticulations; MVF 6-53-140 *Gymnothorax saxicola*
- 19b. Anal fin with alternating dark and pale areas; body with distinct well-separated pale spots; MVF 6-50-145 *Gymnothorax ocellatus*

- 20a.** Tail very short, anus at 2/3 total length; jaws elongate, the lower protruding; snout short, eye above anterior third of jaw; 13 to 16 broad dark bands on body and tail; MVF 122-123-150 *Channomuraena vittata*
- 20b.** Tail about 1/2 total length, anus near midbody; jaws not elongate; snout moderate, eye above midjaw; body variably uniform or patterned → 21

- 21a.** An extra pore adjacent to posterior nostril; MVF 97-102-107 (Fig. 5a) *Anarchias similis*
- 21b.** No pore adjacent to posterior nostril; MVF 106-110-121 (Fig. 5b). *Uropterygius macularius*

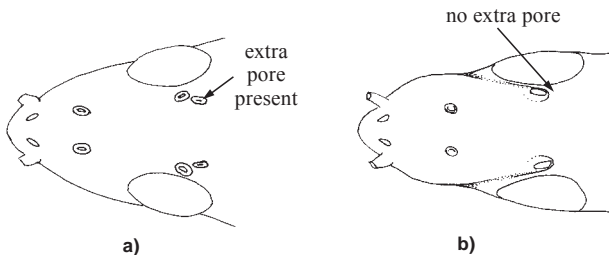


Fig. 5 dorsal view of head

List of species occurring in the area

The symbol  is given when species accounts are included.

-  *Anarchias similis* (Lea, 1913).
-  *Channomuraena vittata* (Richardson, 1845).
-  *Echidna catenata* (Bloch, 1795).
-  *Enchelycore anatina* (Lowe, 1838).
-  *Enchelycore carychroa* Böhlke and Böhlke, 1976.
-  *Enchelycore nigricans* (Bonnaterre, 1788).
-  *Gymnothorax conspersus* Poey, 1867.
-  *Gymnothorax funebris* Ranzani, 1839.
-  *Gymnothorax hubbsi* Böhlke and Böhlke, 1977.
-  *Gymnothorax kolpos* Böhlke and Böhlke, 1980.
-  *Gymnothorax maderensis* (Johnson, 1862).
-  *Gymnothorax miliaris* (Kaup, 1856).
-  *Gymnothorax moringa* (Cuvier, 1829).
-  *Gymnothorax nigromarginatus* (Girard, 1858).
-  *Gymnothorax ocellatus* Agassiz, 1831.
-  *Gymnothorax polygonius* Poey, 1876.
-  *Gymnothorax saxicola* Jordan and Davis, 1891.
-  *Gymnothorax vicinus* (Castelnau, 1855).
-  *Monopenchelys acuta* (Parr, 1930).
-  *Muraena retifera* Goode and Bean, 1882.
-  *Muraena robusta* Osorio, 1909.
-  *Uropterygius macularius* (Lesueur, 1825).

Reference

Böhlke, E.B., J.E. McCosker and J.E. Böhlke. 1989. Family Muraenidae. In Fishes of the western North Atlantic, edited by E.B. Böhlke. *Mem. Sears Found. Mar. Res.*, Memoir No. 1, 9(1): 655p.

***Channomuraena vittata* (Richardson, 1845)**

AMH

Frequent synonyms / misidentifications: None / None.

FAO names: En - Broadbanded moray; Fr - Murène anneau; Sp - Morena franjeada.

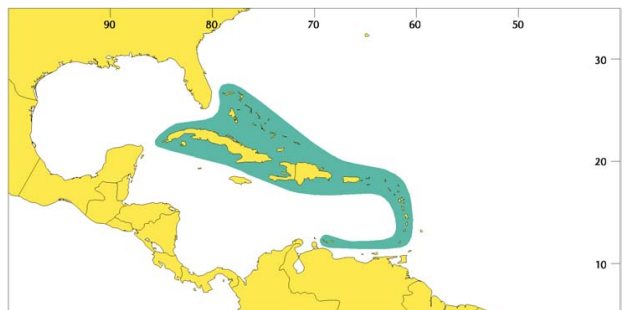


Diagnostic characters: A large, thick, muscular moray with tapering body and short tail; anus in posterior third of total length. Head large; eye small and near tip of snout; posterior nostril in short tube above anterior margin of eye. Snout short, tip of lower jaw projecting beyond upper; jaws very long and widely separated posteriorly. Teeth numerous, small, and pointed, all of similar size; intermaxillary teeth in a patch of 9 teeth across anteriorly, decreasing in number and continuous with vomerine row of triserial to biserial teeth; maxillary and dentary teeth in bands 3 to 6 rows across (6 in large specimens). Fins confined to posterior part of tail, low and inconspicuous. **Colour:** background uniform pale brown, with 13 to 16 broad dark bars encircling head and body behind eye, sometimes with pale borders; colour varying from tan or reddish brown with brown bars to dark greyish brown with dark olive bars.

Size: Maximum to 150 cm.

Habitat, biology, and fisheries: An uncommon bottom-dwelling species, found in rocky habitats at depths to 40 m. Uniquely snake-like in appearance and behaviour, described as expanding its head like a cobra when approached. Caught incidentally in insular trap and line fisheries; of no commercial importance.

Distribution: A circumtropical species, taken off islands in the tropical Atlantic and central and western Pacific. In the study area, from Bermuda, the Bahamas and the Caribbean islands. In the eastern central Atlantic from the Cape Verde Archipelago and Annobon in the Gulf of Guinea (Area 34), and from Ascension Island in the southeastern Atlantic (Area 47). In the Pacific, a few individuals taken off scattered islands of the central Pacific and off Taiwan Province of China.

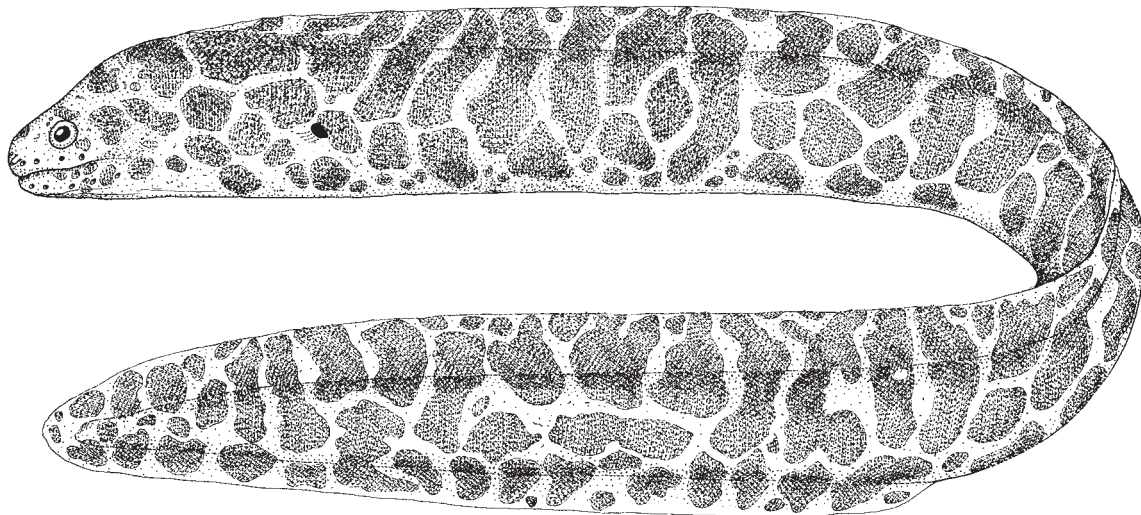


Echidna catenata (Bloch, 1795)

AMD

Frequent synonyms / misidentifications: None / None.

FAO names: En - Chain moray; Fr - Murène enchainée; Sp - Morena cadeneta.

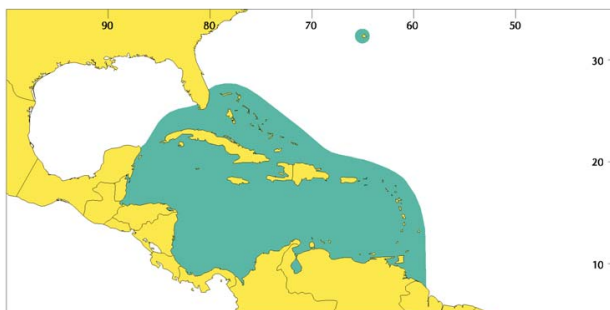


Diagnostic characters: **Body stout, tail rounded; anus shortly behind midbody.** Head short, profile steep. Eye above or shortly behind midjaw; **posterior nostril with raised, crenulate margin**, above anterior margin of eye. **Snout short and rounded; jaws short**, closing completely. **Teeth short, some molariform**; intermaxillary teeth short and stout, 3 rows across, 1 to 3 short median teeth; maxillary teeth in 2 short rows, **vomerine teeth biserial and molariform**; dentary teeth in 1 or 2 rows. Dorsal fin beginning on head midway between corner of mouth and gill opening. **Colour:** most specimens **dark with overall chain-like pattern** of pale narrow reticulations (yellowish in life); very large specimens may have the colour reversed.

Size: Maximum to 70 cm.

Habitat, biology, and fisheries: One of the most common morays found on coral reefs, in rocks and sand; frequently seen in shallow waters where it feeds on crabs. Large specimens may be consumed locally. Occasionally taken by trawl or line; of no commercial importance, but a desired aquarium fish.

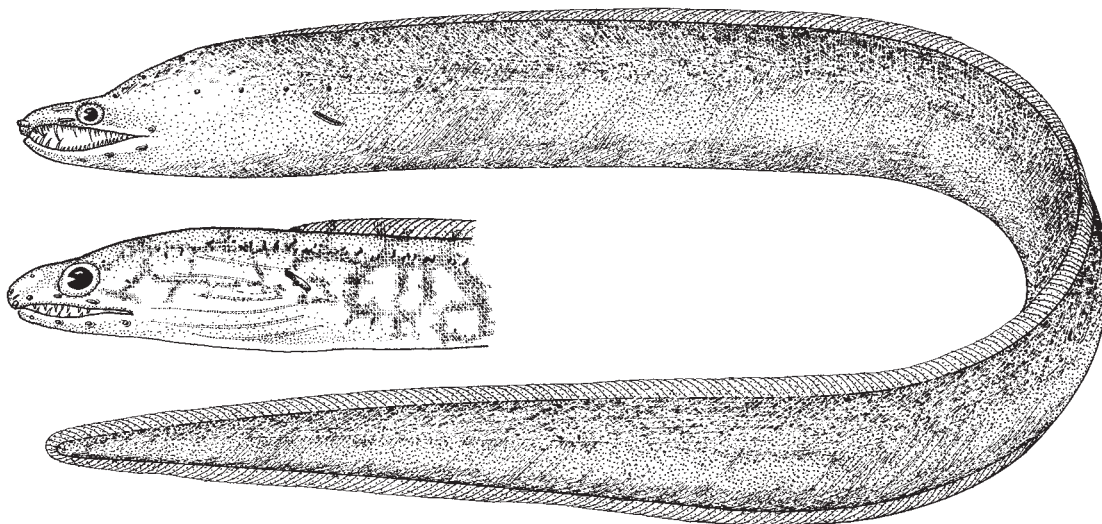
Distribution: An insular species, taken off Bermuda, the Bahamas, the Florida Keys, throughout the islands of the Caribbean, off coastal Mexico, and central and northern South America. Also taken off Brazil (Area 41) and off Ascension Island (Area 47), but not in the eastern central Atlantic.



Enchelycore nigricans (Bonnaterre, 1788)

Frequent synonyms / misidentifications: None / None.

FAO names: **En** - Viper moray; **Fr** - Murène noire; **Sp** - Morena negra.

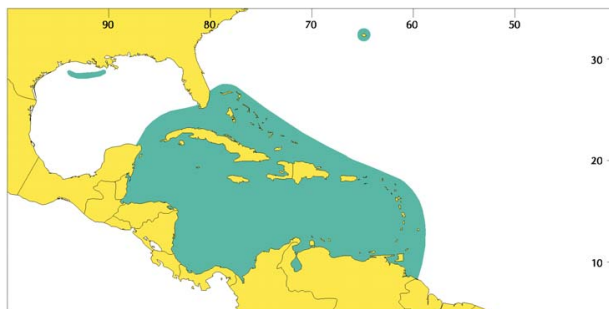


Diagnostic characters: **Body elongate, strong, and muscular**, moderately compressed; **anus at midbody or shortly before**. Head elongate, somewhat elevated. Eye above or just behind midjaw; **posterior nostril an elongate pore** before eye in adults. **Snout long, jaws long and arched**. Teeth numerous, some **long fang-like canines which are exposed when mouth is closed**; intermaxillary teeth in 5 irregular rows across, 1 to 3 long fang-like median teeth; maxillary teeth biserial; vomerine teeth short and uniserial; dentary teeth biserial anteriorly, uniserial posteriorly. Dorsal fin beginning above or above and slightly before gill opening. **Colour:** young pale with contrasting dark reticulated pattern (inset), adults **brown and faintly mottled with darker brown or sometimes uniformly brown**.

Size: Maximum to 100 cm.

Habitat, biology, and fisheries: A common inhabitant of coral reefs and rocky shorelines to depths of 24 m. Caught incidentally in trap and line fisheries. Reported to be consumed fresh or salted in some localities (ciguatera poisoning should be considered); not of commercial importance.

Distribution: A wide-ranging insular species found throughout the tropical and subtropical Atlantic, from Bermuda, the Bahamas, the Florida Keys, the northwestern Gulf of Mexico, throughout the Caribbean Islands, and off coastal central and northern South America. Also off islands of the eastern central and southeastern Atlantic (Areas 34, 47), and off Brazil (Area 41).

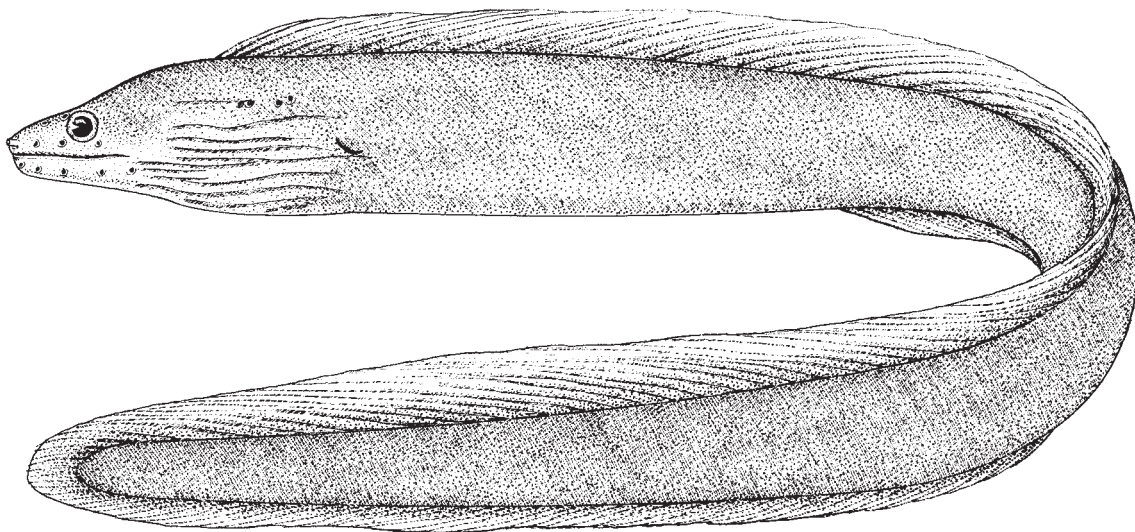


Gymnothorax funebris Ranzani, 1839

AMI

Frequent synonyms / misidentifications: *Lycodontis funebris* (Ranzani, 1839) / None.

FAO names: En - Green moray; Fr - Murène verte; Sp - Morena congrio.

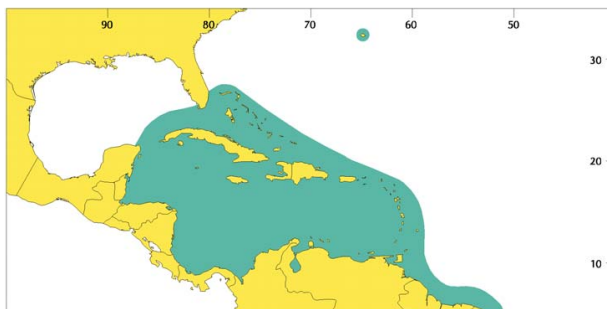


Diagnostic characters: Body strong and muscular; anus shortly before midbody. Head elongate, elevated posteriorly. Eye above midjaw; **posterior nostril a simple pore or with short rim**, above anterior margin of eye. Snout moderate; jaws moderate, closing completely. **Teeth smooth, large, and stout**; intermaxillary teeth 3 rows across, 1 to 3 long median fangs; maxillary teeth uniserial, few inner teeth in small specimens; **vomerine teeth biserial**; dentary teeth uniserial, few anterior inner teeth. Dorsal fin beginning on head, a little closer to gill opening than to mouth angle. **Colour:** uniformly dark brown or greenish brown; green in life.

Size: Maximum 190 cm.

Habitat, biology, and fisheries: Common in tidepools, rocks, and coral reefs to depths of 33 m; also found in brackish-water tidal creeks and mangrove areas. Large individuals reported to be aggressive without provocation. Used for food in some areas; large specimens have been reported to be ciguatoxic. Occasionally caught in trawls and by line; of no commercial importance.

Distribution: Widespread throughout the Atlantic; from Bermuda, the Bahamas, the Florida Keys, throughout the Caribbean Islands, off coastal Mexico, and central and northern South America. In the eastern central Atlantic from Cape Verde Archipelago (Area 34); in southwestern Atlantic off Brazil (Area 41); and from the southeastern Atlantic islands of Ascension and St. Helena (Area 47).



***Gymnothorax kolpos* Böhlke and Böhlke, 1980**

Frequent synonyms / misidentifications: None / *Gymnothorax ocellatus* Agassiz, 1831.

FAO names: En - Blacktail moray.



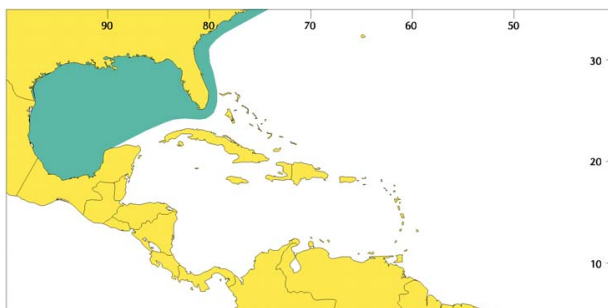
Diagnostic characters: Body strong and muscular with long tapering tail; anus shortly before midbody. Head large with sloping profile. Eye above midjaw; posterior nostril with rim, above anterior margin of eye. Snout and jaws moderate, lower jaw prominent; only 3 pores along upper jaw. Teeth few, strong, triangular, and shark-like, with serrate margins; both upper and lower jaws with a single continuous row of teeth; no median intermaxillary teeth; vomerine teeth few and inconspicuous or hidden. Dorsal fin beginning on head between corner of mouth and gill opening. **Colour:** head and body pale to medium greenish brown, tail progressively darker; numerous distinct small pale spots on head and body, becoming larger and fewer to only 3 or 4 large white spots on posterior third of tail. Dorsal fin with body pattern anteriorly, black posteriorly; anal fin dark, without spots.

Size: Maximum to about 100 cm.

Habitat, biology, and fisheries: A deep-water inhabitant, infrequently taken, most often over mud or sand bottoms at 75 to 100 m. Most individuals are large, mature adults; the habitat of young is not known. Taken by trawl, trap, or hook-and-line. May be consumed locally but the possibility of ciguatera poisoning should be considered. Of no commercial importance.

Distribution: Only known from deep waters of the Gulf of Mexico and off the coast of North Carolina and Georgia.

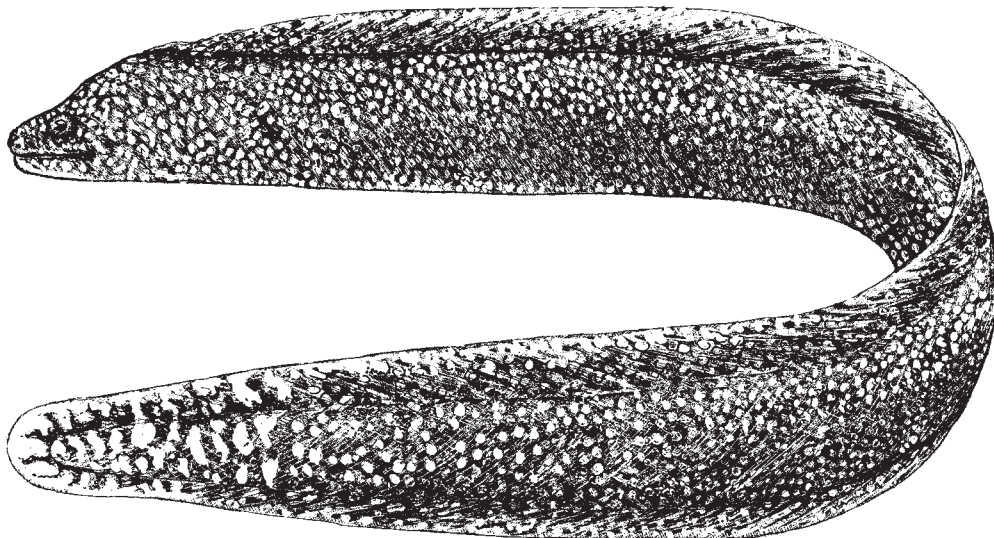
Note: There are 5 spotted species in Area 31 which are similar in appearance and may be confused: *Gymnothorax conspersus*, *G. kolpos*, *G. nigromarginatus*, *G. ocellatus*, and *G. saxicola*; they are separated by subtle colour differences and vertebral counts, and are separated geographically.



***Gymnothorax miliaris* (Kaup, 1856)**

Frequent synonyms / misidentifications: *Lycodontis miliaris* (Kaup, 1856) / *Muraena flavopicta* (Kaup, 1856); *Muraena miliaris* (Kaup, 1856).

FAO names: **En** - Goldentail moray; **Fr** - Murène dorée; **Sp** - Morena dorada.



Diagnostic characters: **Body stout, tail not tapering but rounded at tip; anus shortly before midbody.** Head moderate. Eye above jaw, closer to rictus than to snout tip; **posterior nostril with raised rim**, above anterior margin of eye. Snout short; jaws short, closing completely. **Teeth smooth, short, and stout**, no very long canines; **intermaxillary teeth numerous, 5 rows across**, 2 to 5 median teeth; **maxillary teeth biserial**; vomerine teeth uniserial. Dorsal fin beginning on head between corner of mouth and gill opening. **Colour:** highly variable colour pattern; common pattern for young and most adults overall **dark background with scattered small pale spots or dots**; some large individuals with overall **pale background with dark reticulations**, or with **pale background with very few, highly irregular, dark spots** and blotches; the pattern similar on all parts of eel; **tail tip always pale**. Pale areas cream to golden yellow in life, dark areas brown to purplish.

Size: Maximum 55 cm.

Habitat, biology, and fisheries: A common inhabitant of coral reefs and rocky shorelines, but seldom seen; taken at depths to 50 m. Large specimens occasionally caught by trawl, trap, and hook-and-line. Possibly consumed locally; of no commercial importance.

Distribution: An insular species, widespread in the Atlantic; from Bermuda, the Bahamas, the Florida Keys, throughout the islands of the Caribbean, off coastal Mexico, and central and northern South America. Also, taken off islands of the eastern central and southeastern Atlantic (Areas 34, 47), and off Brazil (Area 41).

