

FAO Names: En - Rock grouper; Fr - Mérou rocaille; Sp - Mero de las piedras.

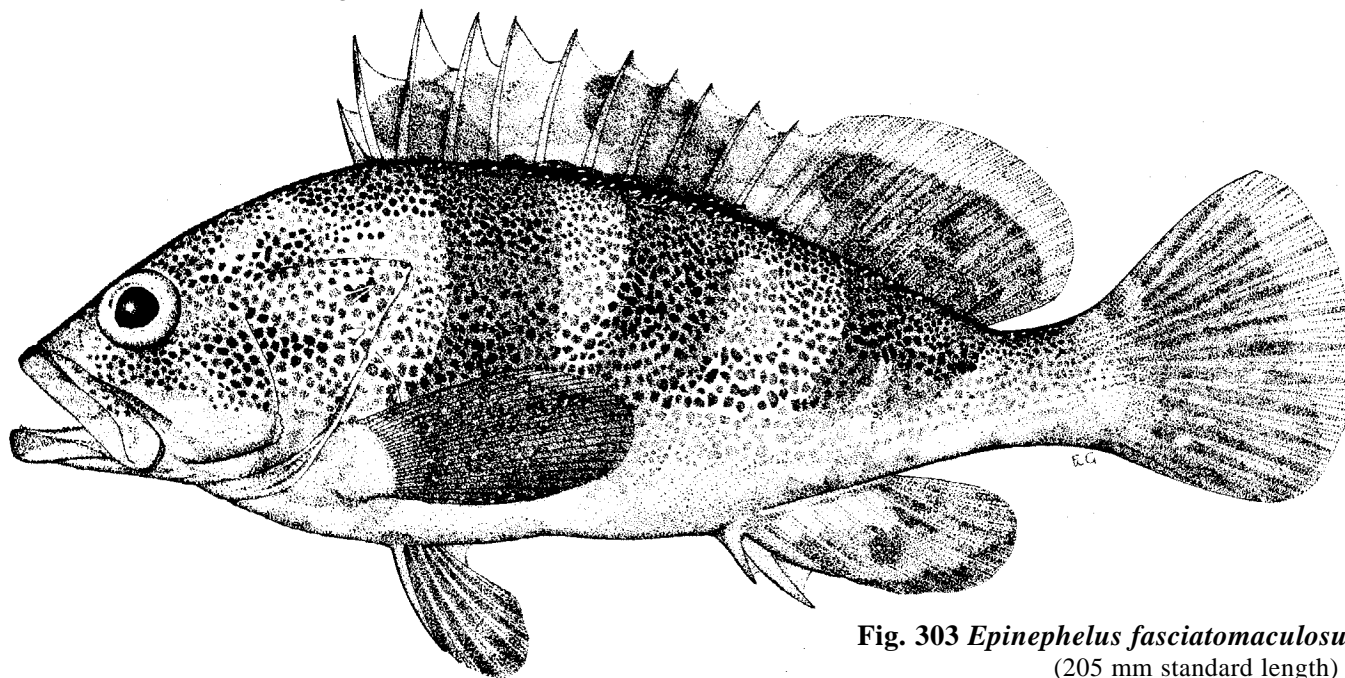


Fig. 303 *Epinephelus fasciatomaculosus*
(205 mm standard length)

Diagnostic Features: Body depth contained 2.8 to 3.3 times in standard length (for fish 9 to 29 cm standard length). Head length contained 2.4 to 2.6 times in standard length; interorbital area and dorsal head profile slightly convex; preopercle angular, the serrae at the angle slightly enlarged; upper edge of operculum straight; nostrils subequal; maxilla reaches about to below rear third of eye or a little past eye; midlateral part of lower jaw with 2 or 3 rows of subequal teeth. Gill rakers 7 or 8 on upper limb, 14 to 16 on lower limb. Dorsal fin with XI spines and 15 to 17 rays, the third or fourth, spine longest, its length contained 2.5 to 3.1 times in head length, and a little shorter than longest dorsal-fin rays, 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 1.8 times in head length; pelvic fins not reaching past anus, their length contained 1.9 to 2.3 times in head length; caudal fin rounded. Lateral-body scales ctenoid, with auxiliary scales; lateral-line scales 48 to 52; lateral-scale series 92 to 106. **Colour:** Head and body pale greyish brown, with numerous small dark brown, brownish yellow, or russet spots; 3 to 5 slightly oblique broad dark bars usually visible on body, the last covering peduncle, the first 4 extending into dorsal fin; the first 2 bars are darker dorsally and extend to the margin of spinous dorsal fin; ventral parts of head and body whitish or pinkish; soft dorsal, caudal, and anal fins with faint pale spots and streaks; minute gold tag often visible at tips of some dorsal-fin spines. Dark body bars faint in adults and may be lost in preservative, except for dorsal part of first two bars.

Geographical Distribution: Western Pacific from southern Japan to Taiwan, Philippines, Viet Nam, China, Hong Kong, Hainan, and Sarawak (Fig. 304).

Habitat and Biology: *E. fasciatomaculosus* occurs in shallow rocky areas. According to Chan (1968), it feeds on fishes, prawns, crabs, worms, and gastropods.

Age and growth and reproduction of Taiwanese fish were studied by Chen et al. (1980a and b, identified as '*Epinephelus diacanthus*'). Maximum size and age were 239 mm standard length at age 6. The von Bertalanffy growth equation was given as standard length = $228 (1 - e^{-0.3571(t+0.6993)})$. The weight/length equation was reported as $W = 1.621 \times 10^{-5} \text{ standard lengths}^{3.0898}$ where W is the weight in grammes of the eviscerated fish and standard length is in millimetre.

This species is protogynous. Females are mature at 125 mm standard length, and most sexual transition occurs in fish 2 or 3 years old (14 to 16 cm).

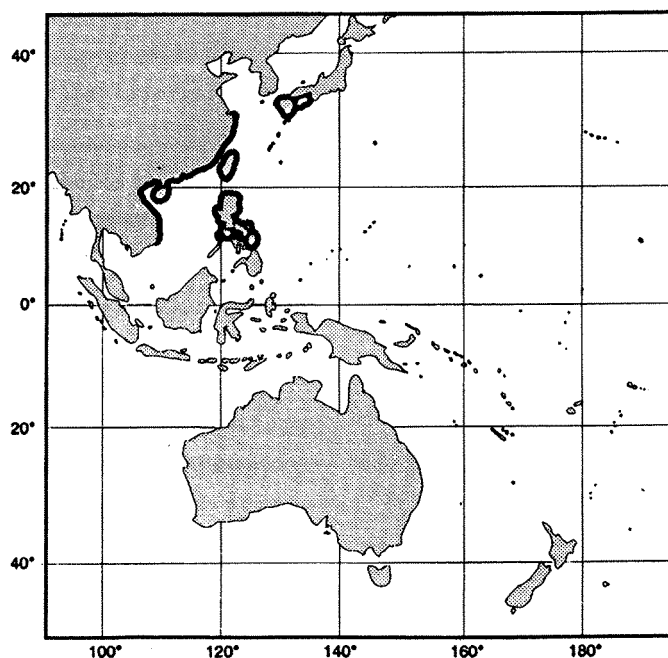


Fig. 304

Fecundity ranged from 64 000 (age 1-year, 126 mm standard length) to 233 000 (age 6-years, 189 mm standard length) maturing ova per female.

Size: Maximum size is about 30 cm total length.

Interest to Fisheries: *E. fasciatus* is of some commercial importance in Hong Kong and Taiwan. Although a small species, it is excellent as a food fish and brings a good price: Caught with trawls, gill nets and hook-and-line.

Local Names: HONG KONG: Sek-dang; JAPAN: Obihata; SINGAPORE: Jiao zhi hou.

Literature: Randall and Heemstra (1991).

Remarks: In their *Colour Guide to the Fishes of the South China Sea and the Andaman Sea*, Tan et al. (1982) published a photograph of *Epinephelus bleekeri* on the plate opposite the species account for *E. fasciatus*. But the correct photograph of *E. fasciatus* appears on the errata page supplied with their publication.

E. fasciatus is very similar to the sympatric *E. akaara* in meristic and most morphometric features. The dark bars on the body of *E. akaara* are fainter and they extend only onto the base of the dorsal fin; the prominent spots on the head and body are red, orange, or gold (pale in alcohol), and there are dusky yellow or orange spots on the spinous dorsal fin. Comparing fishes of 13 to 23 cm standard length, *E. fasciatus* has a slightly larger eye and more slender caudal peduncle (ratio of peduncle depth/eye diameter is 1.0 to 1.4, and in *E. akaara* it is 1.5 to 2.0).

Epinephelus fasciatus (Forsskål, 1775)

Fig. 305; Pl. XIII-C-E

SERRAN Epin 8

Perca fasciata Forsskål, 1775:40 (type locality: Red Sea).

Synonyms: *Epinephelus marginalis* Bloch, 1793:14, pl. 328, fig. 1 (type locality: East Indian seas). *Holocentrus erythraeus* Bloch and Schneider, 1801:320 (type locality: Red Sea). *Holocentrus forskael* Lacepède, 1802:337, 377 (substitute name for *Perca fasciata* Forsskål). *Holocentrus marginatus* Lacepède, 1802:384 (error for *marginalis* Bloch). *Holocentrus rosmarus* Lacepède, 1802:345, 389, pl. 7, fig. 2 (type locality: probably Indian Ocean). *Holocentrus oceanicus* Lacepède, 1802:345-46, 389, pl. 7, fig. 3 (type locality: probably Indian Ocean). *Serranus Alexandrinus* Valenciennes in Cuv. and Val., 1828:281 (type locality: Egypt [Red Sea]). *Serranus variolosus* Valenciennes in Cuv. and Val., 1828:354 (type locality: Tahiti). *Serranus Tsirimen-ara* Temminck and Schlegel, 1842:7, pl. 4 A, fig. 3 (type locality: Japan). *Perca maculata* Forster, 1844:220 (type locality: Tahuata, Marquesas). *Serranus cruentus* De Vis, 1884b:446 (type locality: New Britain). *Serranus geometricus* De Vis, 1885a:144 (type locality: Moreton Bay, Queensland). *Serranus subfasciatus* De Vis, 1885b:389 (type locality: Cardwell, Queensland). *Epinephelus zapyrus* Seale, 1906:36, fig. 11 (type locality: Tubuai, Austral Islands). *Epinephelus emoryi* Schultz, 1953:330, 340, fig. 52 (type locality: Bikini Atoll, Marshall Islands)

FAO Names: En - Blacktip grouper (formerly: Redbanded grouper); Fr - Mérrou oriflamme; Sp - Mero banderilla.

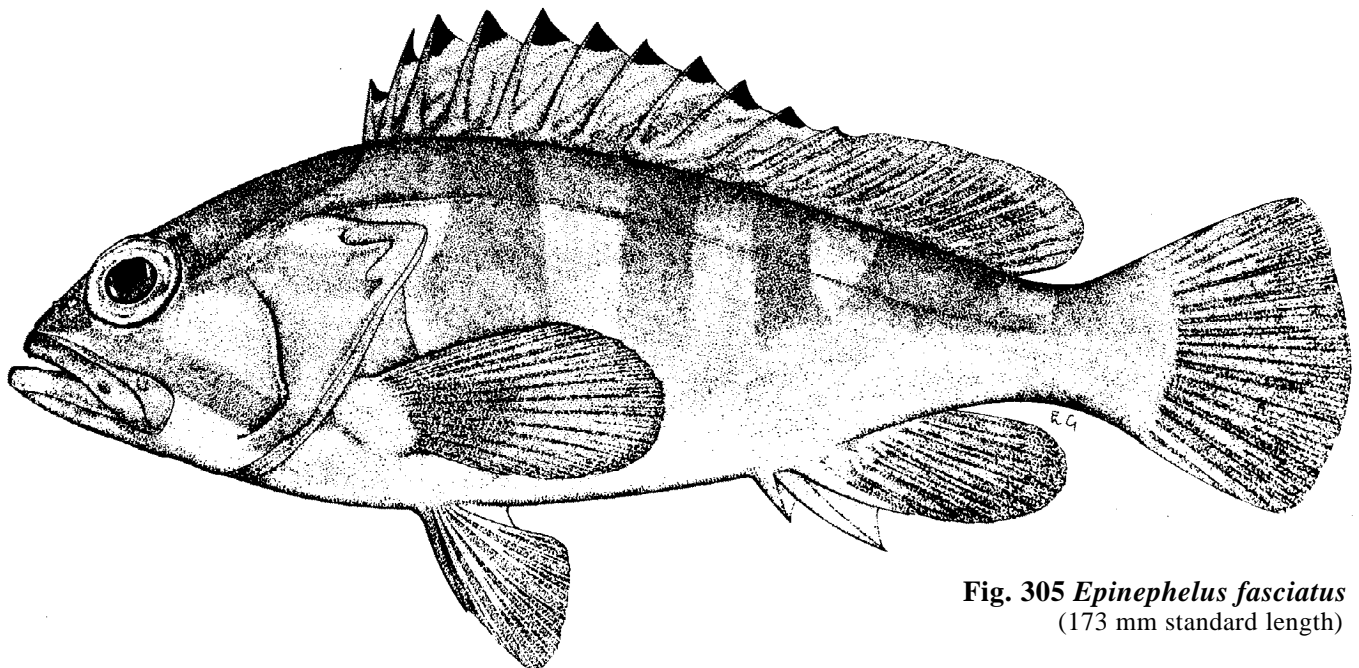


Fig. 305 *Epinephelus fasciatus*
(173 mm standard length)

Diagnostic Features: Body depth contained 2.8 to 3.3 times in standard length (for fish 10 to 26 cm standard length). Head length contained 2.3 to 2.6 times in standard length; interorbital area flat, but dorsal head profile convex; snout length contained 4.3 to 5.1 times in head length; preopercle rounded, the rear edge finely serrate, with lowermost serrae slightly enlarged; upper edge of operculum straight; nostril subequal; maxilla reaches to below rear third of eye or a little past eye; midlateral part of lower jaw with 2 to 4 rows of teeth. Gill rakers 6 to 8 on upper limb, 15 to 17 on lower limb. Dorsal fin with XI spines and 15 to 17 rays, the 3rd to 11th spines subequal and slightly shorter than longest dorsal-fin ray; interspinous membranes of dorsal fin distinctly incised; anal fin with III spines and 8 rays; pectoral-fin rays 18 to 20; pectoral-fin length contained 1.5 to 2.0 in head length; pelvic fins not reaching past anus, their length contained 2.0 to 2.4 times in head length; caudal fin slightly to moderately rounded; central Pacific specimens often with truncate caudal fins. Lateral-body scales ctenoid, with numerous auxiliary scales; nape and dorsoposterior part of head densely covered with minute auxiliary scales; lateral-line scales 49 to 75; lateral-scale series 92 to 135 (see Remarks for discussion of variation in scale counts). Pyloric caeca 10 to 16. **Colour:** Ground colour varying from pale greenish grey, to pale reddish yellow to scarlet; body often with 5 or 6 faint dark bars, the last on peduncle; body scales (except ventrally) with pale centre and dark rear margin, producing a faint checked pattern; dorsal part of head and nape, including upper jaw, dark red or reddish brown or with bands and blotches of similar colour; often a dark band from below eye to interopercle; rim of orbit black and often bordered by a pale bluish line. Fins reddish orange, pale yellowish green, or greenish brown, the outer triangular part of interspinous membranes of dorsal fin black (dark red in fish from Western Australia and in some specimens from deep water), with pale yellow or white spot behind tip of each spine: soft dorsal, anal, and caudal fins often with pale yellow, white, or pale blue margins; pectoral fins may be yellowish distally. Pacific specimens usually with irregular pale or white blotches and spots on body (often a midlateral series diminishing in size posteriorly from behind pectoral-fin base to caudal peduncle) and a blackish brown line along crease of dorsal-fin base.

Geographical Distribution:

E. fasciatus is one of the most common groupers in the Indo-Pacific region, and it is one of the two most widely distributed species of grouper in the world. *E. fasciatus* is known from the Red Sea and western Indian Ocean (south to Port Alfred, 33°36'S) to Fremantle, Western Australia, and in the Pacific it ranges from Japan (south of 33°) and Korea to southern Queensland and Lord Howe Island and eastward to the Pitcairn Islands. It occurs at most (virtually all) of the tropical and subtropical islands of the Indian Ocean and the west-central Pacific, but it is not known from Hawaii. Its absence from the Persian Gulf is puzzling (Fig. 306).

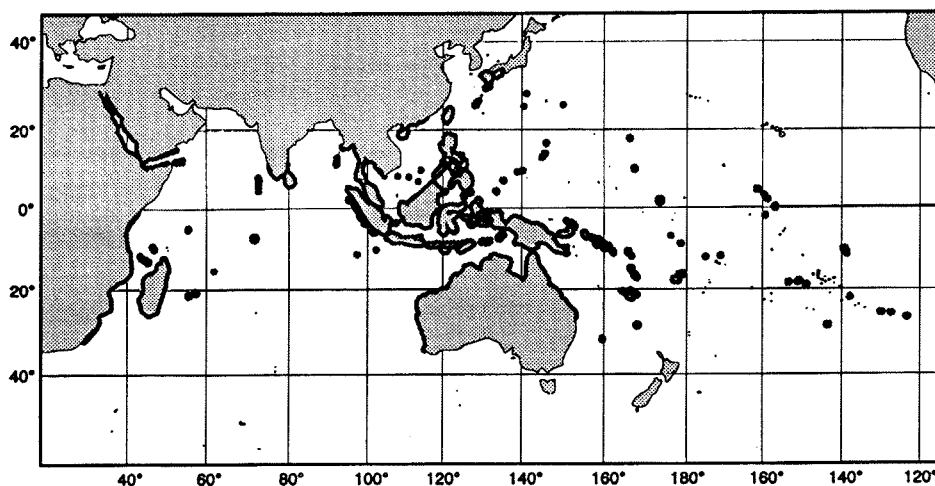


Fig. 306

Habitat and Biology: *E. fasciatus* is found on coral reefs and rocky bottom from the shore to depths of 160 m. At Madagascar it is one of the most abundant serranids at depths of 20 to 45 m, and it feeds during the day and night on brachyuran crabs, fishes, shrimps, and galatheid crabs in that order of importance (Harmelin-Vivien and Bouchon, 1976). Morgans (1982) reported that *E. fasciatus* from Kenyan waters ate crabs, stomatopods, fishes, ophiuroids, and octopus. Randall and Ben-Tuvia (1983) found that Red Sea specimens consumed mostly fishes and also some crustaceans (mainly crabs).

Size: Maximum total length about 40 cm.

Interest to Fisheries: Because of its abundance in shallow water, *E. fasciatus* is widely used for food. It is readily caught with hook-and-line, spear, traps, and gill nets.

Local Names: AUSTRALIA: Black-tipped rockcod, Footballer cod; INDIA: Teda (Marathi); JAPAN: Akahata; NEW CALEDONIA: Loche rouge; PHILIPPINES: Tangkaan (Visayan); SEYCHELLES: Vieille rouge; SINGAPORE: Kerapu bara, Lu gu hou.

Literature: Randall and Heemstra (1991).

Remarks: With such a wide distribution, it is not surprising that *E. fasciatus* exhibits considerable intraspecific variation. Based on scale counts and colour pattern, 6 populations can be distinguished:

1) Indian Ocean and Red Sea, 2) Western Australia, 3) Western Pacific, 4) Japan, 5) Pacific Plate islands, and 6) Marquesas Islands. Ranges of lateral-line scale counts for these populations are as follows: Red Sea, Indian Ocean and Western Australia 49 to 56 ($n = 70$); Western Pacific 49 to 54 ($n = 31$); Japan 55 to 61 ($n = 11$); Pacific Plate and Marquesas 59 to 75 ($n = 46$). The counts of lateral-scale series are as follows: Red Sea, Indian Ocean and Western Australia 91 to 123; Western Pacific 87 to 98; Japan 102 to 119; Pacific Plate 109 to 135; Marquesas 99 to 112 ($n = 28$). Specimens from Western Australia differ notably in colour, with the margin of the spinous dorsal fin dark red rather than black, as in most of the other *E. fasciatus*. At the Marquesas Islands, specimens have numerous irregular white spots scattered over the head and body.

E. fasciatus is one of 4 closely-related species, the other 3 being *E. retouti*, *E. rivulatus*, and *E. irroratus*. These 4 species share similar distinctive features of their colour patterns: 1) Margin of spinous dorsal fin black or dark red (brown or gold in *E. rivulatus*), 2) dark brown or red line along crease at base of dorsal fin, 3) body scales with a white, pale blue, or greenish grey spot or centre, and 4) orbit edged with black, red, or pale blue. These 4 species also have similar meristic and morphometric features.

In *E. retouti* the snout is longer (the length contained 3.5 to 3.9 times in head length), the caudal fin is truncate, the soft dorsal and upper fifth of caudal fin are dark olivaceous to dark greyish brown, the orbit rim is dark red ringed with pale blue; juveniles have the dorsal part of head black, crossed by 4 irregular whitish bands, and the first 3 dark bars on the body are black dorsally, the second and third bars extending into dorsal fin.

In *E. rivulatus* the body scale spots are conspicuous, there is a large semicircular red or reddish brown blotch at the base of the pectoral-fin rays and a similar spot anteriorly on isthmus.

In *E. irroratus*, there are no dark bars on the body (which are usually more or less distinct in the other species) and the second dorsal-fin spine is distinctly elongated in adults.

Epinephelus faveatus (Valenciennes, 1828)

Fig. 307; Pl. XIII F

SERRAN Epin 49

Serranus faveatus Valenciennes in Cuv. and Val., 1828:329 (type locality: Sri Lanka).

Synonyms: *Serranus bontoo* Valenciennes in Cuv. and Val., 1828:334 (type locality: Vishakhapatnam, India).

FAO Names: En - Barred-chest grouper; Fr - M  rou   charpe; Sp - Mero bandeado.

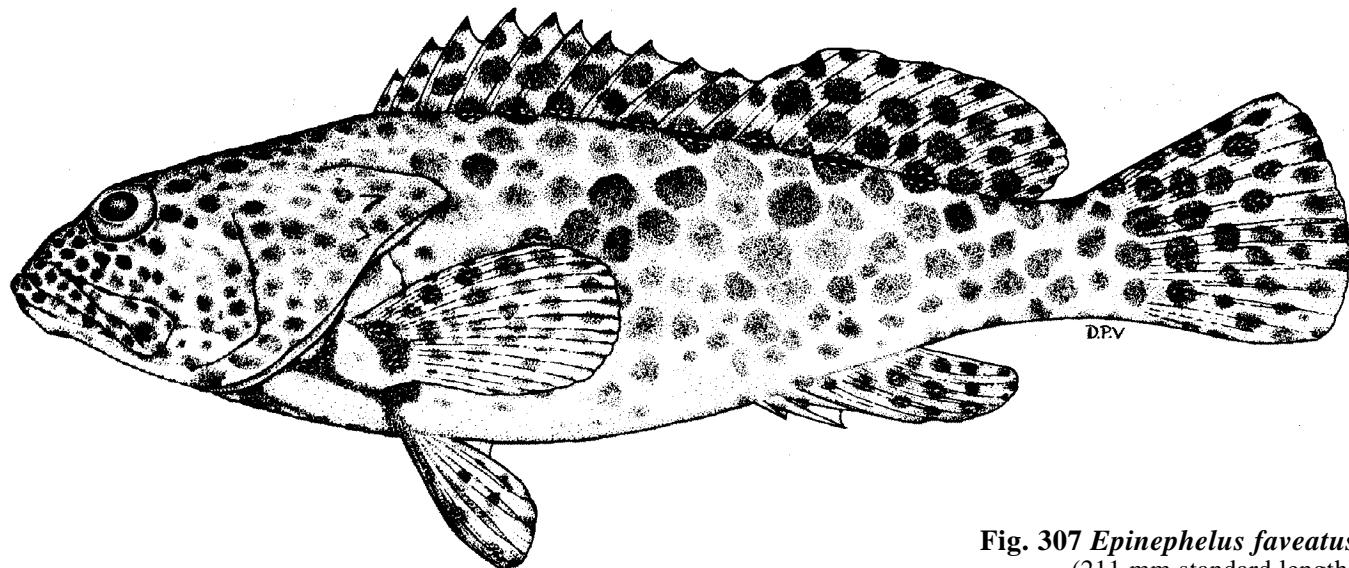


Fig. 307 *Epinephelus faveatus*
(211 mm standard length)

Diagnostic Features: Body depth contained 3.0 to 3.5 times in standard length (for fish 9 to 26 cm standard length). Head length contained 2.3 to 2.6 times in standard length; interorbital area flat or slightly concave, the dorsal head profile convex; preopercle rounded, with shallow indentation just above corner and slightly enlarged serrae at the corner; upper edge of operculum slightly convex; nostrils subequal; maxilla reaches past vertical at rear edge of eye; midlateral part of lower jaw with 2 rows of teeth. Gill rakers 7 to 10 on upper limb, 14 to 16 on lower limb. Dorsal fin with XI spines and 16 to 18 rays, the third or fourth spine longest, its length contained 2.6 to 3.9 times in head length and shorter than longest dorsal-fin rays, the interspinous membranes incised; anal fin with III spines and 8 rays, the second and third spines subequal, their length contained 3.6 to 4.3 times in head length; pectoral-fin rays 17 to 19; pectoral-fin length contained

1.7 to 2.2 times in head length; pelvic fins not reaching anus, their length contained 2.2 to 2.6 times in head length; caudal-peduncle depth contained 3.8 to 4.3 times in head length; caudal fin rounded; length of middle rays contained 1.65 to 1.9 times in head length. Lateral-body scales smooth (except for area covered by pectoral fin), with numerous auxiliary scales; lateral-line scales 48 to 52; lateral-scale series 83 to 98. Pyloric caeca about 25. **Colour:** Head, body, and fins pale, covered with close-set roundish brown spots of unequal size, most of those on body larger than pupil; 4 groups of 2 or 3 spots at base of dorsal fin darker than other spots on body; 2 oblique dark bands on side of chest; pectoral fins dusky, with dark blotch at the base and obscure dark spots more distinct on inner surface of fin; spots on median fins darker than those on body.

Geographical Distribution: Northeastern Indian Ocean: Southern India, (Trivandrum, Kovalam, Vizhinjam, Tuticorin, Mandapam and Madras), Sri Lanka (Negombo, Colombo, Hikkaduwa, Batticaloa and Trincomalee), and southern Indonesia (Bali and Lombok). *E. faveatus* has only recently been recognized and distinguished from similar species, so it is likely that its distribution is continuous from Pakistan to Indonesia. The record from the Chagos Archipelago by Winterbottom et al. (1989) is based on *E. macrospilos* (Fig. 308).

Habitat and Biology: *E. faveatus* is a shallow-water species of coral reefs and rocky areas. It appears to be a small species; a 17 cm standard length fish from Sri Lanka (USNM 270893) has fairly well-developed ovaries.

Size: Maximum size known 32 cm total length.

Interest to Fisheries: Separate statistics are not available for this species, but it is undoubtedly of importance in local artisanal fisheries. Probably caught with hook-and-line, gill nets, lift-nets, traps, and spear.

Local Names:

Literature: Randall and Heemstra (1991).

Remarks: *E. faveatus* is one of 9 similar 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. faveatus* as follows:

E. bilobatus has the lateral-body scales ctenoid, a series of 3 bilobed dark blotches or close-set pairs of dark brown to black spots along base of dorsal fin and adjacent body, third or fourth dorsal-fin spine longest (its length contained 2.1 to 2.5 times in head length), and longest anal-fin spine contained 2.5 to 3.2 times in head length.

E. hexagonatus has the dark spots mostly hexagonal and partially merging, leaving only a conspicuous white triangular dot at each corner of the dark spots; no dark bands on chest; lateral-body scales ctenoid; lateral-line scales 61 to 70; and second anal-fin spine 2.1 to 2.5 times in head length.

E. macrospilos has 15 to 17 dorsal-fin rays, chest and pectoral-fin base with dark spots (not bands), and pectoral fins mostly dusky with pale edge.

E. maculatus has the dorsal-fin membranes not incised between the spines, pelvic-fin length contained 1.7 to 2.0 times in head length, lateral-body scales distinctly ctenoid, longest dorsal-fin spine contained 2.1 to 2.6 times in head length, and juveniles yellowish brown, with large irregular white blotches.

E. melanostigma has a large black blotch on body and dorsal fin at base of last 3 spines, no dark bands on chest, lateral-body scales ctenoid, lateral-line scales 57 to 61, and 3 to 5 rows of teeth at side of lower jaw.

E. merra has pectoral and median fins with prominent small dark spots (much smaller than spots on body), no dark bands on chest, lateral-body scales ctenoid, and lateral-scale series 98 to 114.

E. quoyanus has the lateral-body scales distinctly ctenoid, larger pectoral fins (their length contained 1.2 to 1.7 times in head length) and middle length of caudal-fin rays contained 1.3 to 1.6 times in head length.

E. spilotoceps has no dark bands on chest, spots on front of head less than twice size of nostrils, lateral-body scales ctenoid, lateral-line scales 59 to 69, and dorsal-fin rays 14 to 16.

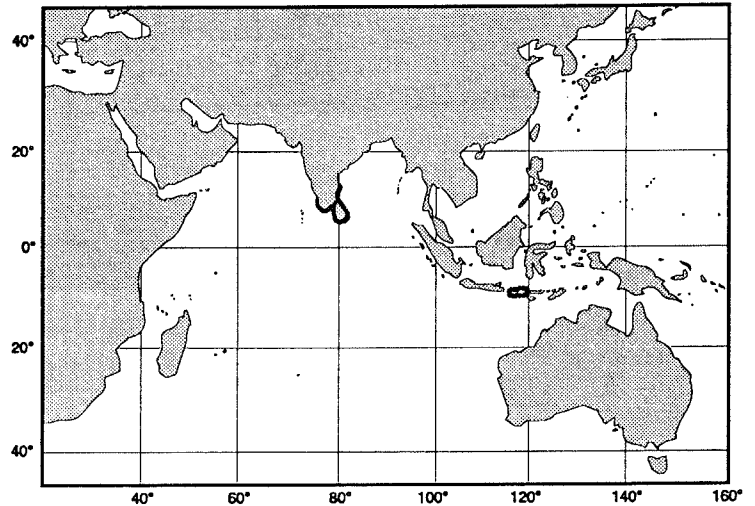


Fig. 308

Epinephelus flavocaeruleus (Lacepède, 1802)

Fig. 309; Pl. XIVA,B

SERRAN Epin 33

Holocentrus flavo-caeruleus Lacepède, 1802:335, 372 (type locality: Mauritius).

Synonyms: *Bodianus macrocephalus* Lacepède, 1802:291, 293 (type locality: Mauritius). *Holocentrus gymnosus* Lacepède, 1902:335, 372 (type locality: Mauritius). *Serranus borbonicus* Quoy and Gaimard, 1824:312, pl. 57, fig. 2 (type locality: Reunion). *Perca flava-purpurea* Bennett, 1830:pl. 19 (type locality: Sri Lanka). *Cynichthys flavo-purpuratus* Swainson, 1839:202, fig. 42c (emendation for *Perca flava-purpurea* Bennett).

FAO Names: En - Blue-and-yellow grouper; Fr - Mérou faraud; Sp - Mero azul y amarillo

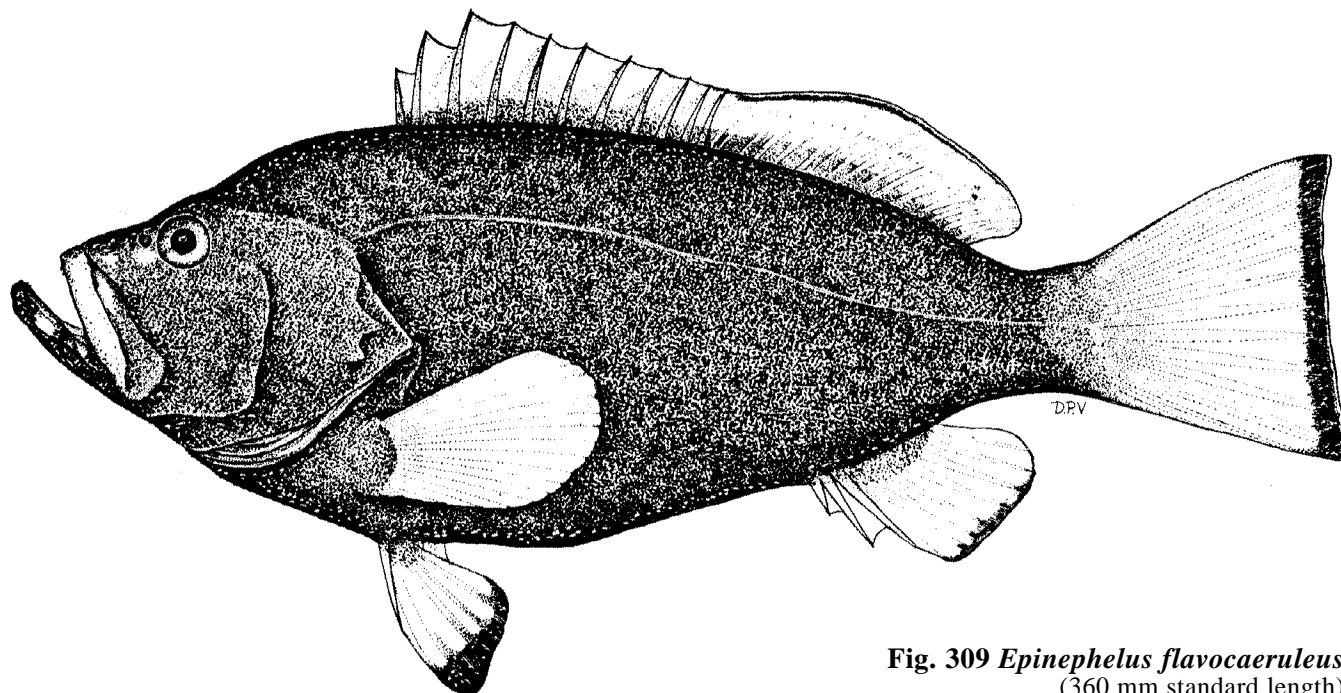


Fig. 309 *Epinephelus flavocaeruleus*
(360 mm standard length)

Diagnostic Features: Body deep and compressed, the depth contained 2.3 to 2.7 times in standard length, body width contained 2.0 to 2.8 times in depth (for fish 13 to 66 cm standard length). Head length contained 2.4 to 2.7 times in standard length; preorbital depth contained 6.75 to 8.75 times in head length for fish 36 to 66 cm standard length; interorbital area convex; posterior nostrils of adults 4 or 5 times larger than anterior nostrils; preopercle subangular, the serrae at angle enlarged; upper edge of operculum straight or slightly convex; maxilla reaches to or slightly past vertical at rear edge of eye; midlateral part of lower jaw with 2 to 4 rows of teeth. Gill rakers 8 to 10 on upper limb, 15 to 17 on lower limb. Dorsal fin with XI spines and 16 or 17 rays, the third or fourth spine longest, its length contained 2.5 to 3.0 times in head length and subequal to longest rays, the interspinous membranes not incised; anal fin with III spines and 8 rays; pectoral-fin rays 18 to 20; pectoral-fin length contained 1.7 to 2.1 times in head length; pelvic fins not reaching anus (except in fish 15 cm standard length) but often longer than pectoral fins, its length contained 1.7 to 2.0 times in head length; caudal fin truncate. Lateral-body scales ctenoid, with a few auxiliary scales in adults; lateral-line scales 61 to 74; lateral-scale series 129 to 148.

Colour: Head and body dark bluish violet to dark greyish blue, sometimes flecked with pale blue; fins and jaws bright yellow; some fish with corners of caudal fin, margin of soft dorsal and anal fins and tips of pelvic fins blackish. Yellow diminishes with growth, and large adults are dark greyish, dark blue, violet, chestnut brown, or almost black.

Geographical Distribution: Indian Ocean from Djibouti south to Algoa Bay, South Africa (34°S) and eastward to the Andaman Sea and Sabang Island at the northwest tip of Sumatra (Sumatra), including Mozambique, Zanzibar, Kenya, Reunion, Mauritius, St. Brandon's Shoals, Seychelles, Lakshadweep Islands, Chagos, Rodriguez, Sri Lanka, and Andaman Islands (Fig. 310). *E. flavocaeruleus* is not known from the Red Sea or the Persian Gulf.

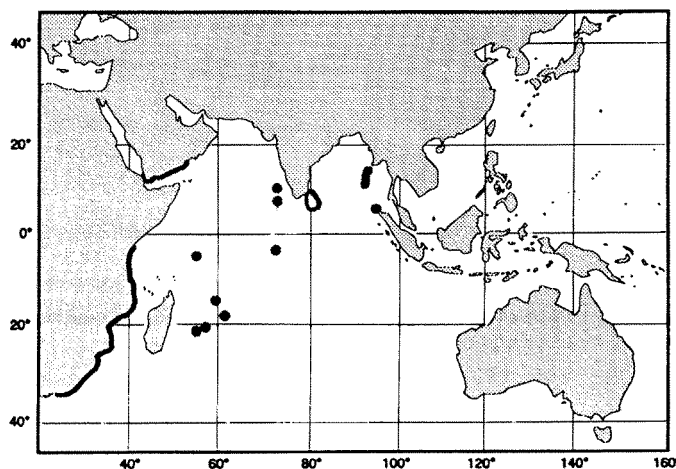


Fig. 310

Habitat and Biology: Juveniles of *E. flavocaeruleus* (to about 40 cm total length) are found on shallow coral reefs, but adults are more common on deeper reefs, to depths of 150 m. Feeds on a variety of fishes, crabs, shrimps, spiny lobsters; squids, and small octopuses. Females are mature at about 50 cm standard length (Morgans, 1982).

Size: Maximum size at least 80 cm total length and 9 kg.

Interest to Fisheries: Often found in the markets of Mombasa and Zanzibar. Caught with hook-and-line and spear.

Local Names: MAURITIUS: Vieille faraud; SEYCHELLES: Vieille plate; SRI LANKA: Kaha laveya, Manjel kaleva.

Literature: Van der Elst (1981); Morgans (1982); Randall and Whitehead (1985); Randall and Heemstra (1991).

Remarks: *E. flavocaeruleus* is closely related to *E. multinotatus* of the northern and western Indian Ocean, and *E. cyanopodus* of the western and central Pacific. These 3 species have similar meristic and morphological features, including a deep body, truncate caudal fin, interspinous dorsal-fin membranes not incised, pelvic fins subequal to pectoral fins, and posterior nostrils enlarged in adults: the only significant differences for these 3 species are their colour patterns, A fourth species, *E. trophis*, known only from 2 juveniles collected off Western Australia, may also belong in this species complex. It has the same meristic and morphological characters, except the caudal fin is slightly convex, which is often the case in juveniles of species with truncate caudal fins; and it also differs in colour pattern from the other 3 species.

Epinephelus flavolimbatus Poey, 1865

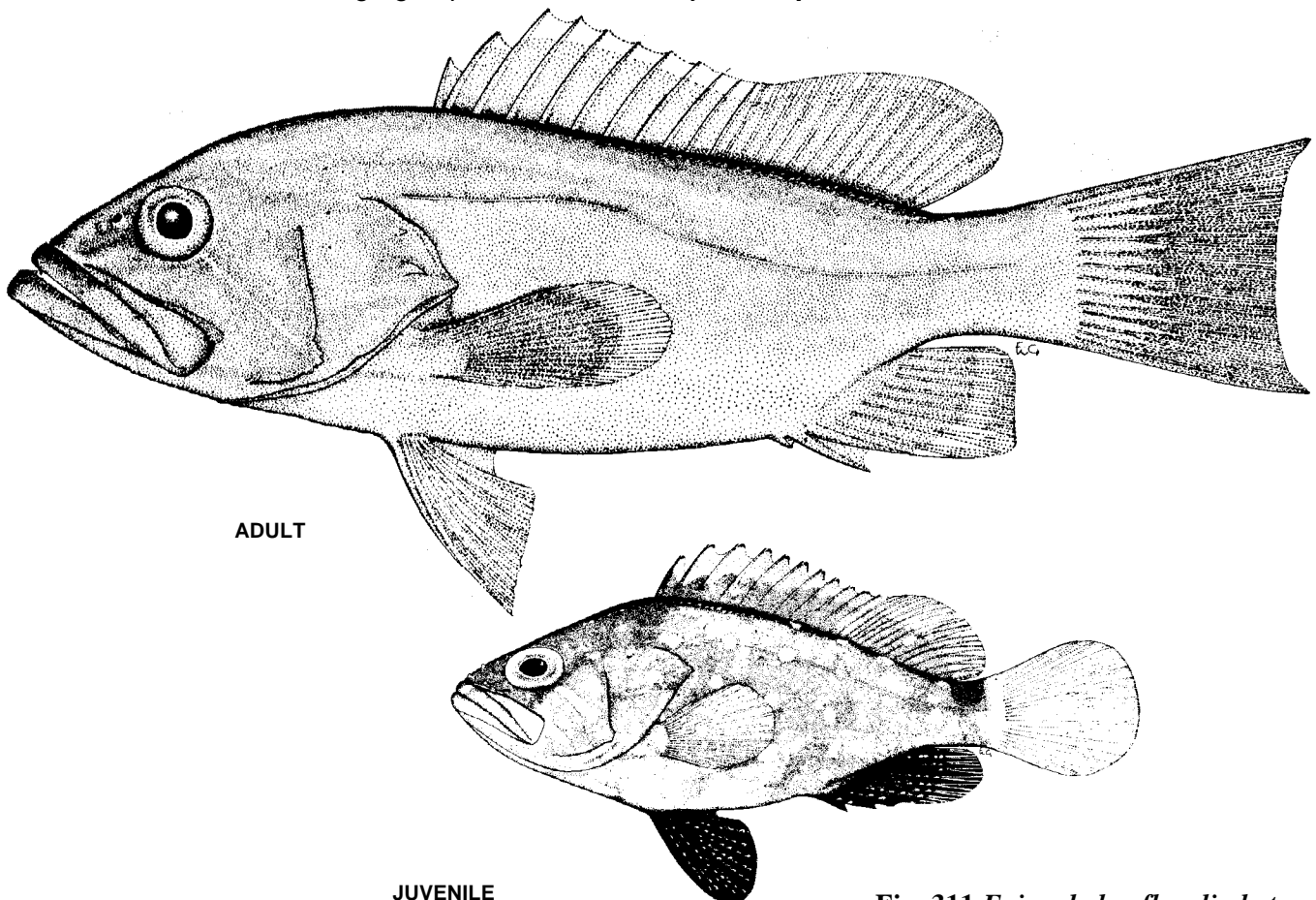
Fig. 311; Pl. XIVCD

SERRAN Epin 15

Epinephelus flavolimbatus Poey, 1865:183 (type locality: Cuba).

Synonyms: None.

FAO Names: En - Yellowedge grouper; Fr - Mérou aile jaune; Sp - Mero aleta amarilla.



ADULT

JUVENILE

Fig. 311 *Epinephelus flavolimbatus*
(adult 480 mm standard length, juvenile about 50 mm standard length)