

*Epinephelus heniochus* Fowler, 1904

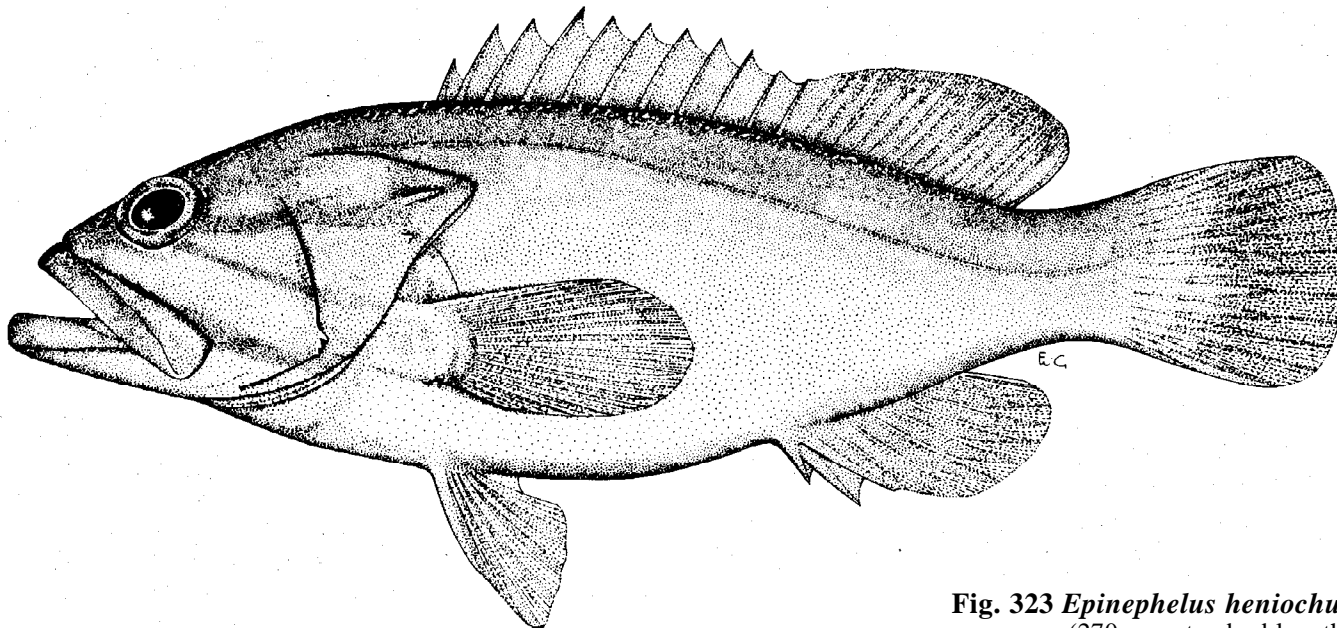
Fig. 323; Pl. XVD

SERRAN Epin 78

*Epinephelus heniochus* Fowler, 1904:522, pl. 18 (type locality: Padang, Sumatra [Sumatera]).

**Synonyms:** *Epinephelus hata* Katayama, 1953:52, figs 1 and 2 (type locality: Nagasaki, Japan).

**FAO Names:** En - Bridled grouper; Fr - M erou bride; Sp - Mero embridado.

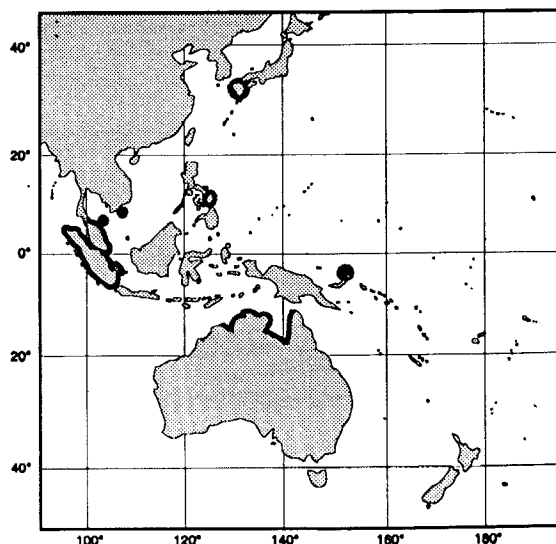


**Fig. 323** *Epinephelus heniochus*  
(270 mm standard length)

**Diagnostic Features:** Body depth contained 2.7 to 3.2 times in standard length (for fish 10 to 27 cm standard length). Head length contained 2.2 to 2.4 times in standard length; interorbital area slightly convex; dorsal head profile distinctly convex; preopercle angular, with 2 to 4 large spines at the angle; upper edge of operculum approximately straight; posterior nostrils about twice as large as anterior nostrils; maxilla usually reaches to or slightly past a vertical at rear edge of eye; lower edge of maxilla with a step-like bend in adults; canines at front of jaws well developed, especially in upper jaw; midlateral part of lower jaw with 2 rows of teeth. Gill rakers 7 to 9 on upper limb, 14 to 16 on lower limb. Dorsal fin with XI spines and 14 or 15 rays, the third or fourth spine longest, its length contained 3.0 to 3.8 times in head length and shorter than longest dorsal-fin rays; anal fin with III spines and 8 rays; pectoral-fin rays 16 to 18; pectoral-fin length contained 1.6 to 1.9 times and pelvic-fin length contained 1.9 to 2.4 times in head length; caudal fin rounded. Lateral-body scales ctenoid, without auxiliary scales; lateral-line scales 54 to 60; lateral-scale series 89 to 100. Pyloric caeca 7 or 8. **Colour:** Head and body pale brown dorsally, shading to whitish or pale pink ventrally; some specimens with minute brownish black dots on body and rear part of head; faint dark brown stripe from eye to end of operculum, another darker stripe from lower edge of eye to subopercle and a third from edge of preorbital to interopercle; pectoral fins hyaline greyish yellow; lower part of caudal fin sometimes darker than rest of fin; margin of interspinous dorsal-fin membranes yellow. The fish illustrated by Gloerfelt-Tarp and Kailola (1984) has a narrow dark brown margin along the rear edge of the caudal fin.

**Geographical Distribution:** Tropical western Pacific; *E. heniochus* is known with certainty from Indonesia, the Philippines; Gulf of Thailand, Viet Nam, northern Australia, and New Britain. Although Katayama's type specimens of *Epinephelus hata* were purchased from the Nagasaki fish market, the absence of other records of *E. heniochus* from Japan indicates that the types of *E. hata* may have been caught south of Japan (Fig. 324).

**Habitat and Biology:** *E. heniochus* seems to prefer soft (sedimentary) bottom, rather than rocky areas: most specimens have been taken with trawls on mud or silty sand bottom in depths of 40 to 235 m. Nothing has been published on the biology of this species.



**Fig. 324**

**Size:** Attains at least 35 cm standard length (43 cm total length).

**Interest to Fisheries:** According to Tan et al. (1982), *E. heniochus* is "common but not abundant" in the South China Sea, and it is not a "very popular food fish" (in the markets of Singapore). Caught with trawls and vertical longlines.

**Local Names:** JAPAN: Hohosujihata.

**Literature:** Randall and Heemstra (1991).

**Remarks:** *E. heniochus* is similar to *E. epistictus*. These two species share the following characters: distinctly enlarged serrae at the corner of the preopercle, 14 or 15 dorsal-fin rays, interspinous dorsal-fin membranes distinctly incised, midlateral part of lower jaw with 2 rows of teeth, similar morphometric features, and similarities in colour pattern. *E. epistictus* differs from *E. heniochus* in having more numerous scales (lateral-line scales 57 to 70 and lateral-scale series 105 to 127) and the dark brown or black dots on the body and rear part of head are conspicuous and larger than the exposed part of each scale and extend onto the dorsal and caudal fins; whereas, the dark dots of *E. heniochus* (if they are present) are faint and smaller than the exposed parts of the scales, and the dorsal and caudal fins are usually unspotted.

*Epinephelus hexagonatus* (Forster, 1801)

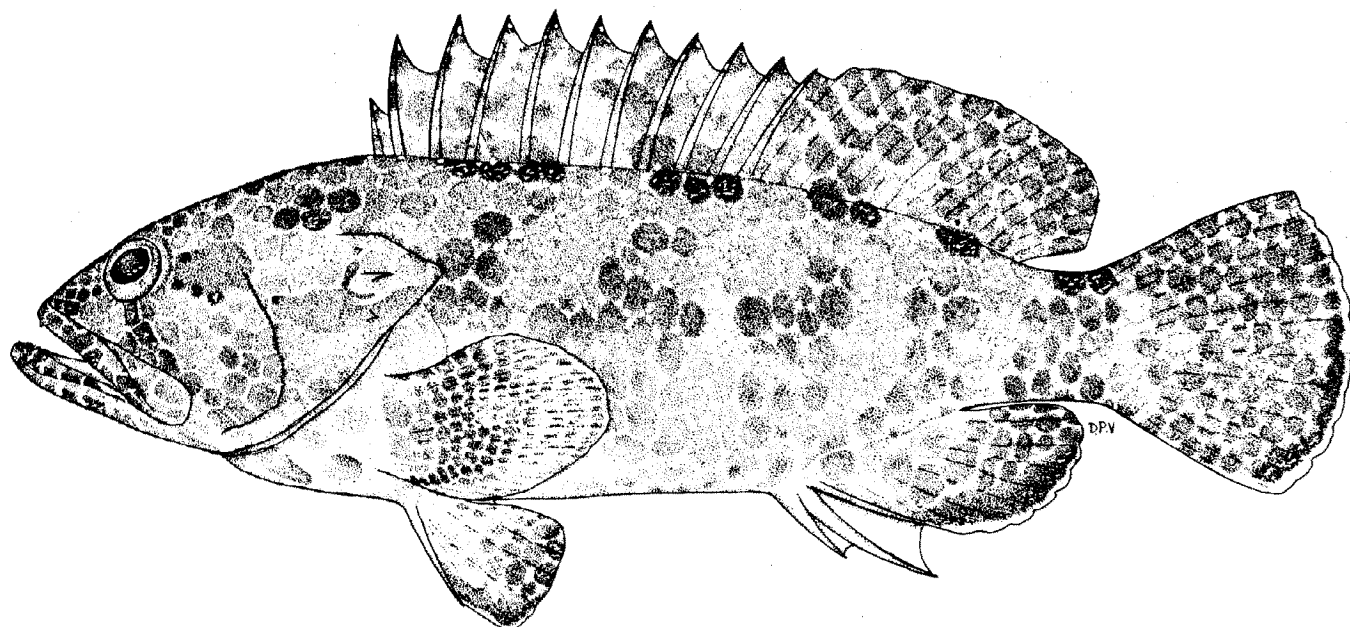
Fig. 325; Pl. XVE

SERRAN Epin 34

*Holocentrus hexagonatus* Forster in Bloch and Schneider, 1801:323 (type locality: Tahiti).

**Synonyms:** *Serranus Parkinsonii* Valenciennes in Cuv. and Val., 1828:329 (type locality: Tahiti). *Serranus stellans* Richardson, 1842:23 (type locality: Melville Island, Torres Strait).

**FAO Names:** En - Star-spotted grouper (formerly: White-speckled grouper); Fr - M erou m elif ere; Sp - Mero mielero.



**Fig. 325** *Epinephelus hexagonatus*  
(152 mm standard length)

**Diagnostic Features:** Body depth contained 2.8 to 3.4 times in standard length (for fish 10 to 17 cm standard length). Head length contained 2.5 to 2.6 times in standard length; interorbital area flat, the dorsal head profile convex; preopercle rounded, the ventral serrae slightly enlarged; upper edge of operculum convex; nostrils subequal; maxilla reaches to or past vertical at rear edge of eye; ventral edge of maxilla smoothly curved; midlateral part of lower jaw with 3 to 5 rows of teeth. Gill rakers 7 to 9 on upper limb, 17 to 19 on lower limb. Dorsal fin with XI spines and 15 to 17 rays, the fifth to ninth spines subequal (their length contained 2.5 to 2.8 times in head length) and slightly shorter than longest rays, the interspinous membranes incised; anal fin with III spines and 8 rays, the second spine contained 2.1 to 2.5 times in head length, distinctly longer than third spine or depth of peduncle; pectoral-fin rays 17 to 19; pectoral-fin length contained 1.6 to 1.9 times in head length; pelvic fins not reaching past anus, their length contained 1.8 to 2.1 times in head length; caudal fin rounded. Lateral-body scales ctenoid, with auxiliary scales; lateral-line scales 61 to 70; lateral-scale series 93 to 114. **Colour:** Head and body covered with polygonal (mostly

hexagonal) brown spots that tend to merge, leaving only conspicuous triangular white dots at corners of the polygons; spots on belly and ventral part of head more rounded and separated and often reddish brown; 4 or 5 brownish black saddle blotches (formed by groups of darker spots) on dorsal part of body and caudal peduncle, the first 4 extending onto base of dorsal fin; irregular dark bar, formed by darker polygonal spots, on lower part of body below each saddle blotch; dark spots on head progressively smaller anteriorly; large dark brown or olive spot just behind eye, sometimes joined to a horizontally elongate spot of the same colour on opercle; all fins with close-set dark brown or reddish brown spots and white dots, except outer half of pectoral fins with faint dark spots and no white dots; leading edge of pelvic fins and distal margin of anal fin with pale edge and dark brown submarginal band; margin of interspinous dorsal-fin membranes with a blackish brown triangle and short white or pale yellow filament behind tip of each spine. The conspicuous white dots on the body and fins often persist on preserved specimens.

**Geographical Distribution:** *E. hexagonatus* is one of the most widely distributed groupers, occurring from the western Indian Ocean to Henderson Island in the Pitcairn Group. It is an insular species, and its absence in the Red Sea and Persian Gulf may be due to its avoidance of continental shelf environments. It is known from most of the tropical Indo-Pacific islands; however, the 112 mm standard length specimen from the Chagos Islands that was illustrated by Winterbottom et al. (1989:fig. 135) is *E. pilotoceps*. *E. hexagonatus* occurs at Latham and Zanzibar

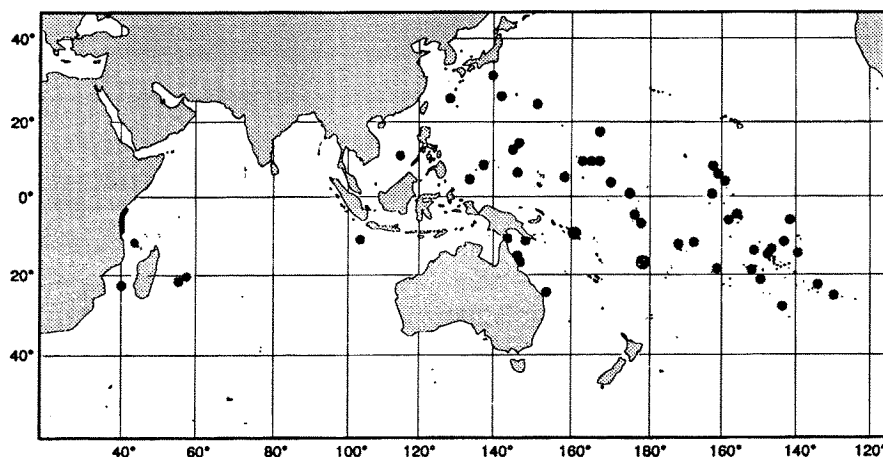


Fig. 326

islands off the coast of Tanzania, but none have been taken on the African coast, except for the specimen recorded by Randall and Heemstra (1991) from the Kenyan coast north of Kilifi Creek. We have examined specimens from the Comoros, Mauritius, Reunion, Japan (Ryukyu and Izu Islands), and most of the islands of the western and central Pacific region (both on and off the Pacific Plate). It is known from islands of the Great Barrier Reef, but no specimens have been collected from the mainland coast of Australia. We know of no verifiable records from Indonesia, the Philippines, Taiwan, or the Hawaiian Islands (Fig. 326).

**Habitat and Biology:** *E. hexagonatus* is a coral-reef species, which is usually found in shallow outer-reef areas exposed to surge. It feeds mainly on fishes and crustaceans (especially stomatopods and brachyuran crabs).

**Size:** Maximum total length about 26 cm.

**Interest to Fisheries:** Probably of some importance as a food fish in artisanal fisheries because of its abundance at most islands. Caught with hook-and-line, traps, spear, and in gill nets.

**Local Names:** GAMBIER ISLANDS: Ako; JAPAN: Ishigakihata; MARQUESAS: Taaiao, Teeiao; TAHITI: Tarao a'au.

**Literature:** Randall and Brock (1960); Hiatt and Strasburg (1960); Harmelin-Vivien and Bouchon (1976); Randall and Heemstra (1991).

**Remarks:** *E. hexagonatus* is one of 9 shallow-water coral reef species that have a rounded caudal fin and close-set dark brown spots, with the pale interspaces forming a network on the body. These "reticulated groupers" have been much confused in the literature, and many museum specimens have been misidentified. These other species differ from *E. hexagonatus* as follows:

*E. bilobatus* has 3 bilobed dark blotches or close-set pairs of dark brown spots on body and base of dorsal fin, no white dots on body, dorsal-fin rays 17 or 18; second and third anal-fin spines subequal, and lateral-line scales 48 to 52.

*E. faveatus* has the lateral-body scales smooth (except for area covered by pectoral fins), no white dots on body, midlateral part of lower jaw with 2 rows of teeth, and lateral-line scales 48 to 52.

*E. macrospilos* has the lateral-body scales mostly smooth, lateral-line scales 48 to 52, lower gill rakers 14 to 17, no triangular white dots on the body, and pectoral fins dusky with narrow white edge.

*E. maculatus* has the dorsal-fin membranes not incised between the spines; third or fourth dorsal-fin spine longest (its length contained 2.1 to 2.6 times in head length and usually longer than dorsal-fin rays), no white dots on body, and juveniles have a few large white blotches on body and dorsal fin.

*E. melanostigma* has a single black blotch at base of last 4 dorsal-fin spines and no white dots on the body, second anal-fin spine subequal to third, its length contained 2.6 to 3.6 times in head length and not more than depth of peduncle.

*E. merra* has the pectoral fins with small black spots largely confined to the rays, no white dots on body, no black blotches at base of dorsal fin, and 48 to 53 lateral-line scales.

*E. quoyanus* has lateral-line scales 48 to 52, lower gill rakers 14 to 16, larger pectoral fins (its length contained 1.2 to 1.7 times in head length), second and third anal-fin spines subequal and not much longer than depth of peduncle, and no triangular white dots on body.

*E. spilotoceps* has distinct black dots on the snout, no triangular white dots on body, no large olive-brown spot behind eye, shorter second anal-fin spine (its length contained 2.4 to 3.4 times in head length), and a distinct notch in rear edge of preopercle just above the corner.

*Epinephelus howlandi* (Günther, 1873)

Fig. 327; Pl. XVF

SERRAN Epin 79

*Serranus howlandi* Günther, 1873:8, pt. 9, fig. B (type locality: Howland Island, central Pacific Ocean).

**Synonyms:** *Epinephelus spilotus* Schultz, 1953:332, 352, fig. 55 (type locality: Enewetak Atoll, Marshall Islands). Often misidentified as *E. macropilos* or *E. corallicola*.

**FAO Names:** En - Blacksaddle grouper; Fr - Mérou selle noir; Sp - Mero montura negra.

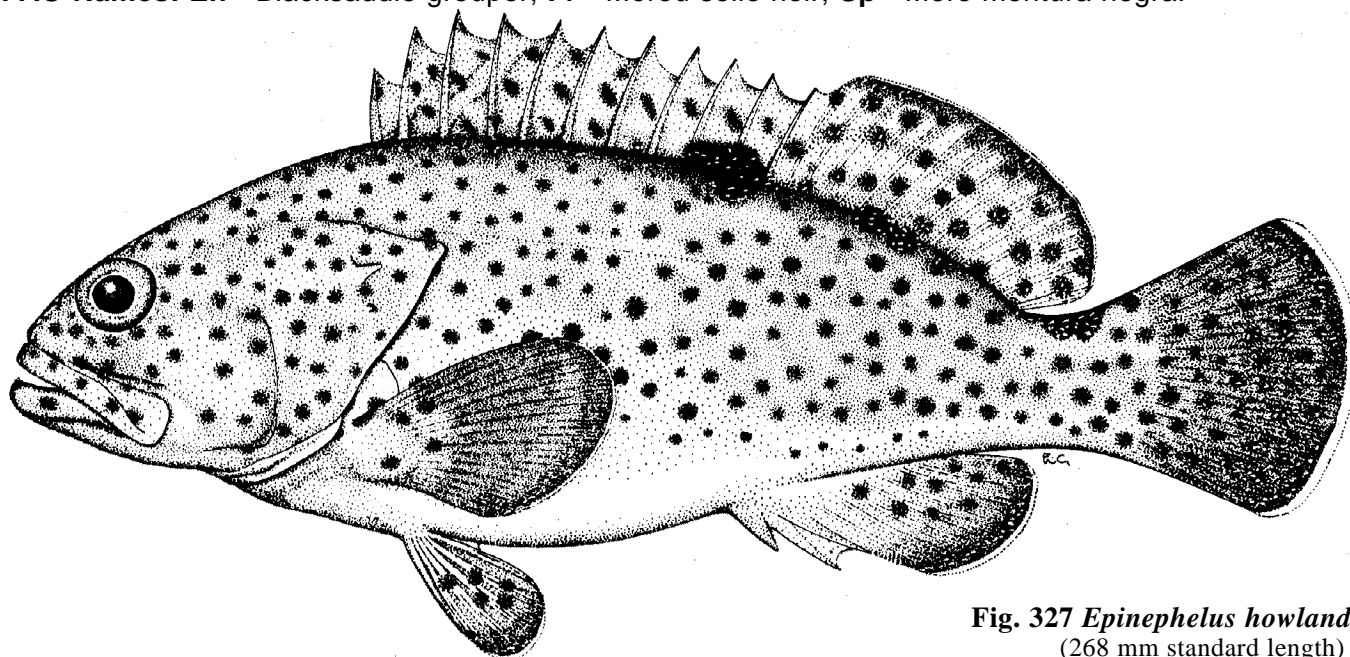


Fig. 327 *Epinephelus howlandi*  
(268 mm standard length)

**Diagnostic Features:** Body depth contained 2.9 to 3.3 times in standard length (for fish 10 to 31 cm standard length). Head length contained 2.2 to 2.5 times in standard length; interorbital area flat, the dorsal head profile convex; preopercle rounded, the serrae at "angle" slightly enlarged; upper edge of operculum almost straight; nostrils subequal; maxilla reaches past vertical at rear edge of eye; midlateral part of lower jaw with 2 to 4 rows of teeth. Gill rakers 7 to 9 on upper limb, 15 to 17 on lower limb, total 23 to 26; gill raker at angle distinctly longer than adjacent rakers. Dorsal fin with XI spines and 15 to 17 rays, the third or fourth spine longest, subequal to longest rays and contained 2.7 to 3.6 times in head length, the interspinous membranes incised; anal fin with III spines and 8 rays, the second and third spines subequal; pectoral-fin rays 17 to 19; pectoral-fin length contained 1.6 to 2.1 times in head length; pelvic fins not reaching anus except in small specimens, their length contained 2.0 to 2.4 times in head length; caudal fin rounded. Lateral-body scales usually smooth (a few ctenoid scales may be found in area covered by pectoral fin), with numerous auxiliary scales; lateral-line scales 49 to 52; lateral-scale series 85 to 102. Pseudobranch pocket well developed; pyloric caeca 13. **Colour:** Head and body pale grey or brownish grey, covered with small brownish black spots (centre black, edges diffuse and brownish) separated from adjacent spots by spaces equal to or greater than width of spots; black saddle blotch on body and dorsal fin at base of last 3

spines and a smaller black saddle blotch on caudal peduncle; no dark spots on belly, chest or underside of head; median and pelvic fins with dark spots as on body, the margins of soft dorsal, caudal, and anal fins dusky, with a white-line along the edge; pectoral fins dusky with a few dark spots basally.

**Geographical Distribution:** *E. howlandi* occurs in the tropical western central Pacific from the Ryukyu Islands to New Guinea, the Great Barrier Reef and eastward to Lord Howe Island, New Caledonia, Vanuatu, Caroline Islands, Palau, Marshall and Mariana Islands, Howland Island, and the Samoa Islands (Fig. 328).

**Habitat and Biology:** Usually found in rocky areas or on coral reefs at depths from 1 to 37 m. Nothing has been published on the biology of *E. howlandi*.

**Size:** Attains at least 44 cm total length (35 cm standard length).

**Interest to Fisheries:** *E. howlandi* appears to be rare and is thus of little commercial importance.

**Local Names:** JAPAN: Hiregurohata.

**Literature:** Randall and Heemstra (1991).

**Remarks:** Boulenger (1895) synonymized *Serranus howlandi* Günther and *S. macrospilos* Bleeker with *E. corallicola* (Valenciennes), and these three species have been confused ever since. Katayama (1960,1988) and Shirai (1986) misidentified *E. howlandi* as *E. corallicola*. Hoese (1976) was the first author to recognize *E. howlandi* as a valid species and distinguish it from *E. corallicola*. Schultz (1953) shifted *E. howlandi* to the synonymy of *E. macrospilos*, and Randall (1987), Masuda and Allen, (1987) and Myers (1989) also misidentified it as *E. macrospilos*. The colour pattern of adult *E. corallicola* is similar to that of *E. howlandi*, but the latter lacks dark spots on the belly, chest, underside of the head, and on the dorsal part of the eye (these areas spotted in *E. corallicola*); and *E. howlandi* has a white line along the edge of the anal and caudal fins, which is absent in *E. corallicola*. Other characters by which *E. corallicola* differs from *E. howlandi* are the ctenoid lateral-body scales, 53 to 63 lateral-line scales, posterior nostrils vertically elongate in adults, absence of a pseudobranch pocket, and the gill raker at the angle of the first gill arch subequal in length to adjacent rakers. *E. macrospilos* differs from *E. howlandi* in lacking a black blotch on body at base of last 3 dorsal-fin spines, and in having a submarginal series of dark spots paralleling rear edge of caudal fin, usually fewer gill rakers (total 21 to 25), pectoral-fin rays 17 to 20 (usually 19), and a strongly projecting lower jaw.

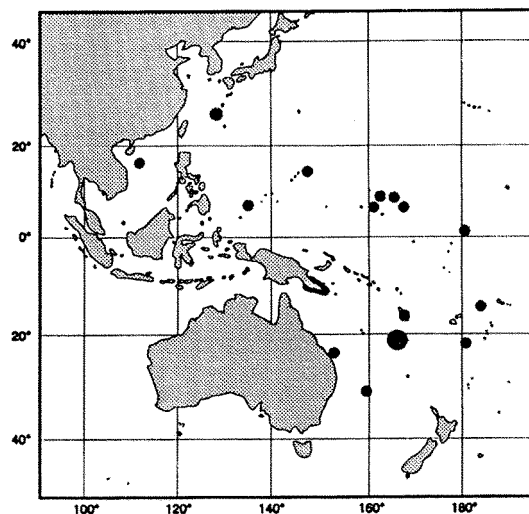


Fig. 328

*Epinephelus indistinctus* Randall and Heemstra, 1991

Fig. 329

SERRAN Epin 80

*Epinephelus indistinctus* Randall and Heemstra, 1991:171, fig. 84 (type locality: Indian Ocean off Somalia, 09°3'N, 50°59'E).

**Synonyms:** None.

**FAO Names:** En - Somali grouper; Fr - Mériou somali; Sp - Mero Somali.

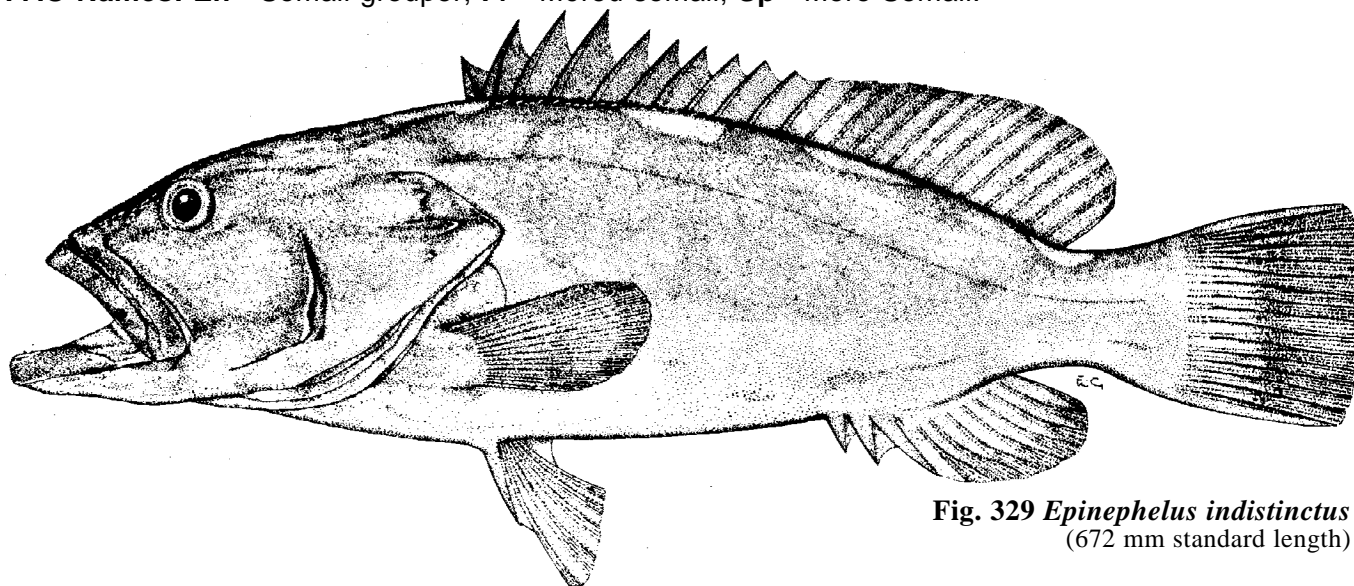


Fig. 329 *Epinephelus indistinctus*  
(672 mm standard length)

**Diagnostic Features:** Body depth contained 3.2 times in standard length (1 specimen, 672 mm standard length). Head length contained 2.3 times in standard length; interorbital area convex, the dorsal head profile slightly convex; preopercle angular, with a shallow indentation just above the rounded angle, the serrae not noticeably enlarged at the angle; upper edge of operculum almost straight; nostrils subequal; maxilla probably reaches vertical at rear edge of eye (holotype preserved with mouth wide open); midlateral part of lower jaw with 2 rows of subequal small teeth; small canines at front of jaws. Gill rakers 9 on upper limb, 14 on lower limb, the longest raker about 2/3 length of longest gill filament; small bony platelets on gill arches. Dorsal fin with XI spines and 14 rays, the fourth spine longest, its length contained 4.2 times in head length and shorter than longest dorsal-fin rays, the interspinous membranes distinctly incised; anal fin with III spines and 8 rays; pectoral-fin rays 18; pectoral-fin length contained 2.4 times in head length; pelvic-fin length contained 2.7 times in head length; caudal-fin rear margin slightly convex. Lateral-body scales smooth (except for area covered by pectoral fins), with numerous auxiliary scales; lateral-line scales 64; lateral-scales series 114. Pyloric caeca more than 50. **Colour** in alcohol: Head, body, and median fins dark greyish brown, the exposed part of dorsolateral-body scales darker, thus giving a faint finely dotted pattern; 4 faint pale blotches on body at base of dorsal fin, the first at origin of fin and extending anterior to it, the last at base of last 3 or 4 rays and extending onto top of front half of peduncle.

**Geographical Distribution:** Known only from Indian Ocean off Somalia (Fig. 330).

**Habitat and Biology:** The holotype was caught with a trawl at a depth of 70 to 80 m.

**Size:** Attains at least 67 cm standard length (80 cm total length).

Interest to Fisheries: Unknown.

**Local Names:**

**Literature:** Randall and Heemstra (1991).

**Remarks:** *E. indistinctus* is known only from the holotype collected off Somalia. It has the same shape, fin-ray and scale counts, and nondescript colour pattern (on large adults) as *E. bruneus* of the western Pacific, but *E. bruneus* has longer teeth, 16 to 18 lower gill rakers, no auxiliary scales on body, and enlarged serrae at preopercle angle.

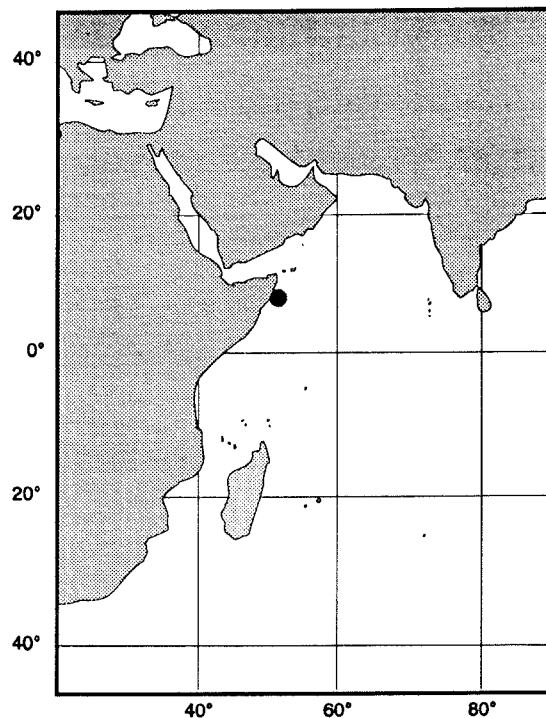


Fig. 330

*Epinephelus irroratus* (Forster, 1801)

Fig. 331; Pl. XVII A

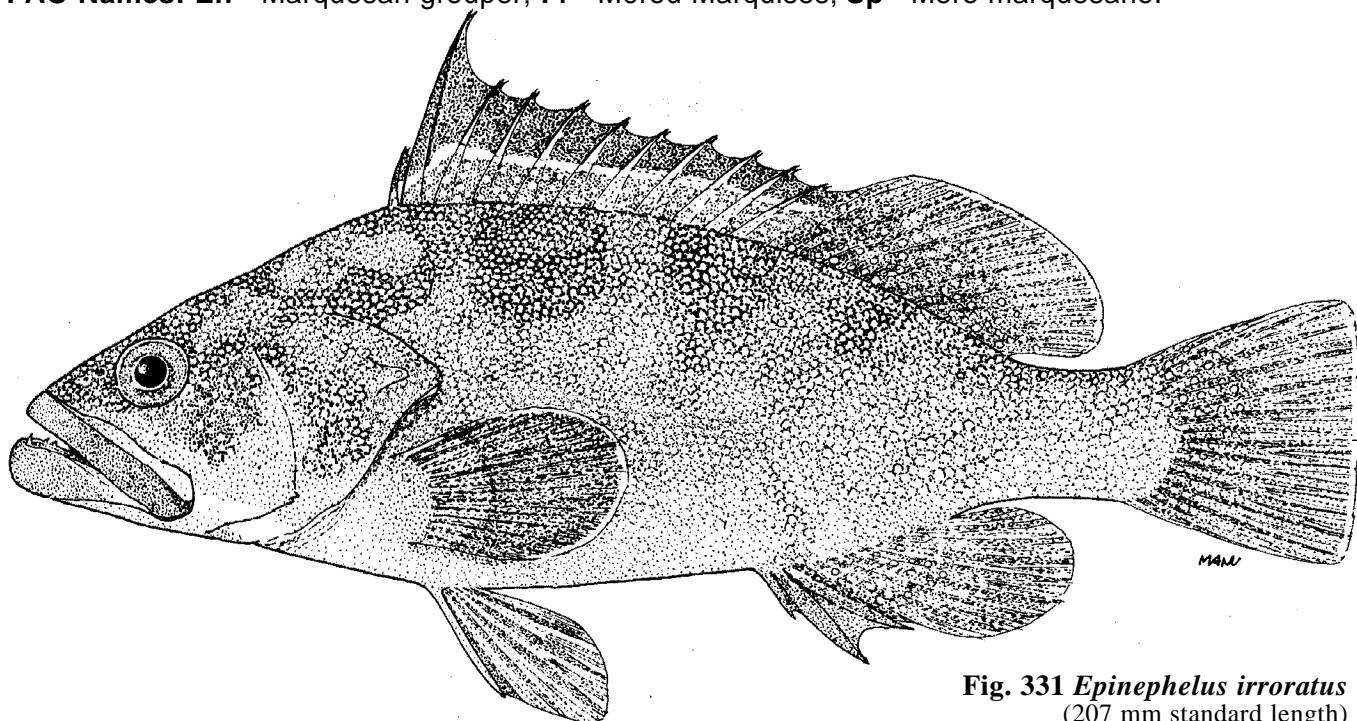
SERRAN Epin 81

*Percam irroratum* Forster in Bloch and Schneider, 1801:333 (type locality: Santa Christina Island [= Tahuata] Marquesas Islands).

**Synonyms:** *Perca irrorata* Forster, 1844:222 (type locality: Santa Christina Island). *Serranus spiniger* Günther, 1859:146 (type locality: unknown). *Epinephelus albopunctulatus* Boulenger, 1895:234, pl. 9 (type locality: Nuku Hiva, Marquesas Islands).



**FAO Names:** En - Marquesan grouper; Fr - M erou Marquises; Sp - Mero marquesano.



**Fig. 331** *Epinephelus irroratus*  
(207 mm standard length)

**Diagnostic Features:** Body depth contained 2.7 to 3.3 times in standard length (for fish 14 to 28 cm standard length). Head length contained 2.4 to 2.6 times in standard length; interorbital area and dorsal head profile slightly convex: preopercle corner rounded and slightly indented, the lower serrae scarcely enlarged; upper edge of operculum almost straight; posterior nostrils about twice the size of anterior nostrils; maxilla reaching to or just past vertical at rear edge of eye; midlateral part of lower jaw with 2 to 4 rows of teeth. Gill rakers 6 to 8 on upper limb, 13 to 16 on lower limb. Dorsal fin with XI spines and 16 rays, the second spine greatly elongated in adults, more than twice length of third spine, the interspinous membranes not or only slightly incised; anal fin with III spines and 8 rays; pectoral-fin rays 18 to 20; pectoral-fin length contained 1.6 to 1.9 times in head length; pelvic fins not reaching past anus, their length contained 1.8 to 2.0 times in head length; caudal fin truncate to slightly rounded. Lateral-body scales ctenoid, with auxiliary scales; lateral-line scales 70 to 75; lateral-scale series 117 to 136. **Colour:** Reddish brown with white dot on each scale (dots may not persist in preservative); maxillary streak dark reddish brown; spinous dorsal fin with prominent dark red margin; white line along rear edges of median and pectoral fins.

**Geographical Distribution:** *E. irroratus* is known only from the Marquesas Islands and 1 specimen from Minami Tori Shima (Marcus Island) (Fig. 332); the latter record may be erroneous (see Remarks below).

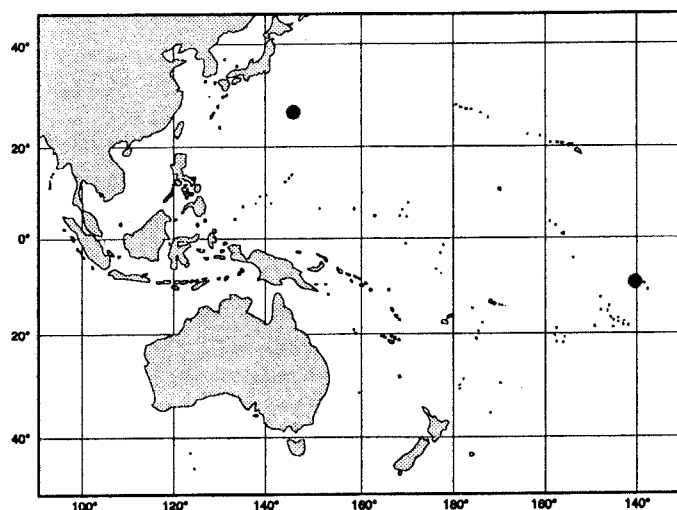
**Habitat and Biology:** Abundant in shallow water around fringing coral reefs. Nothing has been published on the biology of this species.

**Size:** Attains at least 34 cm total length.

**Interest to Fisheries:** *E. irroratus* is of considerable interest to the artisanal fishery of the Marquesas Islands. Caught with hook-and-line, spear, and traps.

**Local Names:** MARQUESAS: Kopau.

**Literature:** Bagnis et al. (1972); Zama (1978); Randall and Heemstra (1991).



**Fig. 332**

**Remarks:** Except for the single specimen reported from Minami Tori Shima Island by Bryan and Herre (1903), *E. irroratus* is known only from the Marquesas Islands where it is a relatively common inshore species. In view of the vast distance (about 7 500 km) between these two localities, the absence of other records outside the Marquesas, and the failure to find the species during two weeks of fish collecting by one of us (J.E.R.) at Minami Tori Shima; it seems likely that this report of *E. irroratus* may be based on a locality error.

*Epinephelus itajara* (Lichtenstein, 1822)

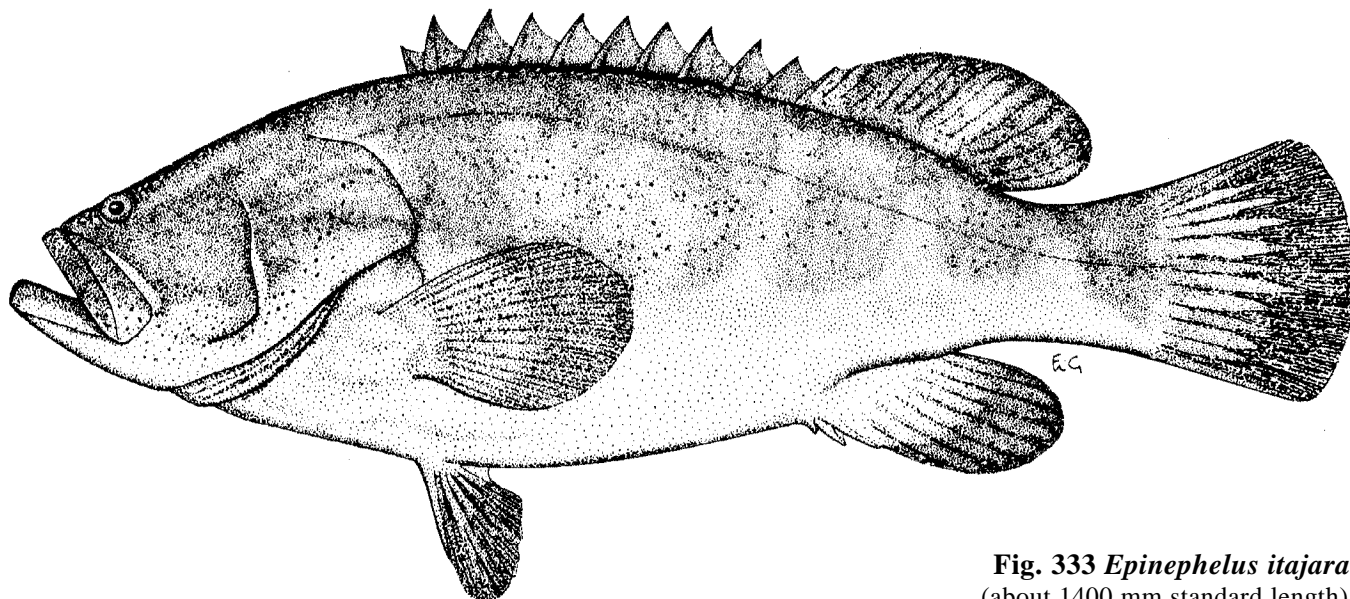
Fig. 333; Pl. XVII B

SERRAN Epin 17

***Serranus itajara*** Lichtenstein, 1822:278 (type locality: Brazil).

**Synonyms:** ?*Serranus Mentzelii* Valenciennes, 1828:291 (type locality: Brazil). ?*Serranus galeus* Müller and Troschel, 1848:621 (type locality: Guyana). *Serranus guasa* Poey, 1861:141, 354, pl. 13, fig. 8 (type locality: Cuba). *Serranus quinquefasciatus* Bocourt, 1868:223 (type locality: Pacific coast of Guatemala). ?*Promicrops esonue* Ehrenbaum, 1914:293; 191554, fig. (type locality: Cameroun). ?*Promicrops ditobo* Roux and Collignon, 1954:473 (type locality: French Equatorial Africa: Kouilou estuary).

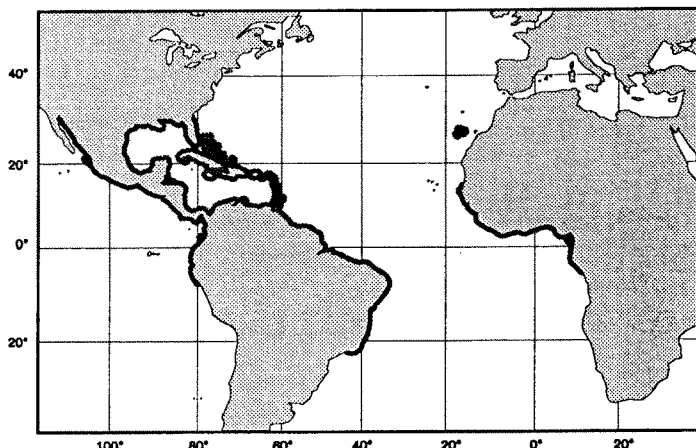
**FAO Names:** En - Jewfish (formerly: Giant grouper); Fr - Mérou géant; Sp - Mero guasa.



**Fig. 333** *Epinephelus itajara*  
(about 1400 mm standard length)

**Diagnostic Features:** Body robust, elongate, the greatest width more than half of body depth, which is distinctly less than head length (in fish 15 to 160 cm); body depth contained 2.7 to 3.4 times in standard length. Head length contained 2.3 to 2.9 times in standard length; head extremely broad; interorbital flat, the width equals eye diameter in fish 10 to 15 cm standard length, distinctly greater than eye diameter in fish 18 to 25 cm standard length, and 1.5 to 3.4 times greater than eye diameter in fish 30 to 160 cm standard length; eye diameter contained 5 to 8 times in head length for fish 10 to 30 cm standard length and 8 to 13 times in head length for fish 35 to 160 cm standard length; preopercle rounded, finely serrate; nostrils round, subequal; maxilla scaly, reaching well past eye; midlateral part of lower jaw with 3 to 5 rows of subequal teeth; no canines at front of jaws. Gill rakers 8 or 9 on upper limb and 13 to 15 on lower limb, total 21 to 24; gill arches covered with small bony plates. Dorsal fin with XI spines and 15 or 16 rays, the spines short, 3rd to 11th subequal and shorter than the first ray, the membranes distinctly indented between the spines; anal fin with III spines and 8 rays; pectoral-fin rays 18 or 19; caudal fin rounded. Body scales strongly ctenoid; lateral-line scales 61 to 64, each with 4 to 6 radiating ridges; lateral-scale series 89 to 112. **Colour:** Generally brownish yellow, grey, or greenish; head, dorsal part of body, and fins with small black spots, becoming smaller with growth. Fish less than about 1 m show 3 or 4 faint, irregular, subvertical dark bars posteriorly on body; and another covering rear half of caudal peduncle; large adults darker and more uniformly coloured than juveniles.

**Geographical Distribution:** Tropical and subtropical waters of the Atlantic and eastern Pacific oceans. In the western Atlantic, it ranges from Florida to southern Brazil, and is caught widely in the Gulf of Mexico and most of the Caribbean. In the eastern Atlantic, *E. itajara* is reported (as *Epinephelus esonue*) by Séret (1981) and Smith (1981) from Senegal to the Congo; according to Brito (1991) it is rare in the Canary Islands. In the eastern Pacific, it occurs from the Gulf of California to Peru (Fig. 334).



**Fig. 334**



**Habitat and Biology:** This giant grouper is often found in shallow water; juveniles are common in mangrove swamps and both juveniles and adults occur in bays and harbours. Large adults are also encountered offshore on wrecks and in areas of high relief; they appear to occupy limited home ranges with little inter-reef movement, and the same individuals were seen at specific reef sites for more than a year (G.B. Smith, 1976).

Schroeder (1924) found that spawning occurred in July and August in the vicinity of Key West, Florida and the greater numbers of large adults captured at this time indicated that the local fishermen were probably exploiting spawning aggregations of this species. G.B. Smith (1976) observed what may have been a spawning aggregation of 20 to 30 large adults (45 to 200 kg) during a dive on a wreck in 36 m off the west coast of Florida in June 1971.

Bullock and Smith (1991) estimated batch fecundity for two females of 132 and 140 cm standard length at 37 to 40 million and 55 to 58 million oocytes, respectively.

Bullock et al. (1992) studied age, growth and reproduction of jewfish from the eastern Gulf of Mexico. Growth averaged >100 mm/year until the age of 6 years, when sexual maturity is attained at a size of 110 to 115 cm total length for males and 120 to 135 cm for females; growth then declined to about 30 mm/year at age 15 (182 to 191 cm total length), and to <10 mm/year after age 25. Age data from 382 fish were used to calculate the von Bertalanffy growth equation: total length (mm) = 2006 (1 - e<sup>(1-0.126(age+0.49))</sup>).

The oldest fish in their sample was 37 years and measured 197 cm total length. The peak spawning activity occurred during July to September. Contrary to reports for other groupers, Bullock et al. (1992) found that male jewfish are mature at a slightly smaller size and younger age than females, and they found no conclusive evidence for protogyny in this species.

Adults and juveniles feed heavily on crustaceans (shrimps, crabs, and lobsters), and in the Caribbean, jewfish are an important predator of lobsters. *E. itajara* take octopus, fishes (including stingrays, ariid catfishes, spadefish, parrotfish, diodontids and ostaciids), and young sea turtles.

**Size:** *E. itajara* and *E. lanceolatus* of the Indo-Pacific region are the two largest species of grouper. The maximum size for jewfish is about 250 cm total length and at least 320 kg. The IGFA all-tackle record (as of 1991) is 308 kg. Bullock et al. (1992) gave the following weight/length formula for 66 jewfish:  $W = 1.31 \times 10^{-8} L^{3.036}$ , where *W* is whole weight (kg) and *L* (total length) in millimetres.

**Interest to Fisheries:** Jewfish are of minor importance in commercial fisheries off the west coast of Florida, where landings for 1988 totalled 61 700 kg. They are easily approached and speared by divers, hence they are scarce in areas accessible to divers. Caught with hook-and-line, occasionally in traps and trawls. Because of their slow growth, longevity, and vulnerability during spawning-aggregations, jewfish have recently been designated as protected species in the US Exclusive Economic Zone.

**Local Names:** BRAZIL: Mero; COLOMBIA: Mero guasa; MEXICO: Cherna; PERU: Cherne; USA: Jewfish; VENEZUELA: Guasa.

**Literature:** Randall (1967); Smith (1971); Thomson et al. (1979); Bullock and Smith (1991); Heemstra (1991); Bullock et al. (1992).

**Remarks:** *E. itajara* and *E. lanceolatus* of the Indo-West Pacific region have usually been recognized in the genus *Promicrops*, but we agree with Smith's (1971) decision to include these two species in *Epinephelus*. These two species differ from other species of the genus by having the tubes of the lateral-line scales with 4 to 6 radiating branches. Except for large adults of *E. malabaricus* and *E. coioides* (which have a few anterior lateral-line scales with branched tubules), the lateral-line scales of other *Epinephelus* have unbranched tubes.

Although we doubt that *E. itajara* of the eastern and western Atlantic and the eastern Pacific share a common gene pool, we are unable to find any significant differences in the published data or the specimens that we have examined from these three areas. If there is any species of American grouper that occurs on both sides of the Central American Isthmus, it would be *E. itajara*. It seems feasible that juveniles, with their predilection for estuarine and mangrove habitats, could easily traverse the Isthmus via the Panama Canal. Johnson and Keener (1984) illustrated the second dorsal- and pelvic-fin spines of the larvae.