

## REVIEW OF THE MORAY EELS (ANGUILLIFORMES: MURAENIDAE) OF THE RED SEA

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### ABSTRACT

We report on 32 species of moray eels (Muraenidae) from the Red Sea, of which the following 11 are new records: *Enchelycore bayeri*, *Gymnothorax angusticauda*, *G. herrei*, *G. moluccensis*, *G. pindae*, *G. punctatofasciatus*, *G. reticularis*, *Muraena helena*, *Uropterygius makatei*, *U. micropterus*, and *U. nagoensis*. *Uropterygius genie*, described as a new species from two specimens, is distinctive in its gill opening high on side of body, forward position of its eye (snout length 7.9–8.2 in head), five rows of teeth in jaws, the inner rows and vomerine teeth very long, 121 vertebrae, and uniform brown color. *Muraena corallinus* Klunzinger is placed in the synonymy of *Gymnothorax buroensis* (Bleeker), and *G. cinerascens* Rüppell in the synonymy of *G. hepaticus* (Rüppell). Previous records of *G. meleagris* Shaw from the Red Sea are misidentifications of *G. buroensis* or *G. undulatus* (Lacepède). The Red Sea records of *G. afer* Bloch and *G. monochrous* (Bleeker) are probable misidentifications of *G. hepaticus*.

Rüppell (1830) included seven eels in the genus *Muraena* in his atlas of Red Sea fishes. Six of these are morays: *M. ophis* Rüppell [= *Echidna nebulosa* (Ahl)], *M. reticulata* (non Bloch) [= *Gymnothorax rueppelliae* (McClelland)], *M. geometrica* Rüppell [= *Siderea grisea* (Lacepède)], *M. flavimarginata* Rüppell [= *G. flavimarginatus*], *M. hepatica* Rüppell [= *Gymnothorax hepaticus*], and *M. cinerascens* Rüppell [here placed in the synonymy of *G. hepaticus* Rüppell]. Rüppell (1838) described two more morays, *Uropterygius concolor* and *M. bilineatus* [= *S. grisea* (Lacepède)].

Klunzinger (1871) recognized 13 species of muraenids in the Red Sea. In addition to the seven morays of Rüppell (the names of two of which he corrected), he recorded *M. undulata* (Lacepède) [= *Gymnothorax undulatus*], *M. javanica* (Bleeker) [= *G. javanicus*], *M. polyzona* Richardson [= *Echidna polyzona*], *M. zebra* Shaw [= *Gymnomuraena zebra*], and he described as new *M. hemprichii* [= *G. hepaticus*] and *M. corallina* [= *G. buroensis* (Bleeker)].

Pellegrin (1912) recorded *Muraena afra* (Bloch) from Massaua, Red Sea. *Gymnothorax afer* Bloch was described from Guinea; therefore a record from the Red Sea is highly unlikely. Böhlke et al. (1989) regarded *G. afer* as an eastern Atlantic species. We suspect Pellegrin's record is a misidentification of *G. hepaticus*.

Tortonese (1937) recorded *Gymnothorax pictus* (Ahl) [= *Siderea picta*] from Massaua.

Ben-Tuvia and Steinitz (1952) listed five morays among a collection of fishes from Eilat, Gulf of Aqaba: *Lycodontis* cf. *geometrica*, *L.* cf. *undulata*, *L.* cf. *meleagris* (Shaw), *L.* cf. *nudivomer* (Playfair and Günther), and *Echidna nebulosa*. Marshall (1952) recorded *Uropterygius polyspilus* (Regan) and *G. meleagris* from the Gulf of Aqaba. Fowler and Steinitz (1956) correctly concluded that the *L.* cf. *nudivomer* from Eilat is *Gymnothorax nudivomer*, reidentified *L.* cf. *undulatus* as *G. punctatus* Bloch and Schneider, and decided that *L.* cf. *meleagris* is *G. meleagris*. As indicated below, Marshall's specimens proved to be *G. buroensis*, and the Fowler-Steinitz specimen is *G. undulatus*. Tortonese (1955) recorded *G. meleagris* from a 124-mm specimen from the Dahlak Archipelago; from his description, this specimen also seems to be *G. buroensis*.

Schultz in Schultz and collaborators (1953) reviewed the moray eels of the

Marshall Islands and Mariana Islands. Twelve of the species he treated also occur in the Red Sea. He confused the species *Gymnothorax petelli* (Bleeker) and *G. rueppelliae*, and he misidentified *G. pindae* Smith as *G. moluccensis* (Bleeker).

Fowler (1956) listed 18 morays from the Red Sea; however, his records of *G. nubilus* (Richardson), *G. pseudothyroideus* (Bleeker), and *G. richardsonii* (Bleeker) are without any documentation by specimens or Red Sea references. His reidentifications of *Muraena reticulata* Rüppell as *G. favagineus* (Bloch and Schneider) and *Muraena tigrina* Rüppell as *Uropterygius tigrinus* (Lesson) [= *Scuticaria tigrina*] are erroneous. Rüppell's *M. tigrina* is the ophichthid *Myrichthys maculosus* (Cuvier), as noted by Klunzinger (1871). Fowler also erred in placing *Muraena flavimarginatus* Rüppell in the synonymy of *Gymnothorax geometricus* (Rüppell) [= *Siderea grisea*].

Smith (1962) reviewed the moray eels of the Red Sea and western Indian Ocean. He recognized both *Gymnothorax rueppelliae* and *G. petelli*, but like Schultz in Schultz and collaborators, he had their names switched. However, he questioned the validity of *petelli*, and Dor (1984) placed it in the synonymy of *rueppelliae*. Randall (1973) examined the lectotype of *G. rueppelliae* (McClelland) and found it to be the species Schultz and Smith had misidentified as *G. petelli*. McCosker and Randall (1982) described the *petelli* of Schultz and Smith as *G. enigmaticus*, a species not known from the Red Sea. In his account of *Gymnothorax buroensis* Bleeker, Smith (1962) wrote, "*Muraena corallina* Klunzinger 1871, 614 (Red Sea) possibly falls here." From Klunzinger's description of *M. corallina* and knowledge of the abundance of this moray on shallow reefs in the northern Red Sea, we place *M. corallina* in the synonymy of *G. buroensis*.

In his checklist of Red Sea fishes, Dor (1984) recorded 19 species of muraenids from the Red Sea (two of these in his Addenda). However, as noted above, three of the species on his list, *Lycodontis afer*, *L. corallinus*, and *L. meleagris* are invalid records, as is a fourth, *L. monochrous* (see account of *Gymnothorax hepaticus* below). He also included three of the postlarval stages he believed to be muraenids which were described in the genus *Leptocephalus* by D'Ancona (1928). Following Day (1878), Dor mistakenly listed *Muraena cinerascens* Rüppell in the synonymy of *L. undulatus* (Lacepède).

Ajiad (1987) recorded *Thyrsoidea macrura* (Bleeker) [= *Strophidon sathete* (Hamilton)] from the Gulf of Aqaba.

McCosker et al. (1993) briefly mentioned the occurrence of *Gymnothorax johnsoni* (Smith) in the Red Sea. The documentation of this new record is presented here.

Randall (1994) reported *Gymnothorax favagineus* Bloch and Schneider from the southern Red Sea based on an underwater photograph.

John E. McCosker and David G. Smith are currently studying two more undescribed Red Sea morays, one a species of *Uropterygius* and the other a possible new genus as well.

## MATERIALS AND METHODS

Recent additions to the collections of morays of the Bernice P. Bishop Museum, Honolulu (BPBM) and The Hebrew University, Jerusalem (HUJ) are the re-examination of older muraenid material in these collections has revealed one new species and 10 new records which are documented herein. Specimens of Red Sea morays of the genera *Gymnothorax* and *Siderea*, including types, were examined by the senior author in the Senckenberg Museum, Frankfurt (SMF).

David G. Smith examined Red Sea muraenids in the collection of the U.S. National Museum of Natural History, Washington D.C. (USNM) for us and provided a listing of species by museum number. Most of these specimens were collected by Victor G. Springer. We have recorded the USNM numbers

in the Remarks of the species accounts below with the number of specimens in parentheses (if more than one).

Loans of Red Sea morays for which identifications in the literature were doubtful were made by the National Museum of Natural History, London (BMNH) and Tel-Aviv University (TAU). A paratype was obtained from the Museum für Naturkunde, Humboldt Universität, Berlin (ZMB).

Diagnoses given for well known muraenids are drawn in part from previous accounts of the species (in particular Randall, 1983; Castle and McCosker in Smith and Heemstra, 1986; Hatooka in Masuda et al., 1988; and Randall et al., 1990). Additional vertebral counts to those published by Böhlke (1982) have been provided by her. Only Red Sea specimens are listed in Material Examined. Diagnoses of the new records are based solely on Red Sea specimens and given in greater detail. When available, underwater photographs or tank photographs of freshly caught morays from the Red Sea are presented. All but one of the photographs were taken by the senior author. Species accounts are presented alphabetically by genus and species.

Lengths given for morays are total length (recorded simply as length). The length could only be approximately determined for many of the eels preserved in a convoluted form; for some that could not be straightened, a string was laid along the median line of the back and placed straight on a meter stick. Body depth is the maximum depth without the fins. Head length (given as head) is measured from the front of the snout to the anterior edge of the gill opening. Orbit diameter is the greatest fleshy diameter, and interorbital width the least fleshy width. Snout length (given as snout) is measured from the front of the snout to the fleshy edge of the orbit. Predorsal length is taken from the origin of the dorsal fin to the front of the snout. Gape length (gape) is from the front of the snout to the bony corner of the mouth. Proportional measurements are rounded to the nearest 0.05.

#### SPECIES ACCOUNTS

##### *Echidna nebulosa* (Ahl)

*Muraena nebulosa* Ahl, 1789: 7, pl. 1, right fig. (type locality, eastern India).

*Muraena ophis* Forsskål, 1775: xiv (nomen nudum).

*Muraena ophis* Rüppell, 1830: 116, pl. 29, fig. 2 (type locality, Red Sea).

**Diagnosis.**—Body depth 14–20 in length; head 8.5–9.5 in length; snout to anus 1.9–2.1 in length; jaws with one or two rows of small, compressed, nodular teeth; vomerine teeth nodular, in two rows; vertebrae 121–124. White with numerous small black spots or irregular lines and two or three longitudinal rows of large dendritic black blotches containing small yellow spots.

**Remarks.**—Occurs throughout the Indo-Pacific region; typically found in shallow water on reef flats or rocky shores. Tortonese (1966) and Marshall (1952) recorded the species from the Gulf of Aqaba. Reported to feed mainly on crabs. This species is regarded as a protogynous hermaphrodite (Fishelson, 1992). Attains 70 cm. The following lots of *Echidna nebulosa* from the Red Sea are in the collection of the U.S. National Museum of Natural History: USNM 166911 (2), 312130.

**Material Examined.**—HUI 5239, 547 mm, Eilat; HUI 5241, 536 mm, Eilat; HUI 15020, 2: 410–476 mm, El Arkana, Gulf of Aqaba; SMF 19, 547 mm, holotype of *Muraena ophis* Rüppell.

##### *Echidna polyzona* (Richardson)

###### Figure 1

*Muraena polyzona* Richardson, 1845: 112, pl. 55, figs. 11–14 (no locality).

*Muraena polyzona*: Klunzinger, 1871: 617 (Quseir, Egypt).

**Diagnosis.**—Body depth 12–16 in length; head 6.5–7.5 in length; snout to anus 2.0–2.15 in length; teeth in jaws in two rows, bluntly conical in young, nodular in adults; vomerine teeth low and nodular, in an elliptical patch; vertebrae 119–126. Young with 25–30 dark brown bars separated by narrower whitish interspaces; dark brown spot at corner of mouth; dark bars progressively more obscure with growth, the large adults mottled brown overall.

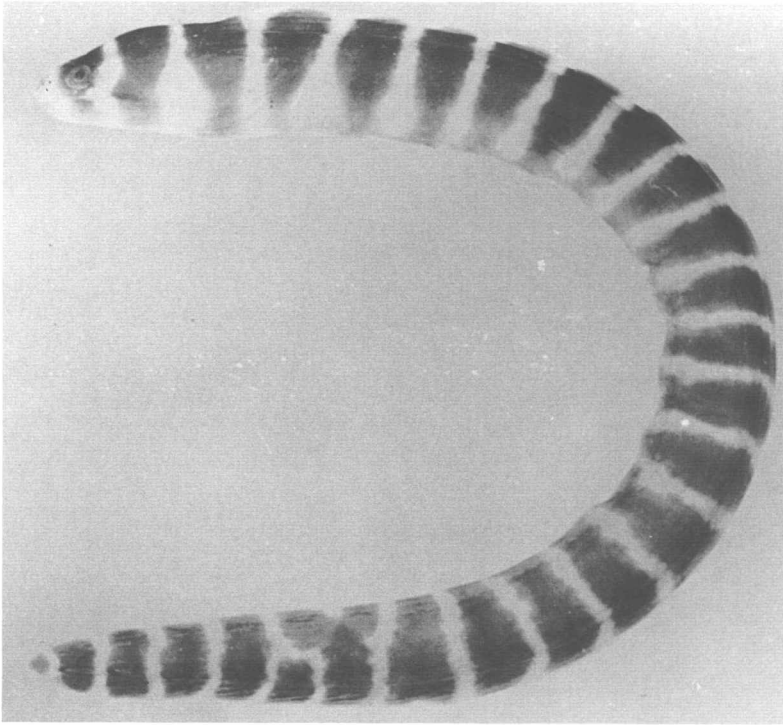


Figure 1. *Echidna polyzona*, BPBM 35748, 173 mm, Eilat, Gulf of Aqaba.

*Remarks.*—Wide-ranging in the Indo-Pacific; generally found in shallow water. Sometimes misidentified as *Gymnothorax rueppelliae* because of the similarity of the dark-banded color pattern; however, the dark bars are wider on *Echidna polyzona*; also one glance at the dentition will provide positive separation. Reaches 60 cm. The following lots of *Echidna polyzona* from the Red Sea are in the collection of the U.S. National Museum of Natural History: USNM 321158, 312209 (2).

*Material Examined.*—BPBM 35748, 173 mm, Eilat; HUI 5243, 435 mm, Eilat; HUI 15093, 3: 110–128 mm, Nabek, Gulf of Aqaba.

### *Enchelycore bayeri* (Schultz)

#### Figure 2

*Gymnothorax bayeri* Schultz in Schultz and collaborators, 1953: 124, figs. 23 f, 26 (type locality, Rongelap Atoll, Marshall Islands).

*Diagnosis.*—Body depth 18–26 in length; snout to anus 2.35–2.5 in length; predorsal length 7.0–7.8 in length; head length 6.9–7.6 in length; snout length 4.4–4.65 in head; orbit diameter 11.1–16 in head; interorbital width 9.9–11.6 in head; gape 2.3–2.5 in head, the jaws curved, meeting only at tips, the maximum gap between closed jaws about three-fourths orbit diameter; side of jaws with long, slender, compressed canines separated by two to six close-set, compressed triangular teeth, mostly less than one-third length of canines; three median intermaxillary canines longest; at inner series of three or four canines along middle part of upper jaw; vomerine teeth short, conical, in two rows, narrowing to a single

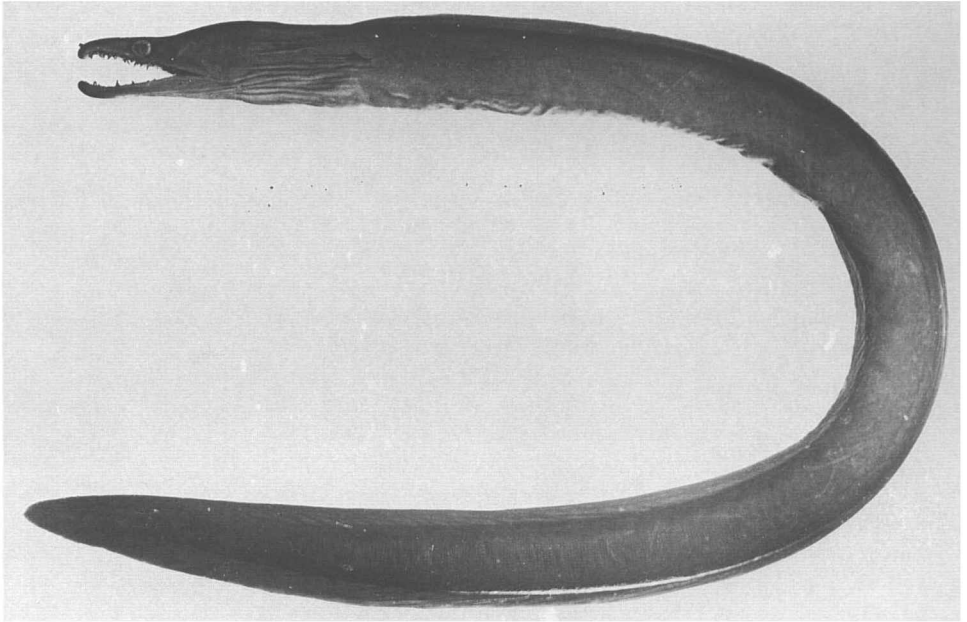


Figure 2. *Enchelycore bayeri*, BPBM 30642, 344 mm, Jeddah, Saudi Arabia.

row posteriorly; posterior nostril elliptical, about a nostril diameter in front of eye; vertebrae 150 (one count; two specimens have the tip of the tail missing; Böhlke, 1982 gave the vertebral count of the holotype as 148). Uniform dark brown, the fins with a narrow white (yellow-green in life) margin except anteriorly; pores along side of jaws and dorsally on snout narrowly dark-edged.

*Remarks.*—*Enchelycore bayeri* was described from specimens in the Marshall Islands and American Samoa. It has since been reported from the Society Islands (Randall, 1973); Christmas Island, Indian Ocean (Allen and Steene, 1979); Great Barrier Reef (Randall et al., 1990); Ryukyu Islands (Hatooka et al., 1990); and Maldive Islands (Randall and Anderson, 1993). The Bishop Museum has 14 lots from the following localities: Society Islands, Marquesas, Cook Islands, American Samoa, Caroline Islands, Mariana Islands, Taiwan, Ryukyu Islands, Papua New Guinea, Indonesia, and the Maldives, collected from the depth range of 2–38 m. Largest specimen, 607 mm, from Guam. This species must be secretive, for we have never seen it while diving, either by day or night. Five Red Sea specimens of *E. bayeri* (USNM 312200) are in the collection of the U.S. National Museum of Natural History.

*Material Examined.*—BPBM 30642, 2: 238–344 mm, Red Sea, Saudi Arabia, off Jeddah, 27 m; HJ 5845, 525 mm, Ras Muhammad, Sinai Peninsula; HJ 15051, 550 mm, Smithsonian Bay, Gulf of Aqaba.

### *Gymnomuraena zebra* (Shaw)

*Gymnothorax zebra* Shaw and Nodder, 1797: pl. 322 (type locality, ?).

*Muraena zebra*: Klunzinger, 1871: 620 (Quseir, Egypt).

*Diagnosis.*—Body depth 16–20 in length; head length 9–10 in length; snout to anus 1.45–1.55 in length; dorsal and anal fins low and difficult to discern; nu-

merous molariform teeth (many with an oblique ridge-like cusp), those in upper jaw in two rows, those in lower jaw in three rows (teeth of outer row small); intermaxillary teeth large, molariform, in three rows, not separated by a gap from teeth at side of upper jaw; vomerine teeth molariform, in a large elliptical patch of five or six irregular rows, those in median rows large; vertebrae 129–137. Dark brown to dark orangish brown with numerous, narrow, pale yellowish bars.

*Remarks.*—Occurs throughout the Indo-Pacific and the tropical eastern Pacific. First reported from the Red Sea by Klunzinger (1871), later by Fowler (1945) from Sudan, and Clark et al. (1966) from the Dahlak Archipelago. Said to attain a length of 150 cm, but rarely exceeds 100 cm. Limited data suggest that it feeds mainly on crabs. Sometimes classified in the genus *Echidna* Forster, but now regarded as the single species of *Gymnomuraena* Lacepède. According to Fishelson (1992), this species may be a protogynous hermaphrodite. Two Red Sea specimens of *G. zebra*, USNM 312170, are in the collection of the U.S. National Museum of Natural History.

*Material Examined.*—HUJ 15143, 495 mm, Ras Muhammad, Sinai Peninsula; HUJ 15167, 584 mm, Entedebir, Dahlak Archipelago.

*Gymnothorax angusticauda* (Weber and de Beaufort)  
Plate Ia

*Muraena* (*Priodonophis*) *angusticauda* Weber and de Beaufort, 1916: 389, fig. 190 (type locality, near Supiori, Schouten Islands, Indonesia).

*Diagnosis.*—Depth of body 19.5–20 in length; snout to anus 2.1–2.2 in length; head 7.7–8.3 in length; snout 6.25–6.35 in head; orbit diameter 9.3–9.45 in head; interorbital width 9.4–9.9 in head; gape 2.95–3.0 in head; teeth uniserial at side of jaws, compressed, finely serrate basally on posterior edge, 8–12 on maxilla and 13–19 on dentary, diminishing in size posteriorly; tubular anterior nostril short; posterior nostril above anterior edge of eye, with a slightly raised rim; five or six outer intermaxillary teeth, three in median row on one specimen, none on larger specimen; vomerine teeth uniserial; vertebrae 143–147. Body tan, abruptly white on lower fourth of trunk; head gray, shading posteriorly to tan, the pores white; nostrils white; margin of anal fin white.

*Remarks.*—This species was previously known only from a single 489-mm specimen from Indonesia. Our two Red Sea specimens were collected by the senior author at Nuweiba on the east coast of the Sinai Peninsula in less than 0.5 m. They were identified as *Gymnothorax angusticauda* by Eugenia B. Böhlke of the Academy of Natural Sciences of Philadelphia who compared them with the holotype (ZMA 102.162, on loan to her from the Zoological Museum, Amsterdam). Vertebral count of holotype, 148.

*Material Examined.*—BPBM 19844, 2: 458–503 mm, Nuweiba, Gulf of Aqaba.

*Gymnothorax buroënsis* (Bleeker)  
Plate Ic

*Muraena buroënsis* Bleeker, 1857: 79 (type locality, Kajeli, Indonesia).

*Gymnothorax buroënsis* Bleeker, 1865: 90, pl. 190, fig. 1.

*Muraena corallina* Klunzinger, 1871: 614 (type locality, Quseir, Egypt).

*Gymnothorax meleagris* (non Shaw) Marshall, 1952: 223 (Sanafir Island and Gulf of Aqaba).

*Diagnosis.*—Body depth 11–16 in length; head 6–7 in length; snout to anus 2.15–2.3 in length; intermaxillary canines in three rows, notably longer than

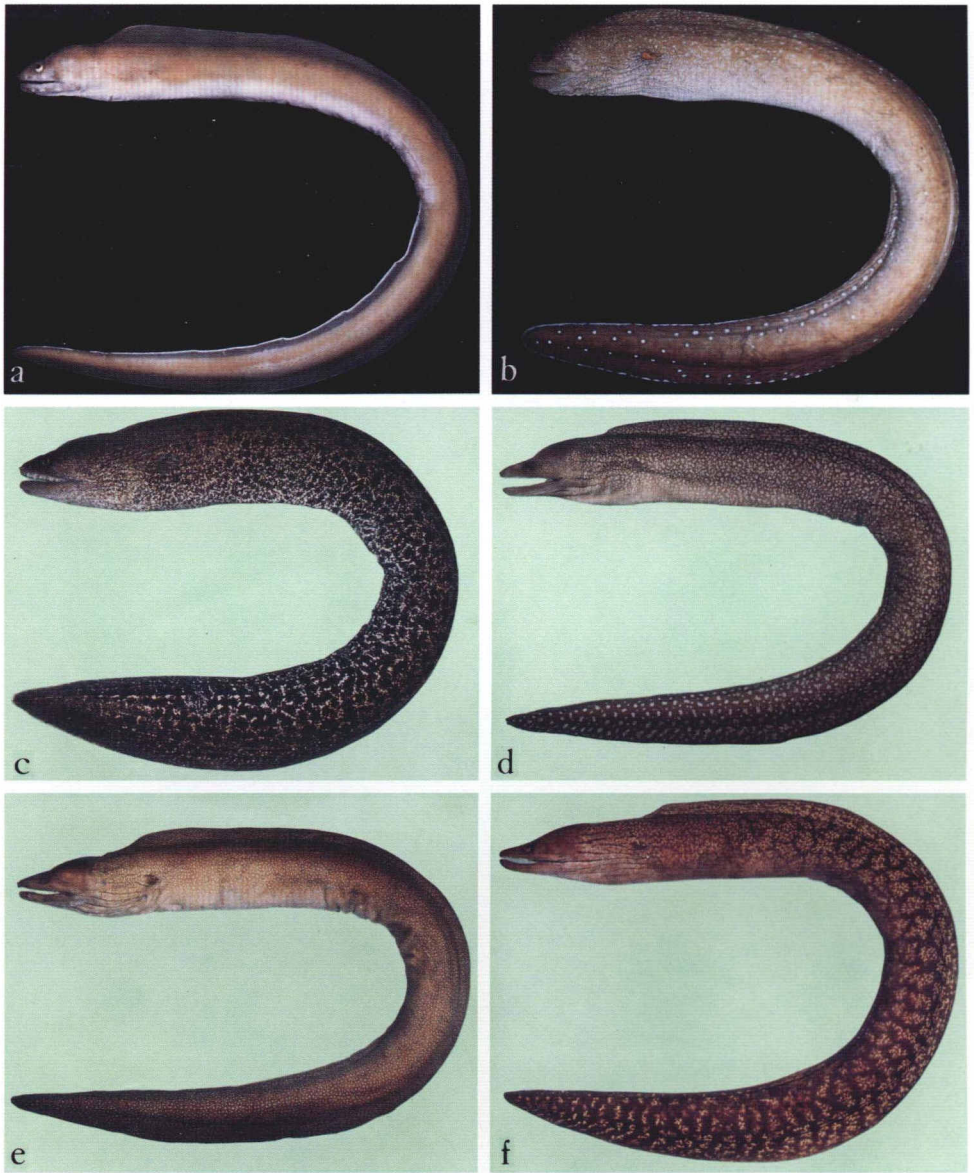


Plate I. a) *Gymnothorax angusticauda*, BPBM 19844, 458 mm, Nuweiba, Gulf of Aqaba; b) *Gymnothorax nudivomer*, BPBM 18286, 560 mm, Eilat, Gulf of Aqaba; c) *Gymnothorax buroensis*, BPBM 20849, 338 mm, Marsa el Mukabeila, Gulf of Aqaba; d) *Gymnothorax johnsoni*, BPBM 35744, 650 mm, Eilat, Gulf of Aqaba; e) *Gymnothorax punctatus*, BPBM 35745, 775 mm, North Beach, Eilat, Gulf of Aqaba; f) *Gymnothorax undulatus*, BPBM 31848, 475 mm, North Beach, Eilat, Gulf of Aqaba.

other teeth of upper jaw; teeth on side of upper jaw biserial, the inner row larger than outer; an inner row of large canines in lower jaw on anterior fourth of jaw; vomerine teeth uniserial; vertebrae 106–115. Light brown anteriorly, finely mottled with dark brown, with four to six longitudinal rows of small black spots on body which become progressively larger posteriorly, until on posterior third

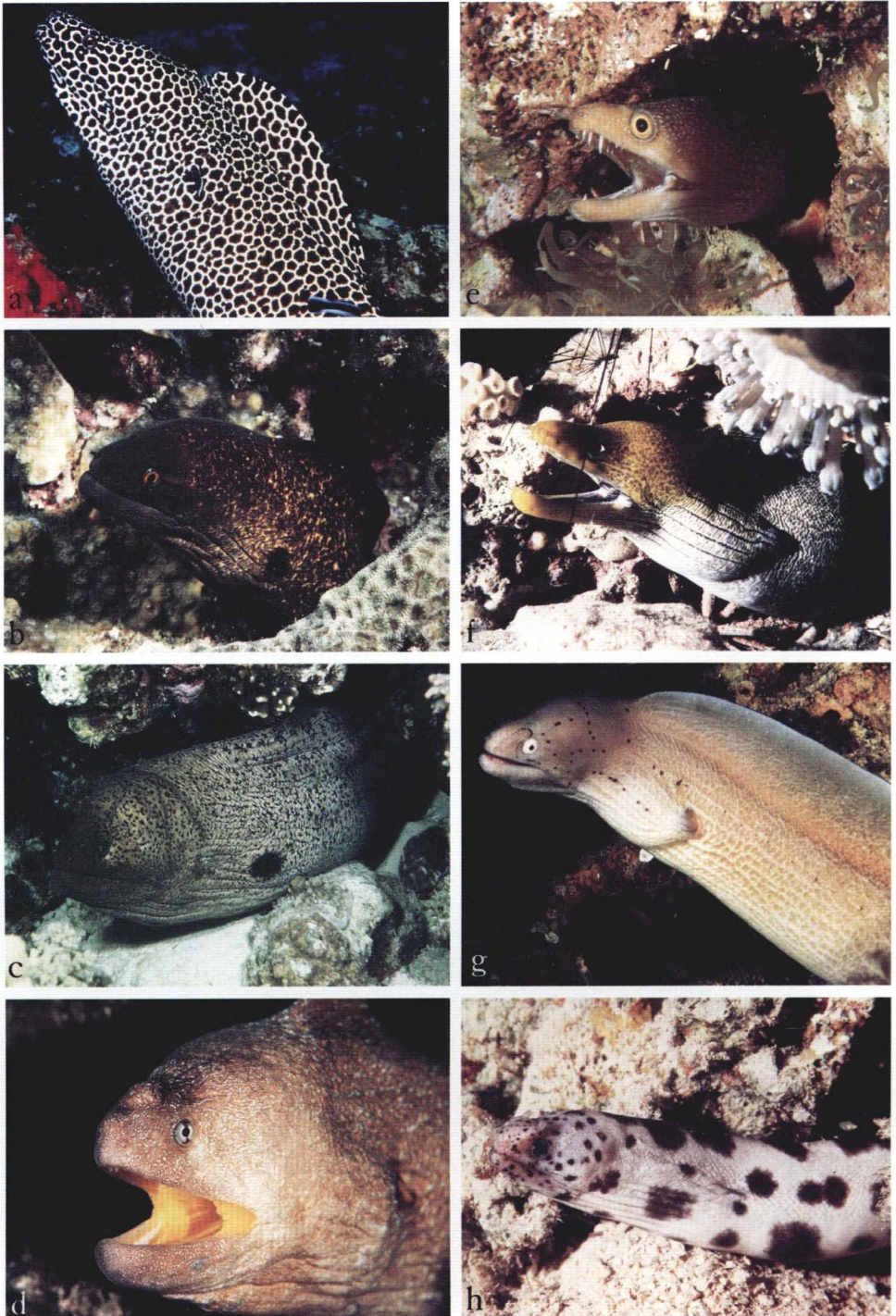


Plate II. a) *Gymnothorax favagineus*, Hanish Islands, southern Red Sea, photo J. A. Stahl; b) *Gymnothorax flavimarginatus*, southern Red Sea; c) *Gymnothorax javanicus*, Gubal Islands, northern Red Sea; d) *Gymnothorax nudivomer*, Eilat, Gulf of Aqaba; e) *Gymnothorax punctatus*, Eilat, Gulf of Aqaba; f) *Gymnothorax undulatus*, Taba, Gulf of Aqaba (night); g) *Siderea grisea*, Eilat, Gulf of Aqaba; h) *Uropterygius polyspilus*, Jeddah, Saudi Arabia.



of body they interconnect to form irregular black bars, the pale interspaces as very narrow irregular bars or series of spots; fins with a narrow yellow margin posteriorly.

*Remarks.*—*Gymnothorax buroensis* occurs throughout the Indo-Pacific region and is recorded from the Galapagos Islands. It is a common shallow-water species of coral reefs. Schultz in Schultz and collaborators (1953) reported it as the most abundant eel on Marshall Islands reefs. Böhlke (1982) gave the vertebral count of the putative holotype (BMNH 1867.11.28.270) as 114. A small species; not known to reach 400 mm. The holotype of *Muraena corallina* could not be located at the Staatliches Museum für Naturkunde in Stuttgart, the Senckenberg Museum in Frankfurt, the Zoologische Museum in Berlin, or the Zoological Institute in St. Petersburg, Russia (Ronald Fricke, pers. comm.). Six of the seven specimens Marshall (1952) reported from Sanafir Island and the Gulf of Aqaba as *Gymnothorax meleagris* Shaw were sent on loan from the Natural History Museum, London (BMNH); they are *G. buroensis*. All but two of Marshall's specimens were collected from pieces of madreporarian coral obtained from the reef at low tide. The following six lots of Red Sea *G. buroensis* are in the collection of the U.S. National Museum of Natural History: USNM 147427, 312283, 312299 (21), 312308 (5), 312310 (4), 312317 (5).

*Material Examined.*—BMNH 1951.1.16.67-72, 6: 104-171 mm; Sanafir Island and Gulf of Aqaba; BPBM 18248, 2: 195-247 mm, Eilat; BPBM 20849, 338 mm, Marsa el Mukabeila, Gulf of Aqaba; HUJ 7174, 348 mm, El Hameira, Gulf of Aqaba; HUJ 10686, 2: 330-345 mm, Nuweiba, Gulf of Aqaba; HUJ 15088, 5: 170-265 mm, El Kura, Gulf of Aqaba; HUJ 15092, 4: 132-205 mm, Eilat.

### *Gymnothorax elegans* Bliss

*Gymnothorax elegans* Bliss, 1883: 60 (type locality, Mauritius).

*Diagnosis.*—Body very elongate, the depth 17-20 in length; snout to anus 2.2-2.4 in length; head length 9.5-10 in length; teeth in jaws uniserial, acutely triangular, retrorse, and serrate; a single long intermaxillary canine; vertebrae 142-145. Brown, darker posteriorly, with numerous white spots, small and close-set anteriorly, becoming larger and more widely spaced posteriorly; most of spots on tail aligned vertically, some forming narrow white bars; gill opening in a black spot; margin of anal fin and posterior margin of dorsal fin white.

*Remarks.*—Ajiad and El-Absy (1986) recorded *Gymnothorax elegans* from the Red Sea from two specimens, 440-510 mm in length, taken by hook and line in 180 m on the Jordanian side of the Gulf of Aqaba. The specimens were deposited at the Museum of the Marine Science Station, Aqaba under MSS A150-151. Avi Baranes photographed this species from a submarine in the Gulf of Aqaba off Eilat at a depth of 350-400 m. The photo is not of publication quality; it is on file at the Interuniversity Institute of Eilat. *G. elegans* is otherwise recorded only from Mauritius, Mozambique (Smith, 1962), Samoa (Wass, 1984), and Hawaii (Randall et al., 1993). The paucity of records is no doubt due to the predilection of this moray for relatively deep water. The Bishop Museum has a specimen from Moorea, Society Islands (BPBM 31610, 645 mm) taken in 300 m. Another from Hawaii (BPBM 9027, 647 mm TL) was collected in 92 m; it is the largest specimen examined. David G. Smith (pers. comm.) has informed us that there is a specimen in the U.S. National Museum of Natural History from the Ryukyu Islands.

*Gymnothorax favagineus* Bloch and Schneider  
Plate IIa

*Gymnothorax favagineus* Bloch and Schneider, 1801: 525 (type locality, Tranquebar, India).  
*Gymnothorax favagineus*: Randall, 1994 (Hanish Islands, southern Red Sea).

**Diagnosis.**—Body depth 13–17 in length; head length 8–9 in length; snout to anus 2.1–2.2 in length; front of jaws usually with four large canines on each side, the more posterior teeth much smaller and angling backward; intermaxillary canines in a single median row, longer than lateral canines; one or two canines may be present as an inner row in about middle of upper jaw of smaller specimens; vomerine teeth uniserial in young, biserial in adults; vertebrae 138–144. Numerous, close-set, large black spots (more numerous and relatively smaller on larger specimens), varying in shape from round to oval and irregular, the white to pale yellowish interspaces often forming a honeycomb-like pattern.

**Remarks.**—Known from the western Pacific to the coast of East Africa where it ranges south to Algoa Bay, South Africa. The Red Sea record is based on an underwater photograph (Randall, 1994) taken in the Hanish Islands off Yemen. The exact distribution of the species in the western Pacific is not known due to confusion with *Gymnothorax isingteena* (Richardson) [see Masuda et al., 1988: pl. 27, figs. H–J, as *G. melanospilus* (Bleeker)]. *G. favagineus* attains at least 180 cm in length (unconfirmed reports to 250 cm).

*Gymnothorax flavimarginatus* (Rüppell)  
Plate IIb

*Muraena flavimarginata* Rüppell, 1830: 119, pl. 30, fig. 3 (type locality, Red Sea).

**Diagnosis.**—Body depth 11–18 in length; head 6.5–10 in length; snout to anus 2.1–2.3 in length; teeth in jaws uniserial with large canines anteriorly; intermaxillary teeth a single median row of large canines; vomerine teeth small, uniserial; vertebrae 129–137. Yellowish, densely mottled with dark brown; front of head purplish gray; a black spot at gill opening; a yellow-green margin posteriorly on fins.

**Remarks.**—Widespread in the tropical Indo-Pacific and eastern Pacific. Feeds mainly on fishes, occasionally on crustaceans. Fishelson (1992) listed this species as a possible protogynous hermaphrodite. Attains at least 120 cm. The following four lots of *Gymnothorax flavimarginatus* from the Red Sea are in the collection of the U.S. National Museum of Natural History: USNM 147422, 147429 (2), 312430 (7), 312453 (3).

**Material Examined.**—BPBM 19734, 195 mm, Sudan; SMF 765, 550 mm, holotype of *Muraena flavimarginata*.

*Gymnothorax hepaticus* (Rüppell)  
Figure 3

*Muraena hepatica* Rüppell, 1830: 120 (type locality, Red Sea).  
*Muraena cinerascens* Rüppell, 1830: 120 (type locality, Red Sea).

**Diagnosis.**—Body depth 12.5–20 in length; snout to anus 1.95–2.1 in length; head 7.0–7.4 in length; jaws slender and may be slightly hooked, the upper with five long compressed canines anteriorly, the third to fifth with a small tooth (one-fourth length) between; rest of jaw with a single row of small teeth, except for

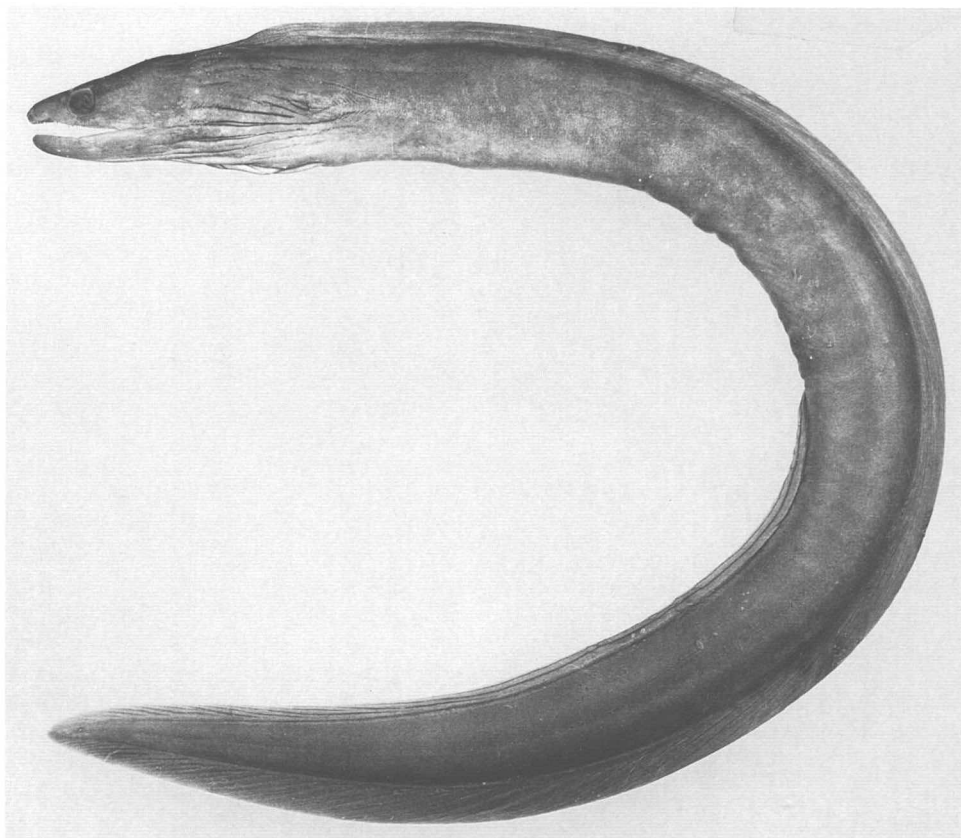


Figure 3. *Gymnothorax hepaticus*, BPBM 20758, 322 mm, Suakin, Sudan.

one or two inner canines in middle of jaw of smaller specimens; intermaxillary teeth a median row of three canines longer than those at side of jaw; vomerine teeth uniserial in small specimens, biserial in large ones; lower jaw with four long canines anteriorly on each side, followed by a single row of smaller teeth; height of dorsal fin about one-third body depth; vertebrae 128–131. Uniform dark brown, the fins a little darker with a narrow whitish margin posteriorly; grooves in throat darker brown than body.

*Remarks.*—In his addenda to the checklist of Red Sea fishes, Dor (1984) included *Lycodontus monochrous* (Bleeker), citing Böhlke (in lit.). This represented the first record of the species from the Red Sea. Since we have found no specimens of this species, we asked Mrs. Eugenia B. Böhlke for details. She said that her husband, the late James E. Böhlke, had identified specimens of Red Sea morays sent to him from Tel-Aviv University as this species. At the request of the senior author, these specimens (listed in Material Examined below) were sent on loan by Menachem Goren. They proved to be *Gymnothorax hepaticus*. Smith (1962) was unable to find any valid records of *Lycodontis hepaticus* from the western Indian Ocean; however, David G. Smith (pers. comm.) has pointed out that the eight specimens from Mozambique and Zanzibar that Smith identified as *Lycodontis monochrous* are probably *G. hepaticus*. Furthermore, David G. Smith has

identified two western Indian Ocean specimens in the U.S. National Museum of Natural History as *G. hepaticus*; one is from Mozambique and the other from Kenya. We know of no valid records of this moray from the Pacific. We suspect that records from the Pacific represent mainly misidentifications of *Gymnothorax albimarginatus* (Temminck and Schlegel). Böhlke (1982) reported the number of vertebrae of the holotype of *G. hepaticus* as 130 and of the holotype of *G. cinerascens* as 135. D'Ancona (1928) gave the vertebral count of one Red Sea specimen that he identified as *Muraena hepaticus* as 150, suggesting that he had another species. Of the habitat, Smith (1962) wrote, "plainly lives in turbid areas." Bishop Museum specimens were collected in protected, silty, dead reef areas. Smith gave the maximum length as "at least 1000 mm." The U.S. National Museum of Natural History has the following six lots of *G. hepaticus* from the Red Sea: USNM 166913, 312567–312571 (29).

*Material Examined.*—BPBM 20703, 417 mm (tip of tail missing), Sudan, Mersa Towartit, 0.5–1.5 m; BPBM 20758, 3: 225–385 mm, Suakin Harbor, Sudan; HUI 9091, 720 mm, El Arkana, Gulf of Aqaba; HUI 9163, 2: 480–650 mm, Um Aabak, Dahlak Archipelago; HUI 15099, 540 mm, southern Red Sea; HUI 15104, 3: 276–370, southern Red Sea; HUI 15120, 460 mm, Dahlak Archipelago; HUI 15160, 298 mm, Nuweiba, Gulf of Aqaba; SMF 185, 3: 178–264 mm (locality given as Mohila, Red Sea), labelled as syntypes of *Muraena cinerascens*; SMF 3554, 535 mm, holotype of *Muraena hepatica*; TAU P7446, 468 mm and TAU P7475, 140 mm, Museri, Dahlak Archipelago; TAU P7452, 255 mm, Entedebir, Dahlak Archipelago

### *Gymnothorax herrei* Beebe and Tee-Van

*Gymnothorax brunneus* Herre, 1923: 212, Fig. 13 (probable type locality, Puerto Galera, Mindoro, Philippines).

*Gymnothorax herrei* Beebe and Tee-Van, 1933: 138 (new name for *G. brunneus* Herre, preoccupied by *G. brunneus* Nichols, 1920).

*Diagnosis.*—Body depth 18.5–22.5 in length; snout to anus 2.15–2.2 in length; head length 8.1–8.3 in length; snout length 6.2–6.7 in head; orbit diameter 9.7–9.9 in head; interorbital width 9.9–10.1 in head; gape 3.25–3.4 in head; posterior nostril slightly posterior to a vertical at front edge of orbit, with a slightly raised rim and irregular margin; two rows of teeth on side of upper jaw, those of the outer row small, those of the inner row much longer and extending to rear of jaw; longer inner row of teeth of lower jaw confined to anterior part of jaw; two stout intermaxillary teeth (although not of canine proportions, longest of upper jaw); vomerine teeth low, nodular, and uniserial; vertebrae 109–119. Brown, the head and posterior part of tail lighter brown.

*Remarks.*—*Gymnothorax herrei* was described from a single 160-mm specimen which is not extant. Herre (1934) obtained a second Philippine specimen (CAS-SU 26842, 190 mm) from a tidepool at Culion, Philippines. Ferraris (1985: fig. 2) redescribed the species from this specimen and four others from Luzon, and he described and illustrated the spawning (fig. 1). He noted a difference in the vertebral count of the second Herre specimen (119) and the counts of his four specimens (109–112); however, our two Red Sea specimens (representing the first record for the Sea) have intermediate counts of 114 and 116. The identification of the Red Sea specimens was made by Eugenia B. Böhlke who is studying this and related small brown species of *Gymnothorax*. She has examined specimens from the Philippines, South China Sea, New Britain, Queensland, Borneo, Sri Lanka, Maldives, and the Persian Gulf (two lots from Bishop Museum, collected at Jana Island). In view of its lack of well developed canine teeth, this species may eventually be reclassified in another genus such as *Siderea*. The generic

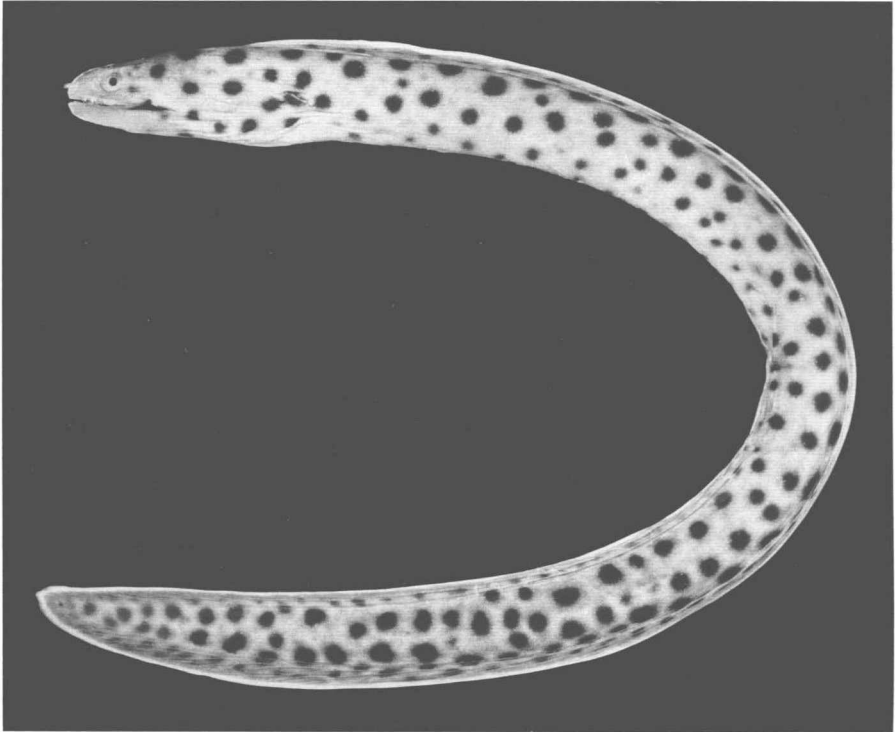


Figure 4. *Gymnothorax javanicus*, juvenile, BPBM 17901, 156 mm, Suakin, Sudan.

classification of Indo-Pacific muraenids is in need of further research. Largest specimen, one from the Persian Gulf, measured 300 mm when fresh; this species is usually less than 200 mm in length. There are three lots of *G. herrei* from the Red Sea in the collection of the U.S. National Museum of Natural History: USNM 312233 (21), 312234 (8), 312247.

*Material Examined*.—HUJ 15113, 2: 185–193 mm, Romia Island, Dahlak Archipelago.

*Gymnothorax javanicus* (Bleeker)  
Plate IIc; Figure 4

*Muraena javanica* Bleeker, 1859: 347 (type locality, Patjitan, Jawa).

*Gymnothorax javanicus* Bleeker, 1865: 95, pl. 179, fig. 2.

*Muraena javanica*: Klunzinger, 1871: 616 (Quseir, Egypt).

*Diagnosis*.—Body depth 9–17 in length (larger specimens deeper bodied); snout to anus 1.9–2.4 in length; head length 6.5–9.5; teeth in jaws uniserial, the anterior teeth as long canines; two or three very long intermaxillary canines in a median row; vomerine teeth biserial anteriorly; vertebrae 138–143. Light brown with large subquadrate to irregular dark brown spots (may have pale centers in adults) in about three irregular rows on body, and smaller spots on head, fins, and in light brown interspaces on body; gill opening in a large black spot. Juveniles (Fig. 4) paler with smaller, more widely spaced dark brown spots.

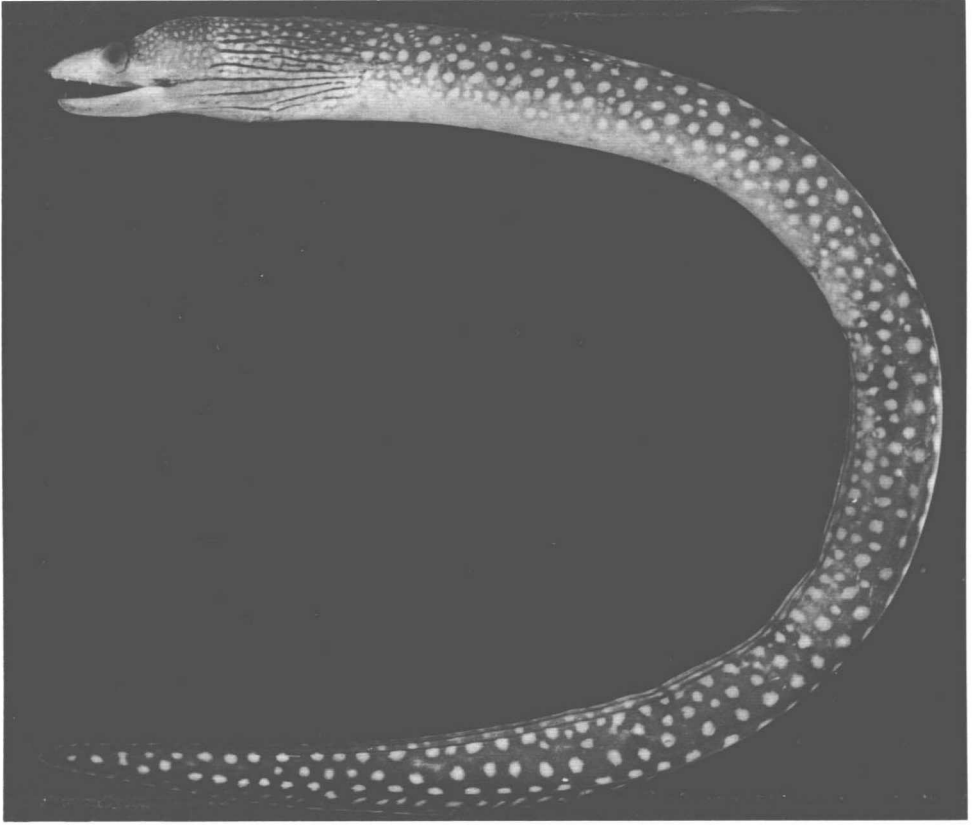


Figure 5. *Gymnothorax johnsoni*, BPBM 18167, 236 mm, Dahab, Gulf of Aqaba.

*Remarks.*—Broadly distributed in the tropical Indo-Pacific region where it is the largest of the genus *Gymnothorax*. Attains at least 220 cm. Occurs on coral reefs and rocky substrata; known from the depth range of 0.3–46 m. Feeds mainly on fishes, occasionally on octopuses and crustaceans. Fricke (1972) observed that the grouper *Cephalopholis argus* may follow *G. javanicus* while it is foraging for prey and may capture small fishes trying to escape from the moray. Three lots of this moray from the Red Sea are in the collection of the U.S. National Museum of Natural History: USNM 147424 (2), 147426, 312505.

*Material Examined.*—BPBM 17901, 156 mm, Suakin Harbor, Sudan; SMF 7464, 550 mm, Sanganeb Atoll, Sudan.

*Gymnothorax johnsoni* (Smith)  
Plate Id; Figure 5

*Lycodontis johnsoni* Smith, 1962: 438, pl. 56, figs. C, D (type locality, Algoa Bay, South Africa).

*Gymnothorax johnsoni*: McCosker, Baranes and Golani, 1993: 165 (Red Sea).

*Gymnothorax johnsoni*: Baranes and Golani, 1993: 302, pl. 2, fig. 5 (Red Sea).

*Diagnosis.*—Body depth 12.5–24 in length; snout to anus 2.15–2.2 in length; predorsal length 7.45–9.3 in length; head 6.7–7.3 in length; snout 4.9–5.15 in head; orbit diameter 9.25–11.3 in head; interorbital width 8.9–9.9 in head; gape

2.45–2.7 in head; jaws slender and slightly hooked (hence not closing completely except at tips); teeth uniserial in jaws (except one to three inner canines in middle of side of upper jaw of small specimens), the upper jaw with moderately long compressed canines anteriorly, gradually diminishing in size and progressively retrorse posteriorly; intermaxillary teeth as a median row of three very long depressible canines; vomerine teeth small, conical, in a single row; lower jaw with three or four canines on each side anteriorly, comparable to upper canines, followed by much smaller, more triangular teeth; vertebrae 137–141. Brown, densely flecked with irregular small whitish (pale yellow in life) spots of variable size commencing on postorbital head, the spots becoming slightly larger and much more broadly spaced posteriorly; corner of mouth and grooves in throat dark brown; edge of orbit narrowly dark brown.

*Remarks.*—Proportional measurements above based on five Red Sea specimens, 236–865 mm in length, as are the above vertebral counts. The number of vertebrae for an ANSP specimen from Kenya is 139, as is one from Somalia. This moray is otherwise recorded only from the 545-mm holotype from Algoa Bay, South Africa (34°S) and the 290-mm paratype from Inhambane, Mozambique (24°S). Both were collected in about 40 fathoms (73 m). Our larger specimens were collected with a trammel net off Eilat in the Gulf of Aqaba in 400 m. The two small specimens were taken with rotenone while diving farther south in the Gulf of Aqaba in 15 and 49 m. David G. Smith (pers. comm.) reported that there are two specimens of this species, USNM 301970, in the U.S. National Museum of Natural History from Somalia; they were collected at Bandar Beila at a depth of 106–110 m, and Eugenia B. Böhlke has informed us that there are two in the Academy of Natural Sciences of Philadelphia (ANSP 117784 and 117785) from Kenya and Somalia, respectively, both with 139 vertebrae.

*Material Examined.*—BPBM 18167, 236 mm, Dahab; BPBM 18240, 166 mm, 1 km north of Coral Island; BPBM 35744, 650 mm, Eilat; HUI 10432, 310 mm, Eilat; HUI 17016, 540 mm, Eilat; HUI 17017, 2: 810–865 mm, Eilat.

### *Gymnothorax moluccensis* (Bleeker)

*Priodonophis moluccensis* Bleeker, 1865: 48 (type locality, Ambon); Bleeker, 1865: 108, pl. 187, fig. 1.

*Diagnosis.*—Body depth 17 in length; anus distinctly posterior to mid-length, the snout to anus distance 1.95 in length; predorsal length 8.35 in length; head 6.85 in length; snout length 6.0 in head; eye over center of gape, small, the orbit diameter 12.5 in head; interorbital width 8.5 in head; tubular anterior nostrils long, 1.7 in orbit diameter; no long fang-like teeth in jaws, the teeth triangular, slightly recurved and backward-projecting, conspicuously serrate on posterior edge (some teeth also serrate on anterior edge); six intermaxillary teeth in outer row on each side, progressively longer posteriorly, and two in median line; 15 maxillary teeth on each side of upper jaw, progressively smaller posteriorly except first two; lower jaw with 18 teeth on a side; vomerine teeth small, conical, biserial anteriorly, the posterior half of series uniserial; vertebrae 130. Brown, the body with well-spaced pale dots, the spaces between dots generally greater than dot diameter.

*Remarks.*—*Gymnothorax moluccensis* was named by Bleeker from a single specimen; he described the color of the body and fins as dark brown. The Red Sea specimen on which the above diagnosis is based represents the first of the species not only for the Red Sea but for the Indian Ocean area. It was collected from the

vessel "Atlantis" in the southern Red Sea in 1958 and deposited in the U.S. National Museum of Natural History. No data are available on the depth of capture. It was identified by David G. Smith who examined the holotype of *G. moluccensis* (BMNH 1867.11.28.227, 387 mm) when it was on loan to Eugenia B. Böhlke at the Academy of Natural Sciences of Philadelphia. The Red Sea specimen, as well as three from the Coral Sea identified as *G. moluccensis* by Mrs. Böhlke (BPBM 33592, 2: 285–372 mm; ANSP 171494, 347 mm), differ from the holotype in having pale dots (those of the Coral Sea specimens were yellow in life); however, in view of uniformity of other features, we agree with Smith's identification of the Red Sea moray as *G. moluccensis*. The placement of this species in *Gymnothorax* is provisional. Schultz in Schultz and collaborators (1953) mistakenly identified specimens of *G. pindae* Smith from Bikini Atoll, Marshall Islands as *G. moluccensis*, and some authors followed in this misidentification.

*Material Examined*.—USNM 312236, 240 mm, southern Red Sea off Yemen (14°55'N, 42°28'E).

*Gymnothorax nudivomer* (Playfair and Günther)  
Plate Ib; Plate IId

*Muraena nudivomer* Playfair and Günther, 1867: 127, pl. 18 (type locality, Zanzibar).

*Lycodontis* cf. *nudivomer*: Ben-Tuvia and Steinitz, 1952: 4 (Eilat).

*Lycodontis nudivomer*: Fowler, 1956: 125 (after Ben-Tuvia and Steinitz).

*Diagnosis*.—Body depth 9–16 in length; snout to anus 2.1–2.3 in length; head 9–11 in length; snout short, 5.5–6.0 in head; teeth in jaws uniserial, acutely triangular, compressed, and many finely serrate; anterior six teeth on each side of upper jaw enlarged but only about half orbit diameter in length; a single median depressible intermaxillary canine; no vomerine teeth in adults; vertebrae 126–139 (see *Remarks*). Light brown, becoming darker posteriorly, with numerous, very small, white flecks and irregular white spots or short lines anteriorly, and widely separated, round, dark-edged white spots of about pupil size posteriorly; gill opening in a dusky to black blotch; white spots along edge of anal fin may be joined to form a near-continuous white margin; inside of mouth bright yellow in life.

*Remarks*.—*Gymnothorax nudivomer* is known from the Hawaiian Islands and western Pacific to East Africa and the Red Sea. Castle and McCosker in Smith and Heemstra (1986) recorded the vertebral counts for the species as 126–129 (specimens presumably from East Africa). Eugenia B. Böhlke (pers. comm.) made vertebral counts of three specimens from Hawaii as 137–139, one from the Comoros as 132, and one of unknown locality as 134. We counted 134 vertebrae in two Red Sea specimens. Randall (1983) noted that this moray has fewer and smaller white spots posteriorly on the body in the Red Sea. It is usually found in depths greater than 30 m extralimital to the Red Sea, but may be seen in 15 m or less in the northern Red Sea. Often observed to make a threat display by widely opening its mouth. Randall et al. (1981) demonstrated the presence of a skin toxin in this species. Reported to attain 100 cm. The following two lots of *Gymnothorax nudivomer* from the Red Sea are in the collection of the U.S. National Museum of Natural History: USNM 191670, 312753.

*Material Examined*.—BPBM 13891, 442 mm, Taba, Gulf of Aqaba; BPBM 18286, 560 mm, Eilat; HJ 15178, 8: 202–562 mm, Eilat; HJ 15182, 2: 460–675 mm, Eilat; HJ 17023, 676 mm, Ras Burka, Gulf of Aqaba; SMF 4523-24, 2: 600–715 mm, Gulf of Aqaba.



*Gymnothorax pindae* Smith

*Gymnothorax pindae* Smith, 1962: 430, pl. 55 D (type locality, Pinda, Mozambique).

**Diagnosis.**—Body depth 16 in length; snout to anus 2.4 in length; predorsal length 9.2 in length; head length 6.75 in length; snout length 5.45 in head; orbit diameter 9.8 in head; interorbital width 7.2 in head; gape 2.7 in head; teeth in jaw uniserial, except for an inner row of two teeth at front of lower jaw, the more posterior long and serrate; teeth along side of jaws triangular, compressed, retrorse, and serrate on posterior edge; intermaxillary teeth as two median canines, the second one very long and slender; 14 nodular vomerine teeth a single row; vertebrae 121. Brown, a little lighter ventrally on head and abdomen, becoming darker brown posteriorly, the fins nearly black posteriorly; edge of orbit narrowly dark brown.

**Remarks.**—Eugenie Clark collected two specimens of *Gymnothorax pindae* off Eilat in 1960; one was deposited in the collection of the Hebrew University of Jerusalem (the basis for the diagnosis above) and the other in the U.S. National Museum of Natural History (USNM 191669). Victor G. Springer collected four specimens at El Hameira, Gulf of Aqaba in 1969 (USNM 312698). These six specimens represent the first record of *Gymnothorax pindae* from the Red Sea. Randall and McCosker (1975) showed that the moray from the Marshall Islands identified as *G. moluccensis* (Bleeker) by Schultz in Schultz and collaborators (1953) is *G. pindae*. Randall and McCosker extended the range to the Hawaiian Islands, Tahiti, Chagos Archipelago, Maldives, Seychelles, Mauritius, Taiwan, and southern Great Barrier Reef. They gave the vertebral count for three specimens from Midway as 130–135. Wass (1984) added a record for the Samoa Islands.

**Material Examined.**—HUI 15130, 277 mm, Eilat.

*Gymnothorax punctatofasciatus* Bleeker

*Muraena catenata* (non Richardson) Bleeker, 1856: 66 (Ambon).

*Gymnothorax punctato-fasciatus* Bleeker, 1863: 167 (type locality, Ambon).

*Gymnothorax punctatofasciatus* Bleeker, 1865: 99, pl. 175, fig. 4 (Ambon, Buru, and Seram).

**Diagnosis.**—Body depth 24 in length; snout to anus 2.3 in length; predorsal length 9.3 in length; head length 7.5 in length; snout length 7.1 in head; orbit diameter 9.2 in head; interorbital width 9.2 in head; gape 3.6 in head; teeth uniserial in jaws (except for one inner tooth in middle of side of upper jaw), compressed, the posterior edge notched near base (resulting in a broader base); about 21 teeth on each side of jaws, the posterior teeth progressively smaller; three intermaxillary canines in a median row, the posterior two about half orbit diameter in length; eight conical vomerine teeth a single row; vertebrae 125. Body pale yellowish with two longitudinal rows of about 30 irregular dark brown spots, most notably larger than orbit and in vertical alignment with spot of other row (last few vertical pairs of spots merged); a third row of irregular dark brown spots midventrally, these merging with spot above to form short bars on posterior two-thirds of tail; pale interspaces with numerous small dark brown spots of variable size, except ventrally; head with numerous dark brown spots of variable size, a few dorsally on posterior half of head larger than orbit.

**Remarks.**—Our only specimen of this species, the first record from the Red Sea, was collected at Nuweiba by Avi Baranes in May, 1976. The species is otherwise reported only from Indonesia, Philippines (Jordan and Seale, 1905; Herre, 1934),

India (Day, 1878), Zanzibar (Jatzow and Lenz, 1898), and Réunion (Blanc and Postel, 1958). Böhlke (1982) gave the vertebral count of the type (BMNH 1867.11.28.277) as 137. Our specimen differs from the figure in Bleeker's *Atlas Ichthyologique* in lacking irregular dark brown bars; however, the illustration in Day (1878: pl. 169, fig. 4) of a 13-inch specimen from Madras shows an intermediate condition with most vertical pairs of dark spots narrowly merged. Three specimens collected by the senior author in Lombok, Indonesia (BPBM 30188, 3: 225–332 mm) have a color pattern like the Red Sea specimen; the vertebral count of these three specimens is 127–130. Largest specimen recorded, 472 mm.

*Material Examined*.—HJ 9410, 365 mm, Nuweiba, Gulf of Aqaba.

*Gymnothorax punctatus* Bloch and Schneider  
Plate Ie; Plate Iie

*Gymnothorax punctatus* Bloch and Schneider, 1801: 526 (type locality, Tranquebar, India).

*Muraena punctata*: Day, 1878: 669, pl. 173, figs. 1, 1a (Coromandel coast of India).

*Lycodontis* cf. *undulatus*: Ben-Tuvia and Steinitz, 1952: 4 (Eilat).

*Gymnothorax punctatus*: Fowler and Steinitz, 1956: 269 (Eilat).

*Diagnosis*.—Body depth 13–15 in length; snout to anus 2.2–2.35 in length; predorsal length 9–10 in length; head 6.5–7.25 in length; snout 4.9–5.4 in head; orbit diameter 12–12.6 in head; interorbital width 8.55–9.2 in head; gape 2.5–2.7 in head; teeth in jaws uniserial except a single canine on one side about half way back in upper jaw; four teeth on each side anteriorly in jaws enlarged as moderate canines; three very long slender, depressible intermaxillary canines in a median row; only a single small vomerine tooth; vertebrae 138–143 (2 counts). Reddish brown, densely flecked with numerous, very small, irregular, white spots; ventral part of head and side of snout without white flecks, those dorsally on snout and postorbital head as white dots; white spots posteriorly on body slightly larger and more widely spaced; corner of mouth and grooves of throat dark brown.

*Remarks*.—The diagnosis above is based on our Red Sea material. The 775-mm specimen was taken on the North Beach of Eilat by a commercial seine. The 730-mm specimen reported as *Lycodontis* cf. *undulatus* by Ben-Tuvia and Steinitz (1952) and reidentified as *Gymnothorax punctatus* by Fowler and Steinitz (1956) appears to be lost; it is not present in the fish collection of the Hebrew University. Information on the holotype of *G. punctatus*, a dried stuffed specimen at the Zoologisches Museum in Berlin (ZMB 6141, 70 cm), was provided by Hans-Joachim Paepke; the one 202-mm paratype was sent on loan by him. It is more slender than the adult specimens, as is typical of juvenile morays, the depth 21 in the length; snout to anus 2.3 in length; head 8.35 in length; snout 5.35 in head; eye 8.05 in head; predorsal distance 10 in length; dentition as in adults except for an inner row of three moderate canines on side of upper jaw; the color medium brown with three to four longitudinal rows of pale spots on body about size of eye; no spots on head; dorsal fin with pale spots. Two lots of *G. punctatus* from the Red Sea are in the collection of the U.S. National Museum of Natural History: USNM 312701, 316922 (3).

*Material Examined*.—BPBM 35745, 775 mm, Eilat; HJ 4708, 760 mm, Eilat; HJ 4989, 780 mm, Red Sea; HJ 4992, 783 mm, Eilat; ZMB 3989, paratype of *Gymnothorax punctatus*, 202 mm, Tranquebar, India.

*Gymnothorax reticularis* Bloch

*Gymnothorax reticularis* Bloch, 1795: 85, pl. 416 (type locality, Tranquebar, India).

**Diagnosis.**—Body depth 20 in length; snout to anus 2.2 in length; predorsal length 11.3 in length; head 7.6 in length; snout 5.3 in head; eye 9.4–9.9 in head; interorbital width 6.9 in head; gape 3.1 in head; compressed, acutely triangular teeth uniserial in jaws, progressively smaller and more retrorse posteriorly, the posterior edge of many finely serrate; no median intermaxillary teeth; six blunt vomerine teeth in a single row; posterior nostril over anterior fourth of eye, with a low fleshy rim; vertebrae 125. Light gray-brown with 19 dark brown bars ventrally on body, the posterior ones continuing more darkly onto anal fin; upper two-thirds of body with numerous, small, irregular, brown spots, some with pale centers, these tending to form lines dorsoanteriorly on body and side of head posterior to rictus; top of head and snout with irregular, small, brown spots, many with pale centers; dorsal fin with 20 alternating dark brown and pale bars of about equal width, the dark bars continuing faintly onto upper body except posteriorly.

**Remarks.**—This species is known from southern Japan to Indonesia, west to India, with one record from Mozambique (Smith, 1962). As noted by Hatooka in Masuda et al. (1988), it is often caught in trawls (thus indicating its occurrence on open sedimentary substrata). Böhlke (1982) reported the vertebral count of the holotype (ZMB 3986) as 118; her counts of six other specimens ranged from 117–120. The above diagnosis is based on our single 242-mm specimen which constitutes the first record from the Red Sea. No collecting data are available with the specimen except the year it was obtained, 1960, and the locality, Eilat. Reported to reach 60 cm.

**Material Examined.**—HUJ 14667, 242 mm, Eilat.

*Gymnothorax rueppelliae* (McClelland)

*Muraena reticulata* (non Bloch) Rüppell, 1830: 117 (Red Sea).

*Dalophis rueppelliae* McClelland, 1845: 213 (type locality, Bengal, India).

*Muraena umbrofasciata* Rüppell, 1852: 33 (Red Sea).

*Gymnothorax Rueppellii*: Klunzinger, 1871: 615 (Quseir, Egypt).

**Diagnosis.**—Body depth 15–20 in length; snout to anus 2.1–2.3 in length; head 7–8 in length; teeth in jaws uniserial (except two to four inner canines in about middle of upper jaw of juveniles), the only canines laterally at front of jaws and a median row of intermaxillary teeth; vomerine teeth small, conical, and uniserial; vertebrae 124–128 (see Remarks). Pale grayish brown with 16–22 dark brown bars about as wide as pale interspaces which encircle body and fins posterior to anus, but some not meeting ventrally on trunk (bars may be obscure on large adults); a dark brown spot at corner of mouth; top of head may be yellow in life.

**Remarks.**—Widely distributed in the Indo-Pacific region from the Red Sea and coast of East Africa to the Hawaiian Islands and French Polynesia. As noted above, some recent authors have identified this species as *Gymnothorax petelli* (Bleeker), a junior synonym of *G. rueppelliae*. Böhlke (1982) gave the vertebral counts of the lectotype and paralectotype of *G. rueppelliae* as 125 and 126, respectively. There is a distinct difference in the vertebral counts of specimens of *G. rueppelliae* from the Red Sea and elsewhere in the Indo-Pacific region: Red Sea, 124–128 (8 counts); Mauritius and islands in Oceania, 130–134 (10 counts). In view of similarity in color and other features, no change in the specific name of the form extralimital to the Red Sea is anticipated. This moray occurs on coral



Figure 6. *Gymnothorax undulatus*, BPBM 18265, 272 mm, Sharm el Mohya, Sinai Peninsula.

reefs and rocky substrata; it is nocturnal. Attains 80 cm. The following two lots of *G. rueppelliae* from the Red Sea are in the collection of the U.S. National Museum of Natural History: USNM 147431, 312676 (5).

*Material Examined.*—BPBM 35747, 2: 191–265 mm, Nabek, Gulf of Aqaba; HUI 4859, 2: 161–230 mm, Ras Muhammad, Sinai Peninsula; HUI 4959, 88 mm, Red Sea; HUI 15071, 3: 73–207 mm, Ras Muhammad; HUI 15090, 2: 82–86 mm, El Arkana, Gulf of Aqaba; HUI 15117, 11: 245–420 mm, Red Sea; HUI 15121, 192 mm, El Arkana; HUI 15137, Nabek; HUI 15145, 500 mm, Eilat; HUI 15161, 165 mm, Eilat; SMF 151, 395 mm, lectotype of *Dalophis ruppelliae*; SMF 7436, 245 mm, paralectotype of *D. ruppelliae*.

*Gymnothorax undulatus* (Lacepède)

Plate If; Plate Iif; Figure 6

*Muraenophis undulata* Lacepède, 1803: 629, 642, 644, pl. 19, fig. 2 (no locality; after Commerson, hence probably Mascarenes).

*Muraena undulata*: Klunzinger, 1871: 615 (Quseir, Egypt).

*Gymnothorax meleagris* (non Shaw and Nodder) Fowler and Steinitz, 1956: 270 (Eilat).

*Diagnosis.*—Body depth 10–19 in length; snout to anus 2.1–2.3 in length; head 6.5–8.5 in length; teeth in jaws compressed, uniserial (except a few canines forming an inner row on side of upper jaw of young), the longest anteriorly in jaws as moderate canines with a much smaller tooth between adjacent canines; posterior teeth small and retrorse; three extremely long intermaxillary canines in a

median row; vomerine teeth small, conical, in a single row; vertebrae 126–138. Gray to brown with narrow, irregular, white to yellowish, vertically elongate spots on body and fins of young which become dendritic blotches in adults, those posteriorly on dorsal fin oblique; head yellow or brownish yellow, the postorbital part with small irregular dark brown spots; grooves in throat dark brown.

*Remarks.*—Occurs throughout the Indo-Pacific region from the Red Sea south to Port Alfred, South Africa and east to the Hawaiian Islands and French Polynesia. Judging from its prevalence in our collections, it is the most common species of *Gymnothorax* in the northern Red Sea. The color pattern is variable, even in the same general area. The above color description is based on Red Sea material. Nocturnally active and prone to bite. The 110-mm specimen identified by Bentuvia and Steinitz (1952) as *Lycodontis* cf. *meleagris* and regarded as *G. meleagris* by Fowler and Steinitz (1956) is a juvenile *G. undulatus*. Reported to attain 100 cm. The U.S. National Museum of Natural History has the following 10 lots of *G. undulatus* from the Red Sea: USNM 147430, 147604, 262775 (34), 312603–312609 (137).

*Material Examined.*—BPBM 13432, 194 mm, El Hameira, Gulf of Aqaba; BPBM 18265, 272 mm, Sharm el Moya, Sinai Peninsula; BPBM 18344, 2: 188–192 mm, Ras Muhammad, Sinai Peninsula; BPBM 18372, 3: 280–410 mm, Eilat; BPBM 19805, 343 mm, Ras Muhammad; BPBM 19862, 258 mm, Marsa el Mukabeila, Gulf of Aqaba; BPBM 20718, 420 mm, North Beach, Eilat; BPBM 20825, 292 mm, Nuweiba, Gulf of Aqaba; HUI 4991, 110 mm, Eilat; BPBM 31848, 475 mm, North Beach, Eilat; HUI 15085, 250 mm, Nabek, Gulf of Aqaba; HUI 15119, 3: 139–215 mm, El Himeira; HUI 15144, 11: 66–330 mm, Eilat; HUI 15174, 2: 353–700 mm, Nabek; HUI 17134, 480 mm, Eilat.

### *Muraena helena* Linnaeus, 1758

*Muraena Helena* Linnaeus, 1758: 244 (type locality, Europe).

*Diagnosis.*—Maximum depth of body 12.5–14.7 in length; depth at anus 14.5–15 in length; snout to anus 2.1–2.2 in length; predorsal length 9.7–10.1 in length; head length 8.2–8.7 in length; snout length 4.6–5.2 in head; orbit diameter 9.3–12.4 in head; interorbital width 9.25–9.3 in head; gape 2.3–2.55 in head; posterior nostril tubular, slightly anterior to a vertical at front edge of orbit, its length nearly half orbit diameter; a single row of 16–17, well-spaced, slender, compressed canine teeth in jaws, the longest near front of jaws, the more posterior teeth progressively smaller and more backward-slanting; two median intermaxillary canines, the second the longest tooth in mouth; vomerine teeth sharply conical, in a single row; vertebrae 144–145 (2 counts). Anterior half of head dark brown, the posterior half and anterior trunk mottled with whitish flecks and short irregular lines; posterior trunk and tail with three longitudinal rows of large whitish blotches, each with a clustering of very dark brown spots and white dots; posterior margin of fins with a series of small hemispherical whitish spots; edge of gill opening blackish.

*Remarks.*—*Muraena helena* is a well-known eastern Atlantic-Mediterranean moray eel extending north to the British Isles and south to Senegal; also found in the Canary Islands, Madeira, and Azores. It generally lives in shallow seas on rocky substrata. Three specimens in the collection of the Hebrew University of Jerusalem, all from Nuweiba on the Sinai coast of the Gulf of Aqaba represent the first record from the Red Sea. Two of these morays were collected in 1969 and one in 1977 (with rotenone in 1–4 m). We suspect that this species is an immigrant to the northern Red Sea from the Mediterranean Sea via the Suez Canal. We compared the Red Sea specimens with the following from the Medi-

terranean: HUI 15116, 250 mm, Cyprus; HUI 15173, 2: 310–412 mm, Cyprus; HUI 16192, 520 mm, Acre, Israel. Eugenia B. Böhlke provided vertebral counts of 15 specimens extralimital to the Red Sea; they ranged from 137–146. This species is reported to attain a length of 130 cm.

*Material Examined.*—HUI 9048, 2: 650–880 mm, Nuweiba; HUI 9012, 545 mm, Nuweiba.

*Siderea grisea* (Lacepède)  
Plate IIg

*Muraenophis grisea* Lacepède, 1803: 629, 642, 644, pl. 19, fig. 3 (no locality; after Commerson, hence probably Mascarenes).

*Muraena geometrica* Rüppell, 1830: 118, pl. 30, fig. 1 (type locality, Massaua, Red Sea).

*Muraena bilineata* Rüppell, 1838: 84 (type locality, Jeddah, Red Sea).

*Diagnosis.*—Body depth 17–22 in length; anus well in front of middle of length, the snout to anus distance about 2.4 in length; head 8.5–10.5 in length; conical teeth in jaws (none of typical moray canine length) in two rows on side of upper jaw and front of lower jaw, the inner row larger; a single row anteriorly in upper jaw and side of lower jaw; one or two median conical intermaxillary teeth, the largest in the mouth; two rows of short conical vomerine teeth, merging to one row posteriorly; origin of dorsal fin about half distance from gill opening to eye; vertebrae 128–136. Pale yellowish, the body densely mottled with small light brown spots; head anterior to dorsal fin brownish gray; pores on head in small black spots.

*Remarks.*—Western Indian Ocean and Red Sea; the most common moray seen by divers and snorkelers in the Red Sea. Diamant and Shpigel (1985) describe it as a solitary hunter that swims among corals and rocks, occasionally poking its head into fissures and crevices, apparently searching for food. It is known to form interspecific feeding associations with several species of fishes (Karplus, 1978; Diamant and Shpigel, 1985). A synchronous hermaphrodite (Fishelson, 1992). Maximum length about 65 cm. The following 15 lots of *Siderea grisea* from the Red Sea are in the collection of the U.S. National Museum of Natural History: USNM 166914 (2), 191671, 191689 (2), 312469–312478 (19), 312490, 312491 (16).

*Material Examined.*—BPBM 18133, 2: 378–388 mm, Marsa el Mukabeila, Gulf of Aqaba; HUI 15062, 7: 252–404 mm, El Arkana, Gulf of Aqaba; HUI 15164, 3: 503–645 mm, Nuweiba, Gulf of Aqaba; SMF 130, 213 mm, holotype of *Muraena geometrica*; SMF 911, 510 mm, holotype of *M. bilineata*.

*Siderea picta* (Ahl)

*Muraena picta* Ahl, 1789: 8 (type locality, eastern India).

*Gymnothorax pictus*: Tortonese, 1937: 166 (Massaua).

*Diagnosis.*—Body depth 10–20 in length; snout to anus 1.9–2.1 in length; head 6–8 in length; teeth in jaws uniserial, conical, becoming compressed and retrorse posteriorly; a single median conical intermaxillary tooth, the largest in mouth; vomerine teeth short, conical, in one to two irregular rows; origin of dorsal fin slightly anterior to gill opening; vertebrae 127–135. White, densely peppered with black dots, these sometimes clumping to form large diffuse blackish blotches; juveniles with small black spots arranged in about three longitudinal rows; larger juveniles may have pale centers in the black spots.

*Remarks.*—*Siderea picta* ranges from the Red Sea south to Natal and east throughout the islands of Oceania to islands of the tropical eastern Pacific. It is a shallow-water species of reef flats and rocky shores; sometimes briefly exposed

as waves recede. Chave and H. Randall (1971) noted that it feeds mainly on crabs; it was observed at times to strike from the water at grapsid crabs above the surface. According to Fishelson (1992) who examined eight specimens (though none from the Red Sea), this species is a synchronous hermaphrodite. Reaches at least 100 cm. There are five lots of *S. picta* from the Red Sea in the collection of the U.S. National Museum of Natural History: USNM 47605–47609 (10).

*Material Examined.*—HUI 11428, 410 mm, Eilat.

*Strophidon sathete* (Hamilton)

*Muraenophis sathete* Hamilton, 1822: 17, 363 (type locality, Ganges estuaries).

*Thyrsoidea macrura*: Ajiad, 1987: 102 (Gulf of Aqaba).

*Diagnosis.*—Body very elongate, the depth 38–47 in length; tail about twice as long as head and trunk; head 10–14 in length; eye above front half of gape; canine teeth in jaws relatively small, compressed, in two rows at side of upper jaw and front of lower; about four slender depressible intermaxillary canines in a median row, the longest teeth in mouth; small vomerine teeth in a single row; vertebrae 183–207. Grayish brown, paler ventrally, the fins darker than body.

*Remarks.*—Western Pacific to East Africa and the Red Sea, generally in estuarine areas. The Red Sea record (Ajiad, 1987) is based on two specimens, 2380–2450 mm, taken by hook and line in 50 m at Newcibeh (=Nuweiba?), Sinai Peninsula. The largest was deposited at the Marine Science Station in Aqaba under no. MSS-206. *Strophidon sathete* is the longest of all known eels; largest specimen reported, 375 cm, from Queensland, Australia. *Muraena macrurus* Bleeker is a junior synonym.

*Uropterygius concolor* Rüppell

*Uropterygius concolor* Rüppell, 1838: 83, pl. 20, fig. 4 (type locality, Massaua, Red Sea).

*Diagnosis.*—Body depth 15–20 in length; snout to anus 2.35–2.4 in length; head 8.6–9.2 in length; snout 5.8–6.2 in head; eye about midway between tip of snout and rictus, the orbit diameter 10.2–10.6 in head; gill opening in about middle of body; fins posteriorly on tail; a single prominent lateral-line pore on head above level of gill opening about half distance from gill opening to rictus; two rows of teeth in jaws, those of outer series small, close-set, and retrorse, the inner series of well-spaced, long, slender, inwardly depressible canines, those in lower jaw extending only about two-thirds length of jaw; two very long depressible intermaxillary canines; 11 small conical vomerine teeth in one row; vertebrae 121. Color uniform light brown, a little paler ventrally on head, abdomen, and tip of tail; large pores along side of jaws pale.

*Remarks.*—The diagnosis above is based on two HUI specimens from the Dahlak Archipelago. Böhlke (1982) recorded the vertebral counts of the lectotype (SMF 746) and paralectotype (SMF 7422) in the Senckenberg Museum as 119 and 123, respectively. *Uropterygius concolor* has been recorded south on the East African coast to Natal and east to various islands of the western Pacific and Oceania; however, some of the descriptions of these little morays suggest that not all are *U. concolor*. Maximum length uncertain. The U.S. National Museum of Natural History has the following five lots of *U. concolor* from the Red Sea: USNM 235348 (11), 312829, 312832–312834 (8).

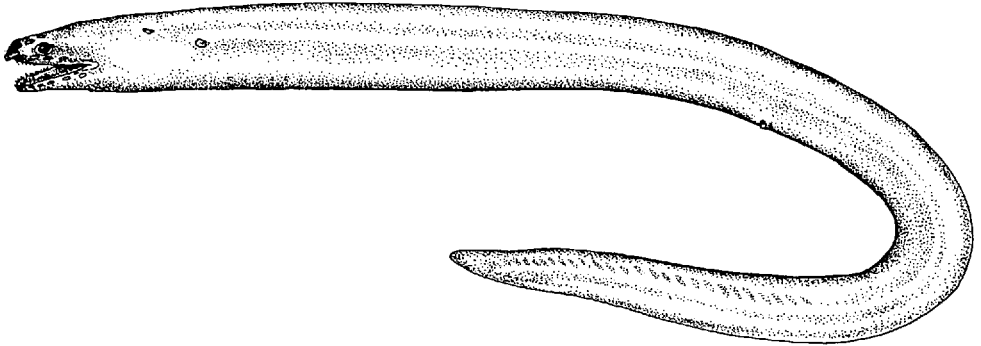


Figure 7. Holotype of *Uropterygius genie*, HUI 5863, 178 mm, Ras Muhammad, Sinai Peninsula.

*Material Examined.*—HUI 4939, 191 mm, Romia Island, Dahlak Archipelago; HUI 15127, 146 mm, Dahlak Archipelago.

*Uropterygius genie*, new species Randall and Golani  
Figures 7–9

*Holotype.*—HUI 5863, male, 178 mm, Red Sea, Sinai Peninsula, Ras Muhammad, 12 March 1972.

*Paratype.*—USNM 312814, 118.5 mm, Red Sea, Gulf of Aqaba, Sinai Peninsula, bay at El Hameira, 0–18 m, rotenone, V.G. Springer et al., 16 July 1969.

*Diagnosis.*—Body depth 19.8–21.5 in length; body compressed, the width 2.2–2.25 in depth; snout to anus 2.15–2.2 in length; eye over anterior third of gape; gill opening in upper third of body; teeth in five rows in upper jaw and four rows on anterior two-fifths of lower jaw, the inner rows progressively longer; longest intermaxillary about equal to orbit diameter; a broad groove separating outer row of teeth on side of upper jaw from ridge bearing inner rows of teeth; vertebrae 121; uniform brown, the fins yellowish brown.

*Description.*—Greatest body depth 19.8 (21.5) in length; depth at anus 22.8 (24.0) in length; greatest width of body 2.25 (2.2) in greatest depth; anus in front of middle of body, the snout to anus distance 2.2 (2.15) in length; head length 9.4 (9.6) in length; snout short, 7.9 (8.2) in head; fleshy orbit diameter 9.6 (8.8) in

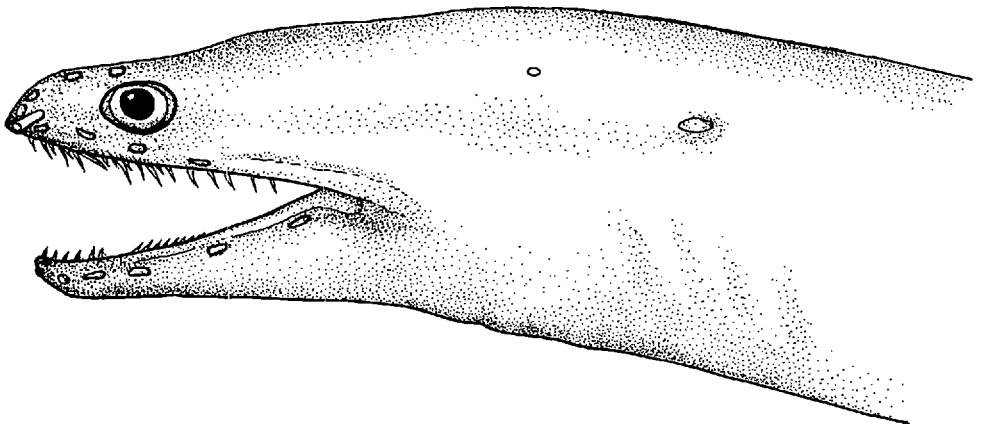


Figure 8. Head of holotype of *Uropterygius genie*.



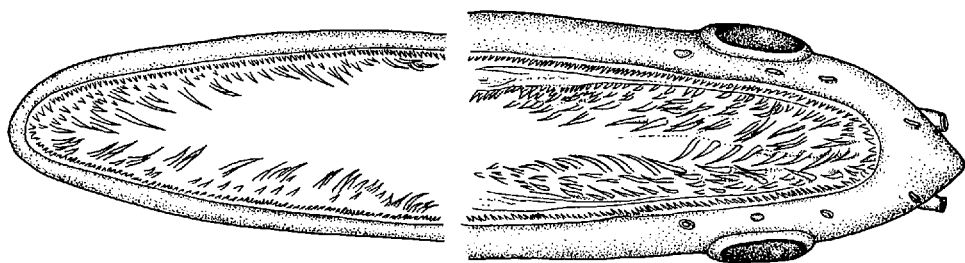


Figure 9. Dentition of holotype of *Uropterygius genie*.

head; fleshy interorbital width 8.9 (10.8) in head; suborbital depth 2.7 (2.8) in orbit diameter; gape 2.35 (2.4) in head; upper jaw length 1.65 (1.6) in head; gill opening small, 2.7 (2.8) in orbit diameter, its distance from upper edge of body 3.4 (3.0) in body depth.

Tubular anterior nostril 2.65 (2.8) in orbit diameter; posterior nostril over anterior edge of iris, with a slightly raised rim. Pores of cephalic lateral-line prominent, three pores in supraorbital series (the first ventroanterior to base of anterior nostril), four in infraorbital series, and six in mandibular; a single large lateral-line pore on head slightly higher than level of gill opening about half distance from gill opening to fleshy corner of mouth.

Each side of upper jaw at edge of lip with an outer row of about 70 small slender teeth (about as long as largest pore of suborbital series); maxillary and lateral intermaxillary teeth slightly recurved, needle-like, in four rows, each row progressively longer medially; a groove developing along side of maxilla between first two rows of teeth, the distance between these rows increasingly greater posteriorly, mainly a result of a bony ridge bearing these inner teeth becoming progressively deeper; inner rows of teeth posteriorly in upper jaw progressively shorter posteriorly and more recurved, the second to fourth rows on side of ridge and much smaller; a median row of four needle-like intermaxillary canines, the most posterior tooth the longest in mouth (about equal to orbit diameter); an outer row of about 80 small teeth on each side of mandible; three inner rows of progressively longer teeth on anterior two-fifths of lower jaw; rows of teeth on side of lower jaw narrowing posteriorly to the single outer row; six needle-like vomerine canines of about equal length, as long as longest maxillary teeth; teeth in jaws posteriorly depressible, the small teeth of outer row the least movable.

Vertebrae 122 (121); vertebrae anterior to anus 54 (52); vertebrae anterior to origin of dorsal fin 102 (105); vertebrae anterior to anal fin 111 (114); dorsal rays (including upper half of caudal rays) 54 (45); anal rays, including lower half of caudal rays, 28 (25).

Color in alcohol medium brown; fins yellowish brown; edge of orbit narrowly dusky, especially anteriorly; cephalic pores and nostrils whitish; inside of mouth white.

*Remarks.*—This species is named *Uropterygius genie* in honor of Eugenia B. Böhlke, in recognition of her research on muraenid eels. The specific name is to be treated as a noun in apposition.

*U. genie* appears to be most closely related to *U. fuscoguttatus* Schultz and *U. supraforatus* Regan, in view of the position of the anus near middle of body, the gill opening high on the side, the eye anterior to the middle of the gape, and the numerous rows of teeth in the jaws. It is readily distinguished from these two

spotted species by its uniform brown color, the shorter snout (7.9–8.2 in head, compared to 5.0–6.3 for the other two species), and in dentition. The two species lack the broad gap separating the outer from inner rows of teeth posteriorly on the side of the upper jaw. Vertebral counts do not provide any clear separation. *U. fuscoguttatus* has 113–120 vertebrae (Böhlke, 1982), and *U. supraforatus* 119–136 (counts from six Bishop Museum specimens from Pacific islands south of Hawaii, 120–130, the highest count for a single specimen from Johnston Island; four counts provided by Eugenia B. Böhlke for specimens at the Academy of Natural Sciences of Philadelphia from the Marshall Islands, Fiji, and New Guinea, 119–121, plus one of 136 for the holotype of *U. dentatus* Schultz from Johnston Island. *U. dentatus* was placed in the synonymy of *U. supraforatus* by Gosline (1958). The high vertebral counts for the two specimens of *U. supraforatus* from Johnston Island suggest that the number of vertebrae at this island (and hence perhaps also for the Hawaiian Islands) will prove to be higher than at other Pacific Islands to the south.

### *Uropterygius makatei* Gosline

*Uropterygius makatei* Gosline, 1958: 227, figs. 1 f, 2 b (type locality, Makatea, Tuamotu Archipelago).

**Diagnosis.**—Body depth 21 in length; snout to anus 2.2 in length; head length 8.0 in length; snout 7.4 in head; orbit diameter 14.8 in head; interorbital width 9.7 in head; gape 3.5 in head; gill opening in lower fifth of body; a single lateral-line pore on upper third of body about half the distance from gill opening to rictus; posterior nostril over center of eye with a slight rim; fins confined to end of tail, the longest rays 8.5 in head; slightly recurved, needle-like teeth in two rows in jaws, the inner row about twice as long as the outer and widely spaced (nine teeth on each side of upper jaw); two long median intermaxillary canines; and a row of six vomerine teeth of about length of longest teeth in outer row of upper jaw; vertebrae 111. Brown, the head including side of lower jaw mottled with whitish; dorsal and posterior part of body with a faint reticulum of dark brown; fins pale yellowish; nostrils and head pores whitish.

**Remarks.**—This species was previously known in the literature from a single 230-mm specimen collected inshore in the surge zone of Makatea by the senior author in 1956. Böhlke (1982) gave its vertebral count as 109. It is a surprise that a second specimen should come from the other end of the Indo-Pacific region. It was collected by Eugenie Clark at Nabek in June, 1972. David G. Smith has informed us that the U.S. National Museum of Natural History has eight specimens of the species, USNM 323565, 323566, 323567, from Ouvea Atoll, Loyalty Islands, and one, USNM 312810, from Huahine, Society Islands. All were taken on inshore reefs exposed to surge except the single specimen of USNM 323566 which was collected from a vertical wall on the oceanside of the atoll that ranged in depth from 15 to 21 m.

**Material Examined.**—HUJ 9418, 136 mm, Nabek, Gulf of Aqaba.

### *Uropterygius micropterus* (Bleeker)

*Muraena micropterus* Bleeker, 1852: 298 (type locality, Wahai, Seram).

*Gymnomuraena micropterus* Bleeker, 1865: 115, pl. 164, fig. 2 (Flores, Buru, Morotai, Ambon, Seram, Aru, and Timor).

**Diagnosis.**—Body depth 23 in length; snout to anus 2.2 in length; head 8.5 in

length; snout 8.8 in head; orbit diameter 12 in head; interorbital space 13 in head; gape 3.3 in head; eye slightly anterior to middle of gape; two rows of teeth in jaws, the outer row close-set and recurved, the inner about twice as long; four median intermaxillary teeth, progressively longer posteriorly, the fourth the longest tooth in jaw; 11 slender conical vomerine teeth in a single row; gill opening on about midside of body; center of posterior nostril above anterior edge of pupil; a single cephalic sensory pore anterior to gill opening; vertebrae 118. Brown with irregular dark brown lines on upper two-thirds of head and body, many interconnected to form a fine reticulum.

*Remarks.*—Bleeker (1852) described this moray from two specimens from Ceram (Seram). Bleeker (1865) added additional Indonesian localities (see synonymy above). Schultz (1943) recorded the species from the Phoenix and Samoa Islands. Schultz in Schultz and collaborators (1953) placed *Uropterygius tinkhami* Fowler from Saipan in the synonymy of *U. micropterus* and added records from Rota and Guam. Hatooka and Yoshino (1982) recorded the species from the Ryukyu Islands, and McCosker et al. (1984) listed additional Ryukyu specimens. Castle and McCosker in Smith and Heemstra (1986) reidentified the specimens Smith (1962) reported as *U. marmoratus* (Lacepède) from Mozambique, Kenya, and Zanzibar as *U. micropterus* and added the locality of Natal. They gave the vertebral count as 114–118. Our Red Sea record is based on a single specimen found in the reference fish collection of Ilan Paperna, then of the former Heinz Steinitz Marine Biology Laboratory, Eilat, who was studying the gill parasites of Red Sea fishes. The specimen has been transferred to the collection of the Hebrew University of Jerusalem.

*Material Examined.*—HJ 17559, 220 mm, Gulf of Aqaba.

*Uropterygius nagoensis* Hatooka  
Figure 10

*Uropterygius nagoensis* Hatooka, 1984: 20, figs. 1–4 (type locality, Nago, Okinawa).

*Diagnosis.*—Body depth 24–24.5 in length; snout to anus 2.05–2.15 in length; head 9–11 in length; snout 6.1–6.3 in head; orbit diameter 8.5–9.3 in head; interorbital space 8.3–8.5 in head; gape 2.35–2.45 in head; four rows of slender sharp teeth in upper jaw and three in lower, the teeth progressively longer medially, the inner rows depressible; two extremely long, slender intermaxillary canines in a medial row; three progressively smaller vomerine teeth in one row; gill opening on upper third of side; posterior nostril centered above anterior edge of pupil; no lateral-line pores anterior to gill opening; vertebrae 136–138 (Red Sea), 140 (holotype); dorsal rays 57; origin of dorsal fin over 115th vertebra; anal rays 36; origin of anal fin over 123rd vertebra (fin-ray counts from largest Red Sea specimen). Light brown with large, dendritic, dark brown spots interconnected to form a coarse reticular pattern; an irregular white band across interorbital space.

*Remarks.*—*Uropterygius nagoensis* was previously known only from the 713-mm holotype obtained in the Nago fish market, Okinawa. The two Red Sea specimens were collected by the senior author with rotenone from a cave in the escarpment of the fringing reef about 500 m north of the entrance to Port Sudan Harbor at a depth of 6–20 m. A third Red Sea specimen, USNM 312825, 505 mm, was found in the fish collection of the U.S. National Museum of Natural History by David G. Smith. It was collected at Ras Muhammad, southern end

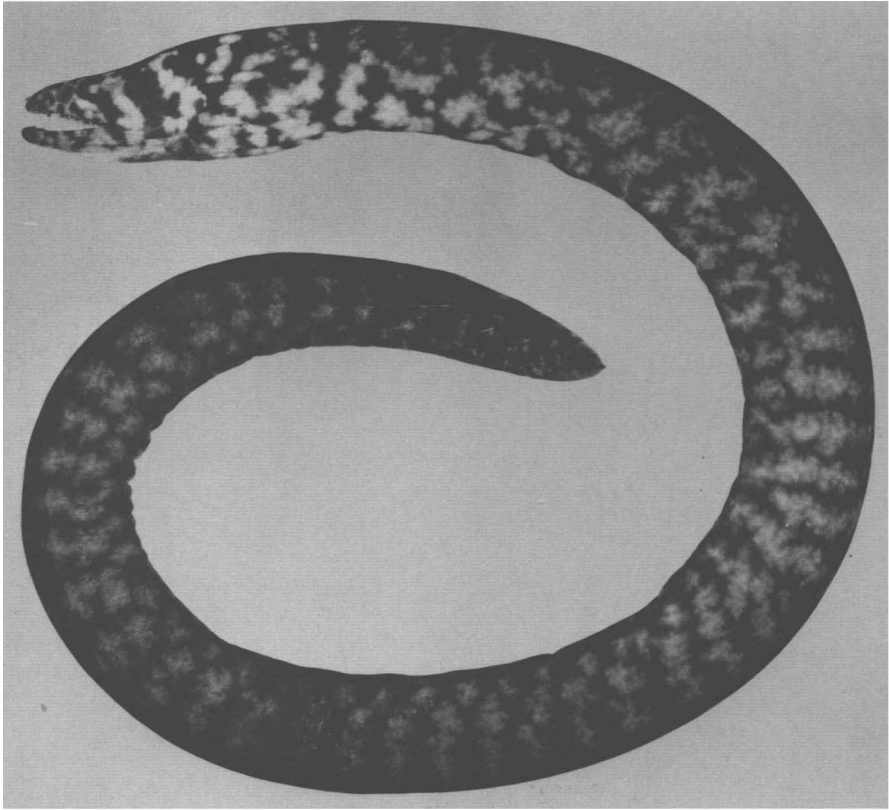


Figure 10. *Uropterygius nagoensis*, BPBM 20429, 389 mm, north of Port Sudan, Sudan.

of the Sinai Peninsula by Victor G. Springer in 1969. Two other lots in the Bishop Museum also represent significant range extensions: BPBM 12747, 550 mm, from Moorea, Society Islands and BPBM 15675, 242 mm, from Florida Island, Solomon Islands.

*Material Examined.*—BPBM 20429, 2: 152–389 mm, north of Port Sudan.

*Uropterygius polyspilus* (Regan)  
Plate IIh

*Gymnomuraena polyspilus* Regan, 1909: 438 (type locality, Tahiti).

*Uropterygius polyspilus*: Marshall, 1952: 224 (Sanafir Island, northern Red Sea).

*Diagnosis.*—Body depth 23–27 in length; snout to anus 2.0–2.1 in length; head about 11 in length; center of eye posterior to midpoint of fleshy gape; gill opening in middle of side; posterior nostril of adults in a tube above middle of eye; teeth in jaws in two rows, those of outer row very small, the inner teeth long and fang-like; three or four very long intermaxillary canines in a median row; vomerine teeth uniserial; fins confined to posterior part of tail; vertebrae 131–135. Light brown to white with scattered, large and small, roundish, dark brown spots (with irregular margins; a few may be merged); front of head with numerous much smaller dark brown spots; nostrils white.

*Remarks.*—This moray has been reported from few localities: Tahiti, Samoa, Pohnpei (Ponape), Johnston Island, Hawaiian Islands, Zanzibar, and the northern Red Sea. The Red Sea record is based on a single 201-mm specimen recorded by Marshall (1952) from Sanafir Island at the entrance to the Gulf of Aqaba. The senior author photographed the species off Jeddah, Saudi Arabia (Plate III). Several authors have remarked on the striking similarity of the color pattern of this moray to that of *Scuticaria tigrinus* (Lesson). The two are readily distinguished with specimens in hand by the anus of *S. tigrinus* being more than two-thirds the total length from the snout tip and by having larger and fewer teeth in the outer row of its jaws. Also, as noted by Gosline (1958) the inner row of teeth in the upper jaw of *S. tigrinus* extends only a little over half way back in the jaw, whereas the teeth continue nearly as far back as the outer row in *U. polyspilus*. With only the head end visible as in Plate III, the more posterior position of the eye of *U. polyspilus* provides separation (in *S. tigrinus* the eye is over or anterior to the center of the fleshy length of the gape). Fishelson (1992) reported this species to be a protogynous hermaphrodite. Attains at least 500 mm. The U.S. National Museum of Natural History has one specimen of *U. polyspilus* from the Red Sea deposited under USNM 312859.

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