

Epinephelus acanthistius (Gilbert, 1892)

Fig. 239; Pl. VIIA

SERRAN Epin 59

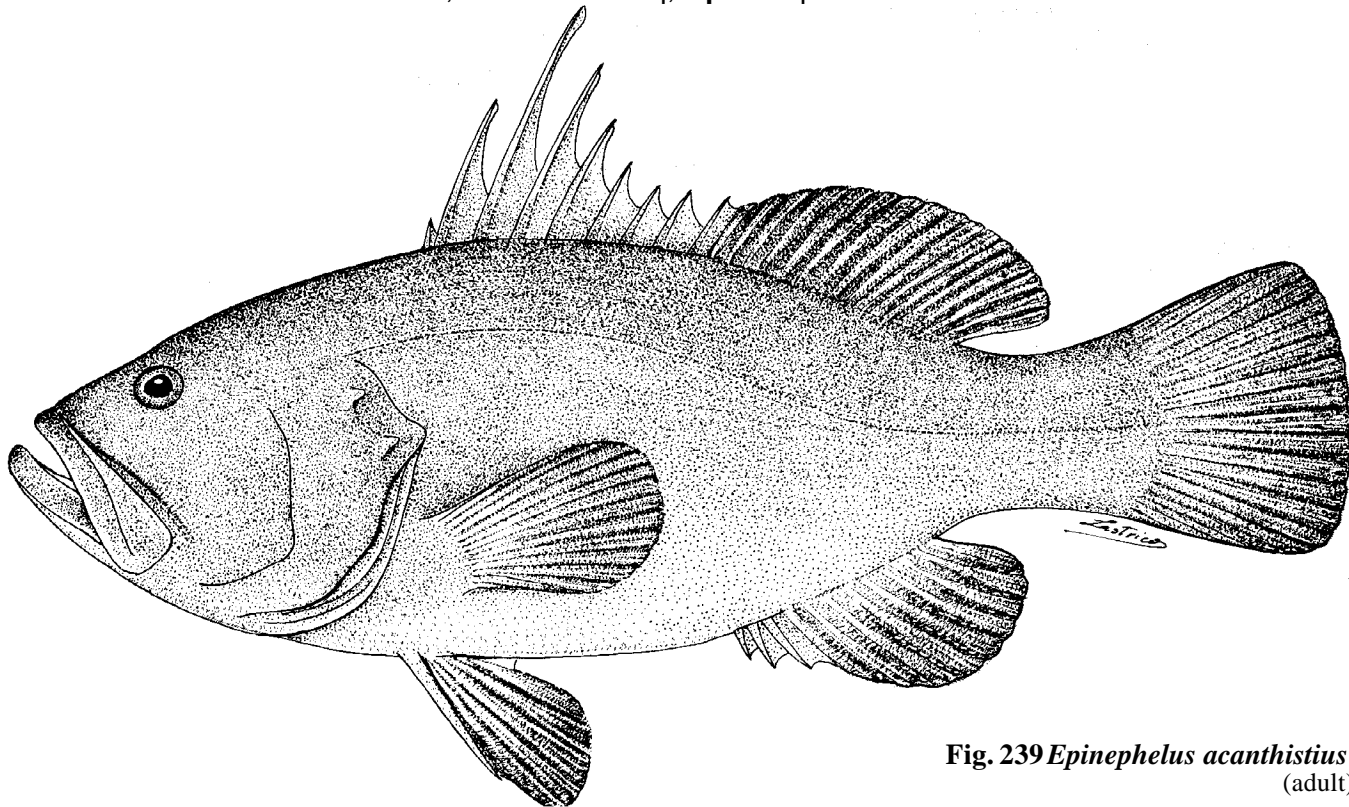
Bodianus acanthistius Gilbert, 1892:552 (type locality: Cape Lobos, Gulf of California).**Synonyms:** *Cephalopholis popino* Walford, 1936:3 (type locality: Mazatlan, Mexico). *Cephalopholis acanthistius***FAO Names:** En - Rooster hind; Fr - Merou coq; Sp - Baqueta.

Fig. 239 *Epinephelus acanthistius*
(adult)

Diagnostic Features: Body depth contained 2.4 to 2.6 times in standard length (in fish 10 to 50 cm standard length), Head length contained 2.3 to 2.4 times in standard length; interorbital area convex; preopercle rounded, finely serrate, the serrae at the angle enlarged but covered by skin; upper edge of operculum distinctly convex. Gill rakers 10 or 11 on upper limb and 14 to 17 on lower limb, total 25 to 27. Dorsal fin with IX spines and 17 rays; adults with second to fourth dorsal-fin spines greatly elongated and the interspinous membranes deeply incised; anal fin with III spines (the third longest) and 9 rays; pectoral-fin rays 18 or 19; pelvic-fin origin in front of lower end of pectoral-fin base; pelvic fins shorter than pectoral fins; caudal fin rounded. Midlateral-body scales ctenoid; distal parts of soft dorsal, anal, and caudal fins without scales; lateral-line scales 61 to 64; lateral-scale series 93 to 98. **Colour:** Head and body dark red or brown; pectoral fins darker than body; tips of interspinous dorsal-fin membranes darker than rest of membranes; naked distal portion of soft dorsal, anal, and caudal fins darker than proximal (scaly) parts of these fins; prominent black moustache streak above maxilla.

Geographical Distribution: Southern California to Peru (Fig. 240).

Habitat and Biology: *E. acanthistius* is a common species in the Gulf of California. Although occasionally caught close to shore, it is usually found in depths of 46 to 90 m (Thomson et al., 1979).

Size: Attains at least 100 cm total length.

Interest to Fisheries: This species is of some importance in the local fisheries of the Gulf of California. Caught in trawls or with hook-and-line.

Local Names: USA: Gulf Coney.

Literature: Walford (1937); Smith (1971); Thomson et al. (1979).

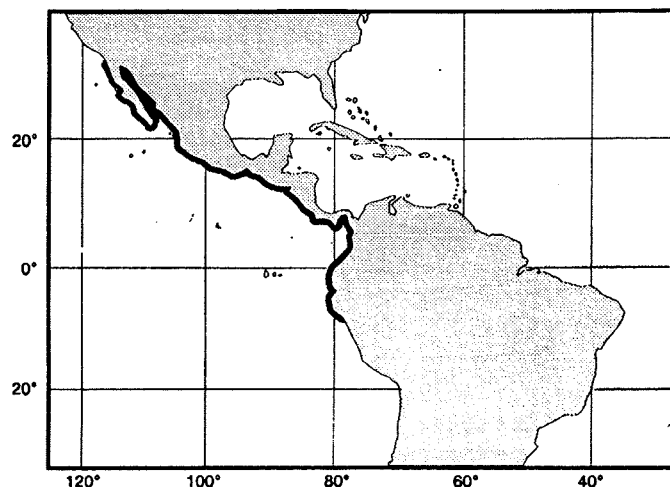


Fig. 240

Remarks: *E. acanthistius* is unique among the species of *Epinephelus* in having only IX dorsal-fin spines. Jordan and Evermann (1898) proposed the monotypic subgenus *Enneistus* for this fish, and Jordan et al. (1930) elevated this taxon to a genus. Although it has only IX dorsal-fin spines, this species has bisegmental pterygiophores in the dorsal and anal-fin supports, as is typical for species of *Epinephelus*; it also lacks the knob at the lower rear corner of the maxilla that is seen in adults of *Cephalopholis*. And it is similar to species of the *E. niveatus* species-complex in having the origin of the pelvic fins located in front of the pectoral-fin base and in having large dark-coloured pelvic fins. According to the biochemical data presented by Lopez Lemus (1988), *E. acanthistius* is quite distinct from *Cephalopholis panamensis* as well as *Epinephelus analogus* and *E. labriformis*.

Epinephelus adscensionis (Osbeck, 1765)

Fig. 241; Pl. VIIB

SERRAN Epin 13

Trachinus adscensionis Osbeck, 1765:388 (type locality: Ascension island, South Atlantic Ocean).

Synonyms: *Perca stellio* Waibaum, 1792:349 (based on *Perca tota maculis* Seba, 1758:76, pl. 27, fig. 7; type locality not given). *Trachinus osbeck* Lacepède, 1800:364 (substitute for *Trachinus adscensionis*; type locality: Ascension Island). *Serranus pixanga* Valenciennes in Cuv. and Val., 1828:383 (type locality: unknown [presumably Brazil]; based on a description by Marcgrave). *Serranus nigriceps* Valenciennes in Cuv. and Val., 1830:517 (type locality: unknown [fide Bauchot et al. 1984:corrigendum]). *Serranus impetiginosus* Müller and Troschei, 1848:665 (type locality: Barbados). *Serranus capreolus* Poey, 1860:145 (type locality: Cuba). *Serranus varius* Bocourt, 1868:222 (type locality: Gulf of Mexico).

FAO Names: En - Rock hind; Fr - Mérou oualioua; Sp - Mero cabriila.

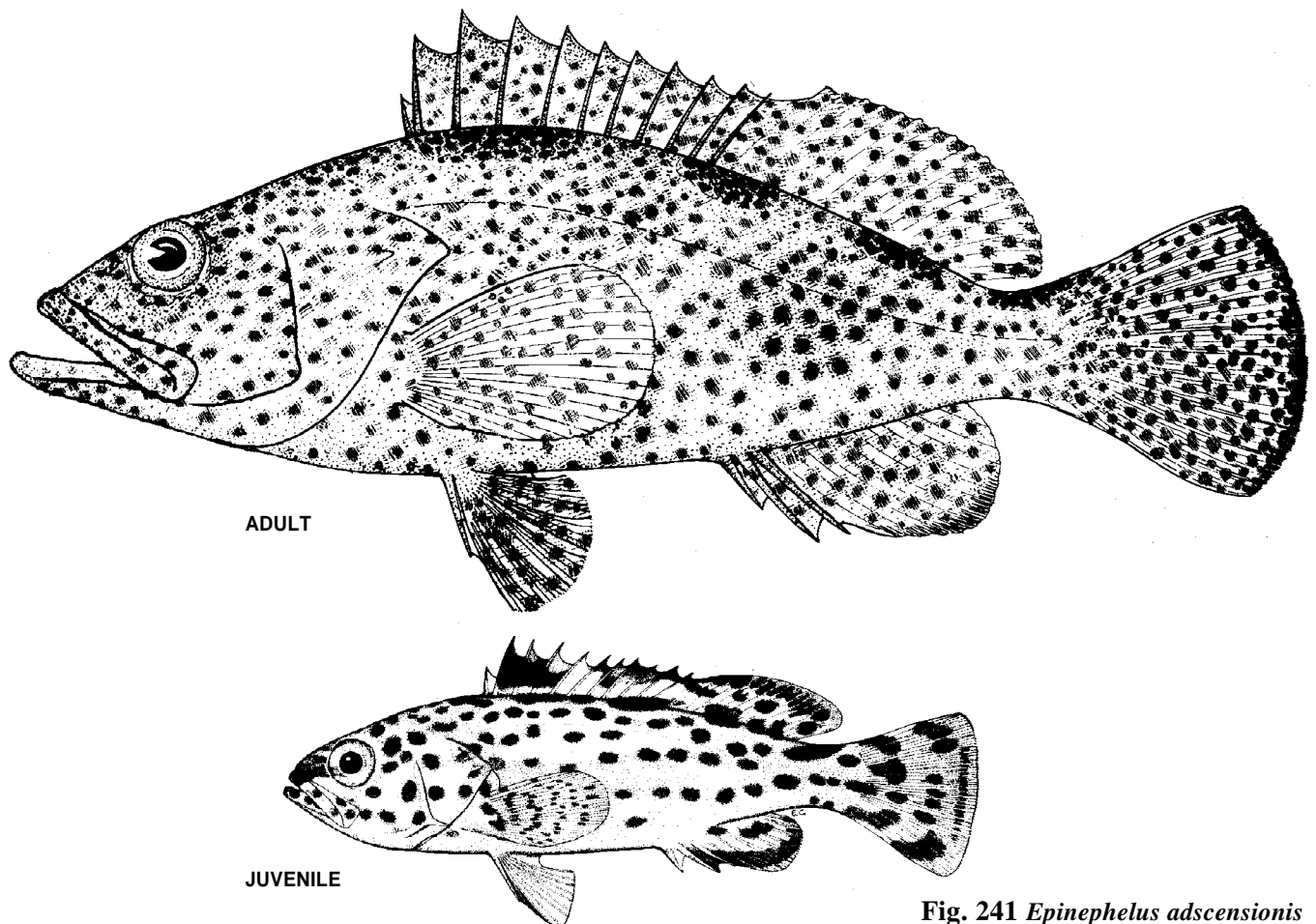


Fig. 241 *Epinephelus adscensionis*

(adult about 290 mm total length, juvenile 40 mm standard length)

Diagnostic Features: Body depth less than head length, depth contained 2.6 to 3.2 times in standard length (for fish 13 to 27 cm standard length). Head length contained 2.1 to 2.5 times in standard length; interorbital area flat or slightly concave; preopercle evenly serrate, without salient angle; subopercle and interopercle smooth; nostrils subequal. Gill rakers 7 to 9 on upper limb, 16 to 19 on lower limb, total 23 to 28. Dorsal fin with XI spines and 16 to 18 rays, the fourth or fifth spine longest and the interspinous

membranes distinctly incised; anal fin with III spines and 8 rays; pectoral-fin rays 18 to 20; pectoral fins longer than pelvic fins, pectoral-fin length contained 1.5 to 2.1 times in head length; pelvic-fin length contained 1.8 to 2.3 times in head length for fish 10 to 19 cm standard length, 2.2 to 2.7 times in head length for fish 20 to 38 cm standard length; rear margin of caudal fin convex. Lateral- body scales distinctly ctenoid, with auxiliary scales; lateral-line scales 48 to 53; lateral-scale series 92 to 108. **Colour:** Head, body, and fins generally buff or pale greenish, covered with reddish brown spots and scattered pale blotches: usually 3 to 5 dark brown blotches (groups of dark spots) at base of dorsal fin and a blackish brown blotch on top of caudal peduncle (on some specimens, only the dark blotch at base of last dorsal-fin spines is apparent): rear edge of caudal fin with a row of dark brown spots forming a dark margin; small juveniles with fewer but larger dark spots on the head, body and fins.

Geographical Distribution: A wide-ranging species known from Ascension and St. Helena Islands and in the western Atlantic from Massachusetts (one record), Bermuda, South Carolina, Georgia, Florida, Gulf of Mexico, Caribbean to southern Brazil (Fig. 242). The dubious records of *E. adscensionis* from the Canary Islands, Cape Verde Islands, and South Africa (Barnard, 1927; Smith, 1949; C.L. Smith, 1971) were discussed by Heemstra (1991). This species was not reported by Dooley et al., (1985) in their extensive survey of the fish fauna of the Canary Islands. Wirtz (1992) published a photograph of *E. adscensionis* taken at the island of São Tome in the Gulf of Guinea.

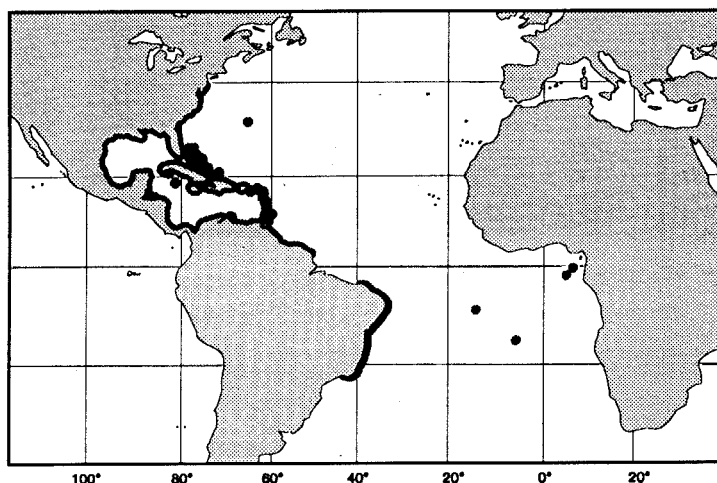


Fig.242

Habitat and Biology: Rock hind occur on rocky reefs in depths of 2 to 100 m; according to Randall (1967) they feed mainly on crabs (67%) and fishes (20%). At Ascension Island, rock hind include juvenile triggerfish (*Melichthys niger*) and young sea turtles in their diet (Lubbock, 1980). At St. Helena, *E. adscensionis* are common in shallow water and represent 90% of "groundfish" landings; large adults (over 50 cm) are taken regularly in 50 to 100 m, but are rare in shallow water (Edwards and Glass, 1987). Females are mature at 25 cm standard length; ripe females (28 to 36 cm standard length) were noted over a six-month period (January to June) at the Florida Middle Ground (Bullock and Smith, 1991).

Size: In the western Atlantic/Caribbean area, the maximum total length is about 60 cm, with a maximum weight of 3 kg. Bullock and Smith (1991) give a weight/length relationship (combined sexes) for 79 Gulf of Mexico specimens as $W = 5.28 \times 10^{-8} L^{2.905}$ where *W* (whole weight) is in kilogrammes and *L* (standard length) is in millimetre. According to Lubbock (1980), the rock hind at Ascension Island may attain a length of "about one metre."

Interest to Fisheries: This species is of minor importance to commercial and sport fisheries in the Western Atlantic, but it is of major importance to the fisheries at Ascension Island and St. Helena. It is caught with hook-and-line, in traps, and with spears.

Local Names: ASCENSION ISLAND: Grouper, Rock cod; BRAZIL: Garoupa-pintada; ST. HELENA: Jack; WEST INDIES: Aguaji.

Literature: Smith (1971); Bauchot et al. (1984); Heemstra (1991).

Remarks: *Serranus luridus* Ranzani was listed as a synonym of *E. adscensionis* by Smith (1971), but neither the original description (Ranzani, 1842:20, no mention of dark spots) nor the illustration (pl. 8, fig. 1, showing a uniformly coloured fish with an emarginate caudal fin) fit *E. adscensionis*. The description and illustration fit *E. morio* better than any other species.

Epinephelus aeneus (E. Geoffroy Saint-Hilaire, 1817)

Fig. 243; Pl. VIIC

SERRAN Epin 3

Serranus aeneus E. Geoffroy Saint-Hilaire, 1817:pl. 21, fig. 3 (description by I. Geoffroy Saint-Hilaire, 1827:317; type locality: Mediterranean coast of Egypt).

Synonyms: ?*Perca robusta* Couch, 1832:21, fig. 7 (type locality: Cornwall, England).

FAO Names: En - White grouper; Fr - Mérou blanc; Sp - Cherna de ley.

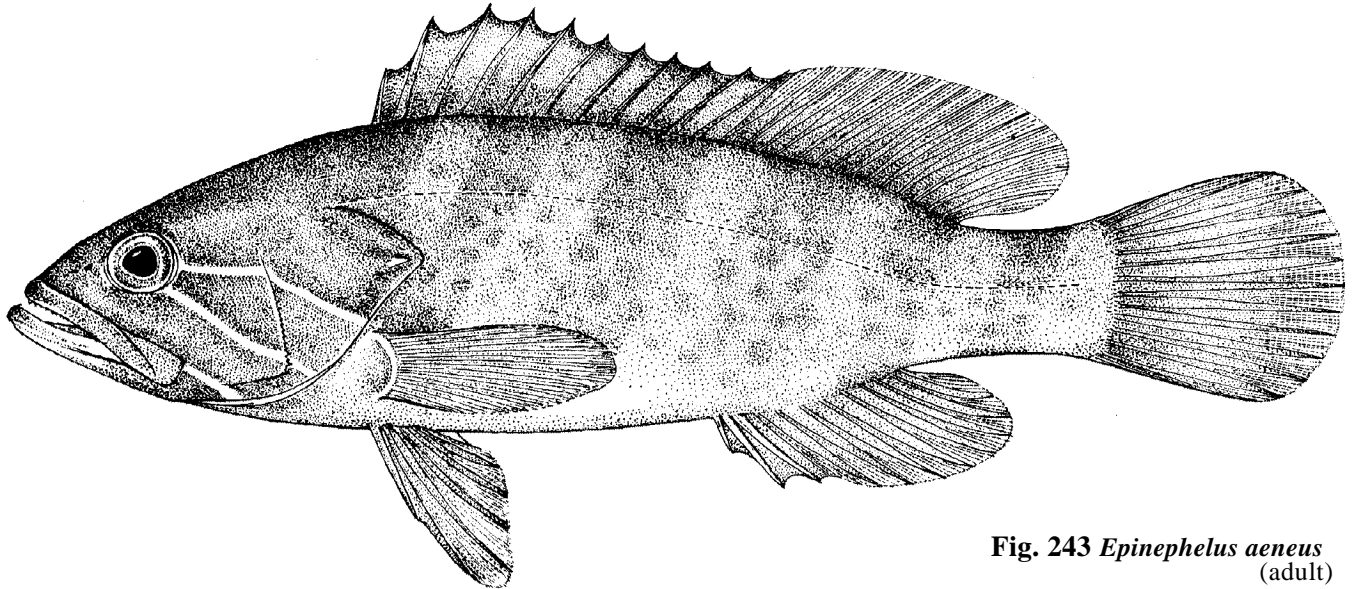


Fig. 243 *Epinephelus aeneus* (adult)

Diagnostic Features: Body depth distinctly less than head length, depth contained 3.0 to 3.6 times in standard length. Head length contained 2.5 to 2.9 times in standard length; interorbital area convex; preopercle angular, with 3 to 6 large spines at the angle, the lowermost directed ventrally; eye diameter equals interorbital width in fish of 20 to 25 cm standard length and is distinctly less than interorbital in larger specimens; rear nostrils slightly bigger than front ones; maxilla reaches about to vertical at rear edge of eye; midlateral part of lower jaw with 2 rows of teeth. Gill rakers 8 to 10 on upper limb, 15 to 17 on lower limb, total 23 to 26. Dorsal fin with XI spines and 14 to 16 rays, third or fourth spine longest, the interspinous membrane only slightly incised between the spines; anal fin with III spines and 8 (rarely 7 or 9) rays; pectoral-fin rays 18 or 19, longest contained 1.5 to 1.7 times in head length; pelvic-fin origin below base of pectoral fins; caudal fin rounded. Body scales ctenoid; lateral-line scales 67 to 72; lateral-scale series 98 to 102. Pyloric caeca 12 to 14. **Colour:** Greenish bronze, the fins darker, brownish violet, bordered with white or pale mauve; 3 or 4 pale blue (or white) lines across operculum, the lowest from rear end of maxilla to interopercle, the next from eye across preopercle just above the angle and onto subopercle, the uppermost line from eye to upper end of preopercle where it usually bifurcates and continues to rear edge of operculum. Juveniles with faint dark spots on body forming 5 indistinct dark bars; fins also with faint dark spots. In large adults the white lines on the head may be indistinct.

Geographical Distribution: *E. aeneus* occurs throughout the southern Mediterranean and along the west coast of Africa to southern Angola (Fig. 244). Heemstra (1991) mentioned reports from the Canaries and Cape Verde Islands (based on the distribution map of Cadenat, 1935:fig. 29), but these records are unsubstantiated. Brito (1991) did not include *E. aeneus* in his catalogue of the fishes of the Canaries, and he informed us that although this species is often seen in the markets there, the specimens invariably emanate from the continental coast of Africa. The seasonal migration of *E. aeneus* off the coast of Senegal is influenced by the seasonal upwellings off Senegal and Mauritania (Cury and Roy, 1988). The description of *Perca robusta* Couch (1832) was apparently based on a stray individual that was caught off the south coast of England.

Habitat and Biology: Adults are found on rocky or mud and sand bottoms in depths of 20 to 200 m; juveniles have been taken in coastal lagoons and estuaries. In west African waters, Longhurst (1960) found that *E. aeneus* feeds on fishes (58%), stomatopods (21%), crabs (10%), and cephalopods (10%).

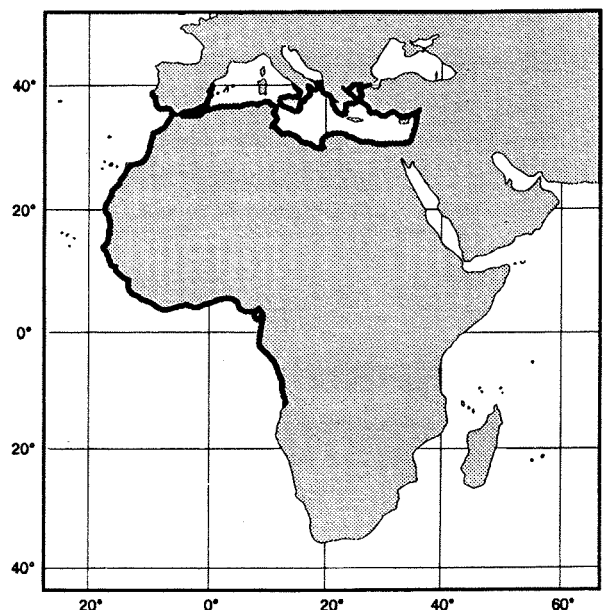


Fig. 244

Bruslé (1985) summarized the published information on the ecology, distribution, and biology of this species. *E. aeneus* is a protogynous hermaphrodite that matures first as a female at 50 to 60 cm total length and a

weight of about 3 kg for Tunisian fish. Most females change sex at about 9 kg, but smaller males (of 3 to 5 kg) are occasionally found. Total potential fecundity was estimated to range from 789 436 ova in a 44 cm standard length fish of 2.2 kg to 12 589 242 ova in a 87 cm standard length fish of 12.6 kg. Vadiya (1984) estimated "absolute fecundity" of a 93.5 cm, 8.6 kg *E. aeneus* at 3 873 271 ova. Ezzat et al. (1981) used annular rings on scales to determine age and growth of *E. aeneus* in Egyptian waters; they found that a 9.7 kg fish was 8 years old. Bouain et al. (1983) studied age, growth, and reproduction of the Tunisian population: the largest fish was 115 cm total length, 25 kg, and was estimated to be 17 years old; females were mature at 5 to 7 years (1.5 to 3.0 kg, 50 to 60 cm total length); and sex change occurs at 10 to 13 years (6 to 15 kg, 80 to 110 cm total length). Development of larvae (2.16 to 8.96 mm standard length) and a prejuvenile of 22.4 mm standard length were illustrated by Aboussouan (1972).

Size: Maximum total length 120 cm; weight 25 kg.

Interest to Fisheries: *E. aeneus* is of considerable economic importance in fisheries of the Mediterranean and west coast of Africa. It is caught with hook-and-line and in trawls. In the 1950's this species was abundant along the south coast of Morocco (Furnestin et al., 1958). *E. aeneus* has been artificially spawned at the National Center for Mariculture in Israel.

Local Names: ALGERIA: Bades; EGYPT: Wakar; GREECE: Sphyrida; GUINEA: Rikotté ISRAEL: Daggar mazury; ITALY: Cernia bronzina, Tiof; COTE-D'IVOIRE: Dadassou ekoué, Orousin; LIBYA: Loukouz; MAURITANIA: Arhani; PORTUGAL: Garoupa Verde; SENEGAL: Khoutch, Loger, Tiof, Nodiof; SPAIN: Cherne de ley; TUNISIA: Mennani abiad, Mérou blanc; TURKEY: Lahoz; YUGOSLAVIA: Kirnja.

Literature: Cadenat (1935); Poll (1954); Séret (1981); Heemstra (1991).

Remarks: *Perca robusta* Couch, 1832 was listed as a synonym of "*Epinephelus guaza*" (= *E. marginatus*) by C.L. Smith (1971), but Heemstra (1991) considered this species a synonym of *E. aeneus*.

Epinephelus akaara (Temminck and Schlegel, 1842)

Fig. 245; Pl. VIID

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Serranus aka-ara Temminck and Schlegel, 1842:9, pl. 3, fig. 1 (type locality: Nagasaki, Japan).

Synonyms: *Serranus shihpan* Richardson, 1846:231 (type locality: Canton, China; based in part on a painting by John Reeves, reproduced by Whitehead and Joysey, 1967:pl. 2, fig. 1). *Serranus variegatus* Richardson, 1846:231 (type locality: Canton China; based on a painting by John Reeves, reproduced by Whitehead, 1969:pl. 4, fig. a). *Epinephelus lobotoides* Nichols, 1913:179, fig. 1 (type locality: Shimonoseki, Japan). *Epinephelus ionthas* Jordan and Metz, 1913:32, pl. 6, fig. 2 (type locality: Pusan, Korea).

FAO Names: En - Hong Kong grouper; Fr - Mérou rouge tacheté; Sp - Mero de pintas rojas.

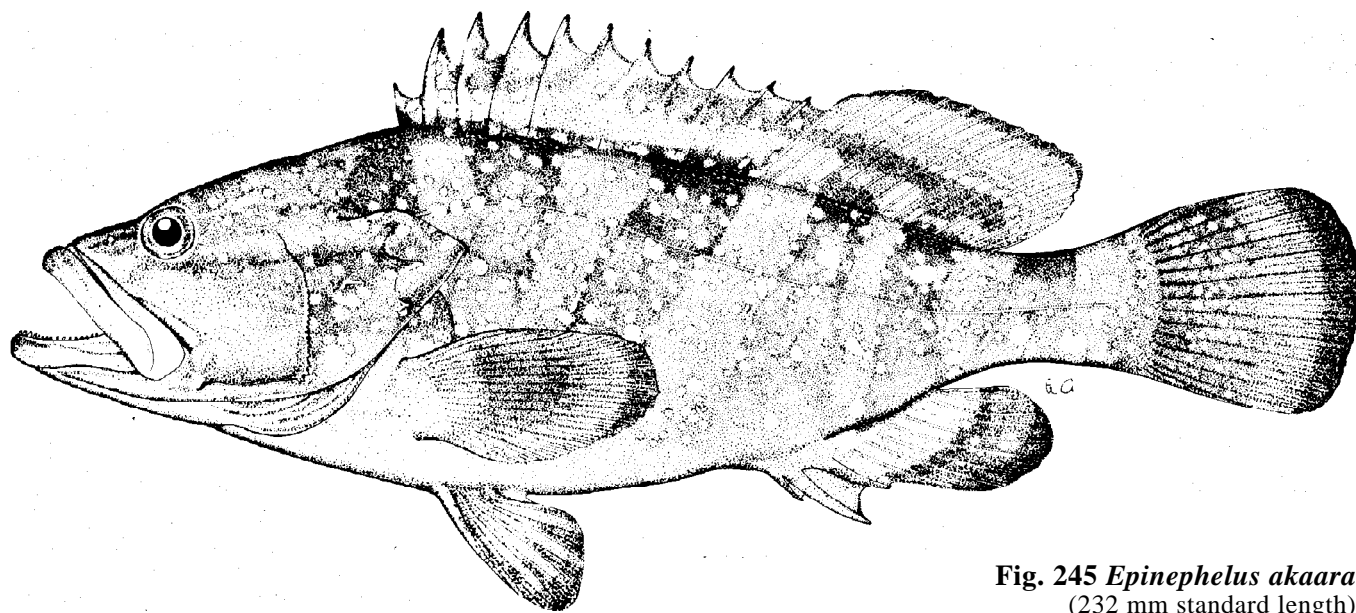


Fig. 245 *Epinephelus akaara*
(232 mm standard length)

Diagnostic Features: Body depth less than head length, depth contained 2.7 to 3.2 times in standard length (for fish 11 to 38 cm standard length). Head length contained 2.3 to 2.6 times in standard length; preopercle with enlarged serrae at angle; upper edge of operculum straight; nostrils subequal; maxilla reaching about to vertical at rear edge of eye; midside of lower jaw with 2 rows of teeth. Gill rakers 8 or 9 on upper limb,

15 to 17 on lower limb, 23 to 25 total. Dorsal fin with XI spines and 15 to 17 rays, the third to sixth spines longest, their length contained 2.4 to 3.8 times in head length, the interspinous membranes incised; anal fin with III spines and 8 rays; pectoral-fin rays 17 to 19, pectoral-fin length contained 1.5 to 2.1 times in head length; pelvic fins not reaching anus, their length contained 1.9 to 2.3 times in head length; caudal fin rounded. Lateral-body scales ctenoid, with auxiliary scales in adults; lateral-line scales 50 to 54; lateral-scale series 92 to 106. **Colour:** Head and body pale brownish grey, covered (except ventrally) with small red, orange or gold spots; 6 faint oblique dark bars usually visible on body (at least dorsally), the first bar on nape, the third bar confluent with a dark brown or black blotch on body at base of last 3 dorsal-fin spines, and the last bar on caudal peduncle; dark body bars extend only onto base of dorsal fin; dorsal-fin margin yellow or orange: a row of dusky yellow or orange spots (one per membrane) along middle of spinous dorsal fin and another row along base of fin; soft dorsal, caudal, and anal fins with faint red or orange spots basally, the distal parts of these fins dusky with small faint white spots.

Geographical Distribution: Western Pacific: known from southern China, Taiwan, East China Sea, Korea, and southern Japan (Kyushu to about 38°N on both coasts of Honshu) (Fig. 246). Reported from Viet Nam by Fourmanoir (1965) but the illustration appears to be *E. fasciatomaculosus*. Shirai's (1986) records of *E. akaara* from the Philippines and India are unsubstantiated.

Habitat and Biology: In Japanese waters, this species is common in rocky areas. Ukawa et al. (1966) reported pair spawning in shallow culture ponds between 15.30 and 16.30 h. The egg is transparent, 0.70 to 0.77 mm in diameter, with colourless yolk and a single colourless oil globule 0.15 to 0.16 mm in diameter. Hatching occurred after 23 to 25 hours at 25.1 to 27.0 °C, and the newly hatched larvae were 1.45 to 1.56 mm total length. Yolk consumption was completed in 4.5 days; 15-day old larvae were 4.05 mm total length, with elongate dorsal- and pelvic-fin spines, but the caudal fin had not yet developed.

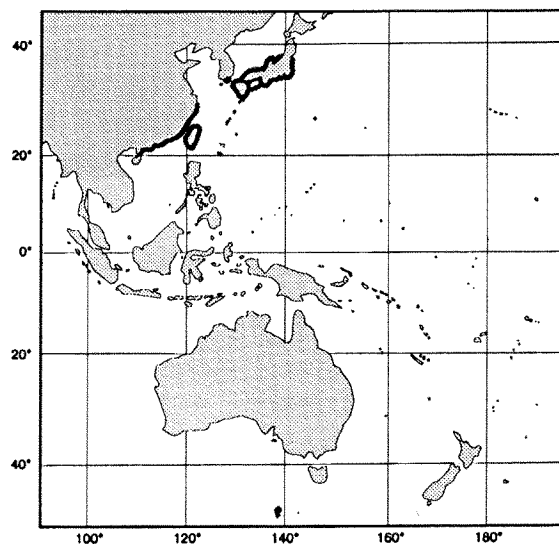


Fig. 246

Mito et al. (1967) described a complete series of larval stages. Larvae of 5.65 mm total length have the second dorsal- and pelvic-fin spines serrate and greatly elongated, and there is a long spine at the angle of the preopercle; at about 12 mm total length the rays of all fins are differentiated, and the greatly elongated dorsal- and pelvic-fin spines begin to shrink. Transformation to the juvenile stage occurs at about 25 mm total length (25 to 26 days after hatching) when many melanophores and orange chromatophores develop rapidly all over the head and body. At 28 mm total length, transformation is mostly completed (except for the spine at the corner of the preopercle, which reaches to the ventral edge of the subopercle), and the colour pattern is recognizable as that of *E. akaara*. Fukuhara and Fushimi (1988) described fin differentiation, squamation and variation of growth in reared larvae. Development of fin rays was completed between 7.3 and 9.6 mm standard length. In the final stages of larval development (at 20 to 27 mm standard length), the elongated second dorsal- and pelvic-fin spines have shortened to adult proportions, the caudal fin becomes rounded, scale development is completed, and the juvenile pigmentation develops.

Size: According to Chan (1968) the maximum total length is 51 cm.

Interest to Fisheries: *E. akaara* is of considerable commercial importance in Hong Kong and Japan where it brings a high price in markets. Although this species spawns readily in captivity, the high mortality of the larvae has hampered its use in aquaculture. In the Hong Kong fishery, wild-caught specimens are often kept alive to be sold for a better price.

Local Names: HONG KONG: Red grouper, Hung-paan; JAPAN: Kijihata.

Literature: Age and growth was studied by Dai et al. (1988) and Li et al. (1988).

Remarks: *E. akaara* is very similar to the sympatric *E. fasciatomaculosus* in meristic and most morphometric features. But the spots on the body of *E. fasciatomaculosus* are dark brown, yellowish brown, or russet (dark in alcohol); the dark bars on the body are darker, with the first two extending to the margin of the spinous dorsal fin; and there are no dusky yellow or orange spots on the spinous dorsal fin. Comparing fishes of 13 to 23 cm standard length, *E. fasciatomaculosus* has a slightly larger eye and more slender caudal peduncle (ratio of peduncle depth/eye diameter is 1.0 to 1.4, and for *E. akaara* it is 1.5 to 2.0).

Epinephelus albomarginatus Boulenger, 1903

Fig. 247; Pl. VIII

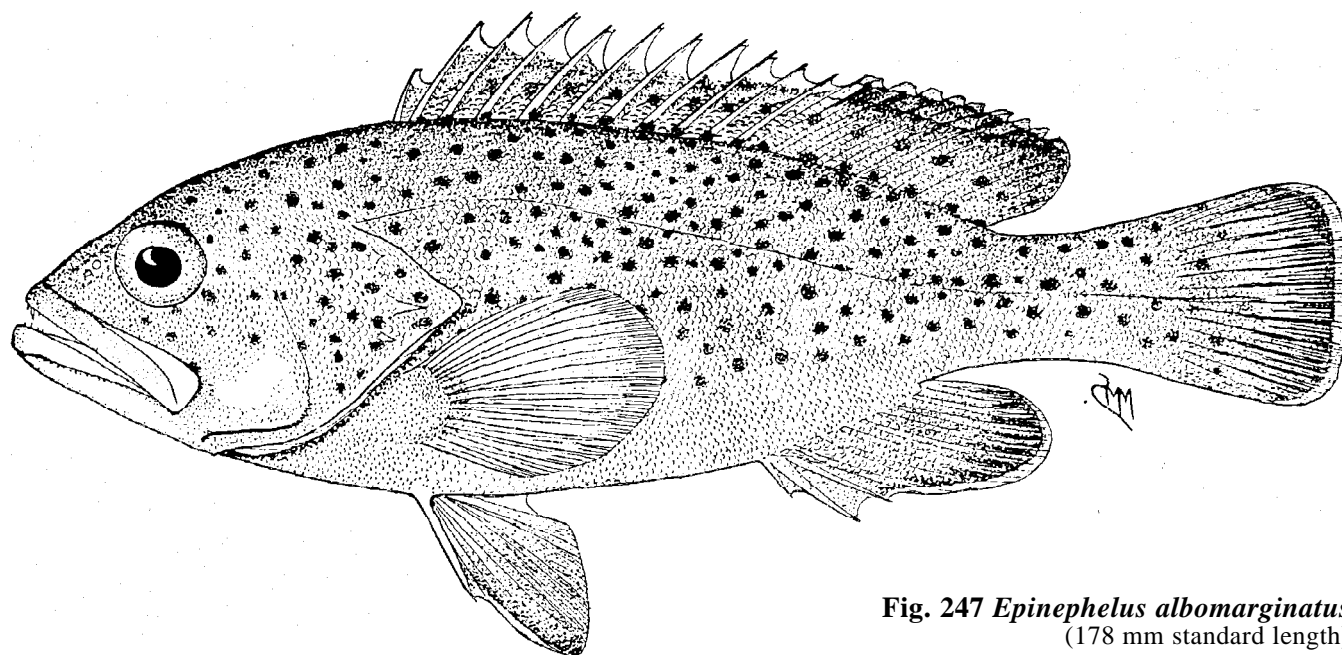
SERRAN Epin 26*Epinephelus albomarginatus* Boulenger, 1903:65, pl. 4 (type locality: Natal, South Africa).**Synonyms:** None.**FAO Names:** En - White-edged grouper; Fr - Mérou bord blanc; Sp - Mero bordiblanco.

Fig. 247 *Epinephelus albomarginatus*
(178 mm standard length)

Diagnostic Features: Body depth less than head length, depth contained 2.6 to 3.0 times in standard length (for fish 15 to 46 cm standard length). Head length contained 2.3 to 2.5 times in standard length; preopercle angular, with 2 or 3 enlarged serrae at the angle; upper edge of operculum straight or convex; diameter of rear nostril about twice that of front one; maxilla naked, without a step on ventral edge; maxilla reaches shorter or longer than vertical at rear edge of eye; midside of lower jaw with 2 rows of teeth. Gill rakers 8 to 10 on upper limb, 14 to 16 on lower limb, 22 to 26 total. Dorsal fin with XI spines and 14 rays, the third or fourth spine longest, its length contained 2.6 to 3.4 times in head length, the interspinous membranes distinctly incised; anal fin with III spines and 8 rays; pectoral-fin with 17 or 18 rays, equal to or slightly longer than pelvic fins, pectoral-fin length contained 1.9 to 2.2 times in head length; pelvic fins not reaching anus; caudal fin truncate, with rounded corners in adults, the rear edge convex in juveniles. Lateral-body scales ctenoid, with a few auxiliary scales in adults; lateral-line scales 56 to 66; lateral-scale series 92 to 106. **Colour:** Head, body, dorsal, and caudal fins pale brown, with numerous small dark brown spots; ventral parts of head and body without spots: on juveniles, many of the spots merge to form double spots; prominent dark brown streak along upper edge of maxillary groove. Margin of interspinous dorsal-fin membranes yellow or gold; soft dorsal and anal fins dusky distally, with prominent white edge; upper and lower edges of rear part of caudal fin also white-edged; pectoral fins yellowish or reddish orange.

Geographical Distribution: *E. albomarginatus* is known only from the southeast coast of Africa between Quissico, Mozambique (24°50'S) and East London, South Africa (33%) (Fig. 248).

Habitat and Biology: Coral or rocky reefs in depths of 10 to 100 m. According to van der Elst (1981), *E. albomarginatus* feeds mainly on spiny lobsters, crabs, and octopus; fishes and squid are also consumed.

Size: Attains at least 100 cm total length and a weight of 13 kg.

Interest to Fisheries: Reasonably common along the coast of Natal, South Africa where it is of interest to anglers.

Local Names: SOUTH AFRICA: Captain Fine, white-edged rockcod.

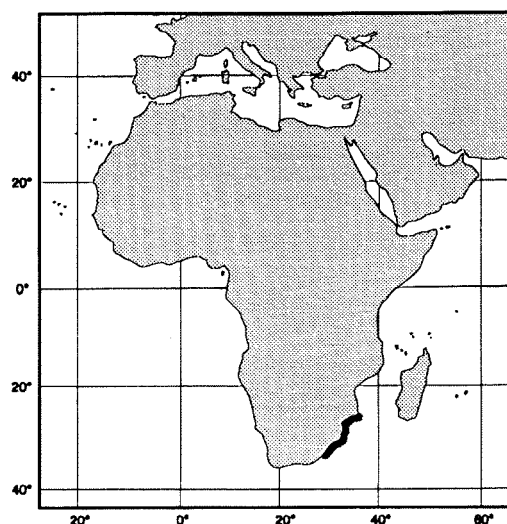


Fig. 248