

**Habitat and Biology:** *E. longispinis* is usually found on coral reefs or rocky areas and occasionally on sandy bottom; depths of capture range from 1 to 70 m. Feeds mainly on crustaceans, especially crabs and stomatopods, and rarely on fish and squid.

**Size:** Attains at least 46 cm standard length, 2.7 kg.

**Interest to Fisheries:** Not uncommon. Caught with hook-and-line, spear, traps, and in trawls.

**Local Names:** INDIA: Fullichammam (Lakshadweep Islands); SOUTH AFRICA: Streakspot rockcod.

**Literature:** Morgans (1982); Randall and Heemstra (1991).

**Remarks:** *E. longispinis* is similar to *E. maculatus* in counts of fin rays, scales, and gill rakers, and also in morphometric features, elevated anterior dorsal-fin spines, and a distinct step-like indentation on ventral edge of maxilla. Juveniles are somewhat similar in colour pattern: brown with small scattered dark spots on body, larger dark spots on fins, and irregular white spots and blotches on head and body. Adults of *E. maculatus* differ in having all the dark spots on head and body round (none elongated into oblique streaks) and close-set (not more crowded posteriorly), large pale blotch on middle of dorsal fin, and no row of dark spots along rear edge of caudal fin. These two species occur together in Indonesia; the junior author (J.E.R.) observed and photographed both species at Bali.

*Epinephelus macrospilos* (Bleeker, 1855)

Fig. 345; Pl. XVIIIB-D

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*Serranus macrospilos* Bleeker, 1855e:499 (type locality: Batjan, Moluccas).

**Synonyms:** *Serranus cylindricus* Gunther, 1859:151 (type locality: Madagascar). Often confused with *Epinephelus quoyanus*, *E. faveatus*, *E. corallicola*, and *E. howlandi*.

**FAO Names:** En - Snubnose grouper (formerly: Bigspot grouper); Fr - M  rou tapis; Sp - Mero alfombrado.

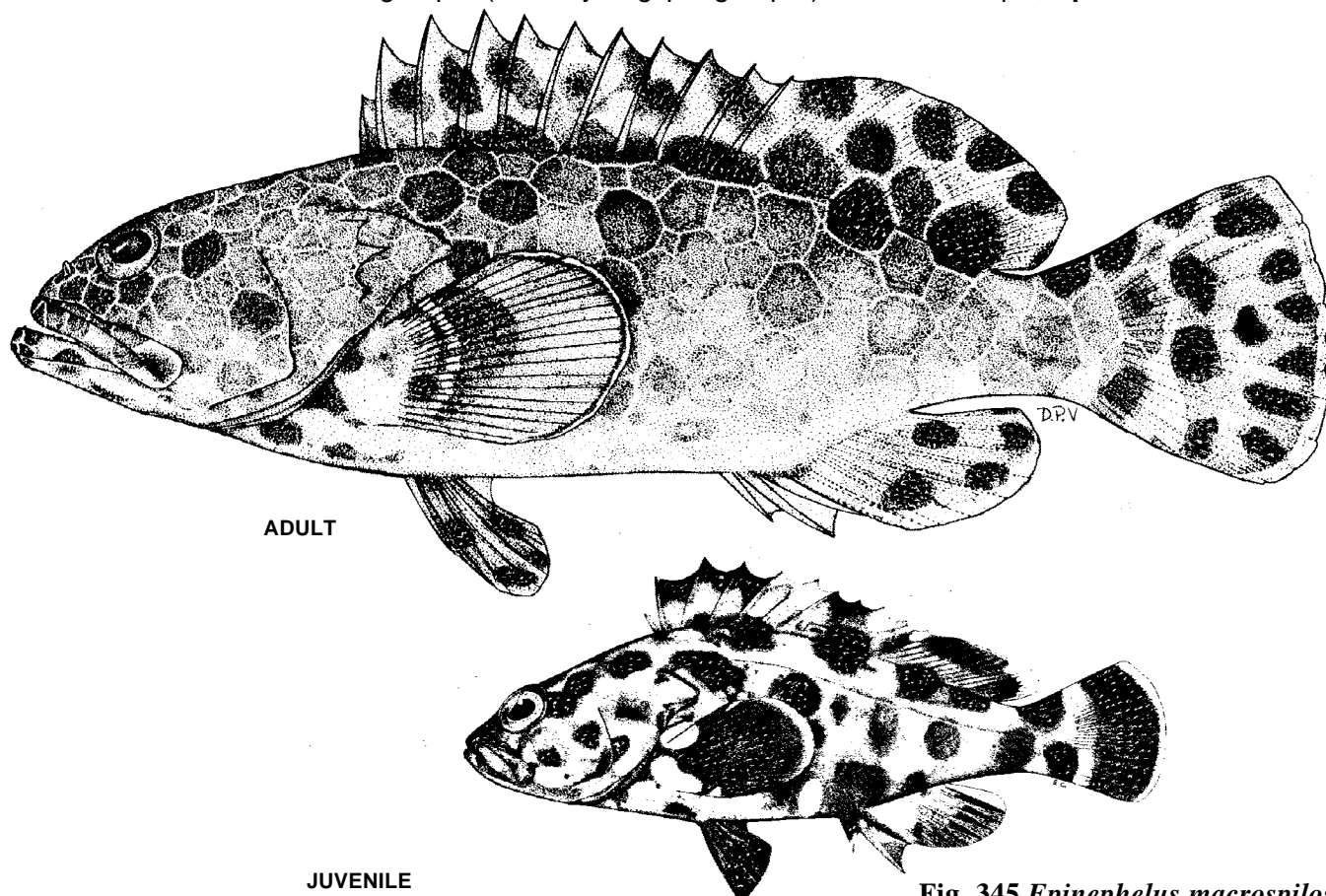


Fig. 345 *Epinephelus macrospilos*

(adult 186 mm standard length juvenile 55 mm standard length)

**Diagnostic Features:** Body depth contained 3.0 to 3.6 times in standard length (48 specimens 10 to 43 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 of adults with a ventral bend at orbits; preopercle rounded, with minute serrae mostly covered by skin and a shallow indentation just above the "corner"; upper edge of operculum

straight or slightly convex; posterior nostrils usually distinctly larger than anteriors; maxilla reaches to or past vertical at rear edge of orbit, the ventral edge smoothly curved at distal expansion; lower jaw strongly projecting, the midlateral part with 2 to 4 rows of teeth. Gill rakers 7 to 9 on upper limb, 14 to 17 on lower limb, 21 to 26 total. Dorsal fin with XI spines and 15 to 17 rays, the third or fourth spine longest, its length contained 2.3 to 3.4 times in head length and shorter than longest dorsal-fin rays, the interspinous membranes moderately incised; anal fin with III spines and 8 rays, the second and third spines subequal, their length contained 2.8 to 4.2 times in head length; pectoral-fin rays 17 to 20; pectoral-fin length contained 1.5 to 2.0 times in head length; pelvic-fin length 1.8 to 2.5 times in head length; caudal-peduncle depth contained 3.2 to 3.7 times in head length; caudal fin rounded; length of middle caudal-fin rays contained 1.5 to 2.0 times in head length. Lateral-body scales smooth, except for area covered by pectoral fins; lateral-line scales 48 to 52; lateral-scale series 86 to 103. Pyloric caeca 25 to 27. **Colour:** Pacific Ocean specimens: Head and body pale greyish brown with dark brown spots (centre of spots darker than the diffuse edges) that are large and well-separated in young, becoming relatively smaller, more numerous and closer together in adults; median and pelvic fins with similar dark spots; pectoral fins usually dusky, with white line along the edge and usually a few faint dark spots; some specimens with a faint oblique dark line across lower part of chest; median fins with narrow pale margin posteriorly; no dark spots on underside of lower jaw. Indian Ocean specimens: Head and body with round to polygonal brown to dark brown spots, variable in size (some spots on juveniles may be as large as eye) and close-set, the narrow interspaces forming a pale network pattern; median fins yellowish, with blackish brown spots like those on body; soft dorsal, caudal, and anal fins with pale margin; underside of lower jaw usually with dark spots.

Small juveniles (5 to 7 cm standard length) with dark spots on head and body fewer and much larger than in adults, those on caudal fin represented by a broad black area covering two-thirds of the fin; Pacific Ocean juveniles with prominent white blotches as shown in figure.

**Geographical Distribution:** Indo-Pacific region from east coast of Africa (Kenya to Natal, South Africa) to the central Pacific, including Madagascar, Comoros, Mascarenes, Seychelles, Chagos, Nicobars, Cocos-Keeling, Western Australia (Scott Reef), Indonesia, Okinawa, Great Barrier Reef, Marquesas Islands, and most western Pacific islands (both on and off the Pacific Plate) (Fig. 346). *E. macrospilos* is not known from the Red Sea, Persian Gulf, or Hawaii.

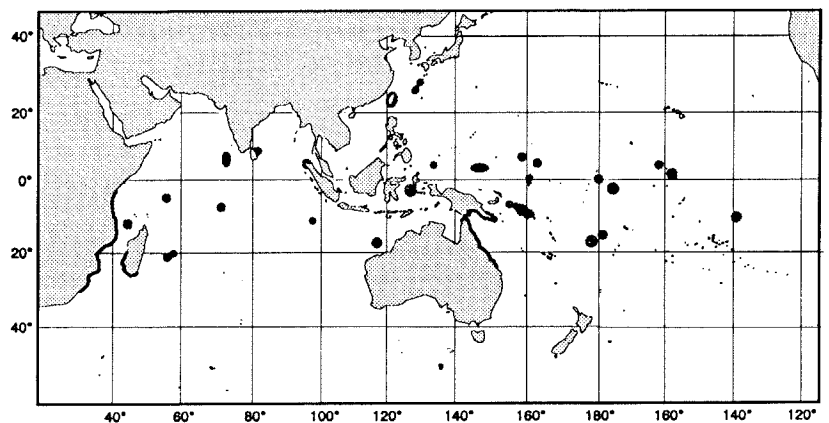


Fig. 346

**Habitat and Biology:** Coral reefs to depths of at least 44 m. Feeds on crustaceans (mainly crabs), fishes, octopuses, and squids.

**Size:** Attains at least 43 cm standard length and 2.0 kg.

**Interest to Fisheries:** *E. macrospilos* is common in some areas and is undoubtedly important in artisanal fisheries. It is caught with hook-and-line, spear, and traps.

**Local Names:** Because of confusion with similarly coloured species, the application of specific local names to this species is uncertain.

**Literature:** Morgans (1982); Randall and Heemstra (1991).

**Remarks:** Specimens from the western Indian Ocean differ from those in the eastern Indian and Pacific oceans in usually having dark spots on the underside of the jaw, and the dark spots on the head and body are larger and close-set, forming a pale mesh dorsally on fresh specimens. But we are unable to find any other differences between specimens of these two populations. Burgess and Axelrod (1974) illustrated the colour pattern of juveniles (figs 230 to 232, photographs by Shih-chieh Shen of specimens 6 to 9 cm standard length from Taiwan labelled "*Epinephelus tauvina*").

*E. macrospilos* was illustrated as "*Epinephelus quoyanus*" by Masuda and Allen (1987:116; and the same specimen was illustrated by Katayama, 1988:pl. 115, fig. E, as *E. faveatus*) and Gloerfelt-Tarp and Kailola (1984:134).

*E. macrospilos* seems to be replaced along the coast of India and Sri Lanka by the closely related *E. faveatus*; and along the northern coast of Australia, it seems to be excluded by *E. quoyanus*. *E. macrospilos* and *E. quoyanus* both occur at the Riu Kiu Islands, Taiwan, Moluccas and probably at other localities in Indonesia.

*E. macrospilos* was compared with *E. bilobatus*, *E. corallicola*, *E. faveatus*, *E. hexagonatus*, and *E. howlandi* in the accounts of these species. Western Indian Ocean specimens of *E. macrospilos* are often confused with the other "reticulated groupers" (*E. bilobatus*, *E. faveatus*, *E. hexagonatus*, *E. maculatus*, *E. melanostigma*, *E. merra*, *E. quoyanus*, and *E. spilotoceps*).

*E. maculatus* has the dorsal-fin membranes not incised between the spines; lateral-body scales ctenoid, lateral-scale series 102 to 120; juveniles are yellowish brown, with irregular white spots and blotches on head, body, and dorsal fin and a few small black spots on head and fins.

*E. melanostigma* has the lateral-body scales ctenoid, lateral-line scales 56 to 68, and a large black blotch (which extends halfway to dorsal-fin margin) on body at base of last 4 dorsal-fin spines.

*E. merra* has the lateral-body scales ctenoid, and pectoral fins covered with distinct small black spots mainly confined to the rays.

*E. quoyanus* has larger pectoral fins (their length contained 1.2 to 1.7 times in head length), lateral-body scales distinctly ctenoid, chest with 2 oblique dark brown bands (or large blotches linked by narrow bands), pectoral fins with semicircular reddish brown blotch covering most of the base, and small juveniles are coloured essentially like the adults.

*E. spilotoceps* has the lateral-body scales ctenoid, lateral-line scales 59 to 69, black spots on snout about size of nostrils, and caudal-peduncle depth contained 3.7 to 4.3 times in head length.

*Epinephelus maculatus* (Bloch, 1790)

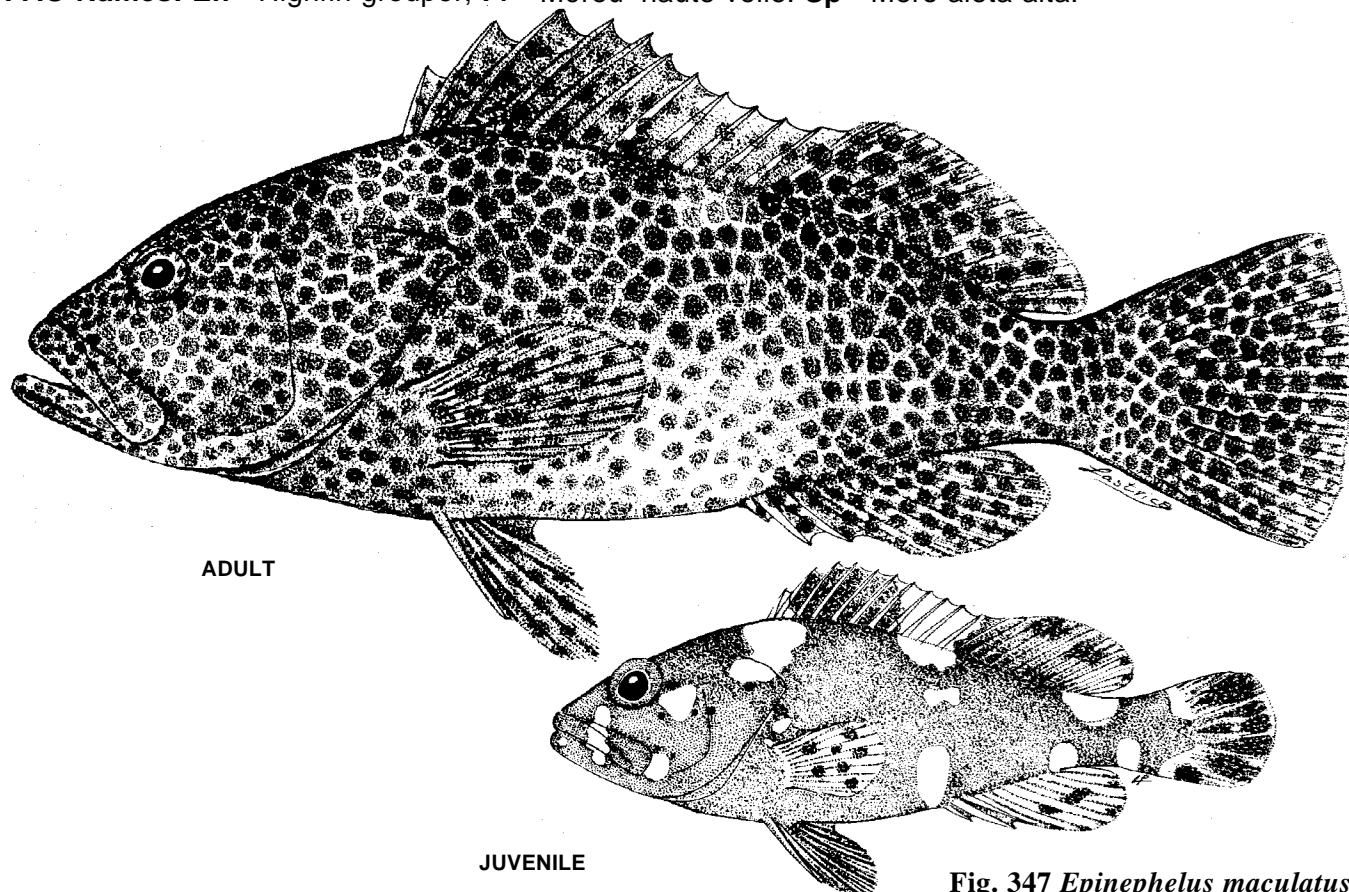
Fig. 347; Pl. XVIII

SERRAN Epin 85

*Holocentrus maculatus* Bloch, 1790:96, pl. 242, fig. 3 (type locality: East Indies).

**Synonyms:** *Holocentrus albo-fuscus* Lacepède, 1802:384 (type locality: East Indies). *Serranus Sebae* Bleeker, 1854:488 (type locality: Ambon, Indonesia). *?Plectropomus kulas* Thiollière in Montrouzier, 1856:423 (type locality: Woodlark Island, Solomon Sea). *Serranus medurensis* Günther, 1873:8, pl. 9, fig. A (type locality: Majuro, Marshall Islands).

**FAO Names:** En - Highfin grouper; Fr - Mérou haute voile; Sp - Mero aleta alta.



**Fig. 347** *Epinephelus maculatus*  
(adult 400 mm standard length juvenile 80 mm standard length)

**Diagnostic Features:** Body depth contained 2.8 to 3.1 times in standard length (for fish 11 to 37 cm standard length). Head length contained 2.4 to 2.6 times in standard length; interorbital area flat to slightly convex, the dorsal head profile convex; preopercle with a shallow indentation just above the enlarged serrae at the corner; upper edge of operculum straight or slightly convex, nostrils subequal; maxilla reaches to or past vertical at rear edge of eye, the ventral edge with a blunt hook-like process distally in fish larger than 35 cm standard length; midlateral part of lower jaw with 2 rows of teeth. Gill rakers 8 to 10 on upper limb, 15 to 17 on lower limb. Dorsal fin with XI spines and 15 to 17 rays, the third or fourth spine longest, its length contained 2.1 to 2.6 times in head length and distinctly longer than dorsal-fin rays, the interspinous membranes slightly incised between anterior spines and not incised posteriorly; anal fin with III spines and 8 rays, the third spine longest, its length contained 3.3 to 4.1 times in head length and equal to or less than depth of caudal peduncle; pectoral-fin rays 17 to 19; pectoral-fin length contained 1.5 to 1.9 times in head length; pelvic fins reaching to or near anus, their length contained 1.7 to 2.0 times in head length; caudal fin convex or rounded. Lateral-body scales distinctly ctenoid, with numerous auxiliary scales; lateral-line scales 49 to 52; lateral-scale series 102 to 120. Pyloric caeca 30 to 45. **Colour:** Head, body, and fins of adults pale brown, covered with small, round to hexagonal, close-set, dark brown spots, extending onto belly, chest and underside of head; 2 large diffuse dusky areas on dorsal part of body and dorsal fin, the largest extending over dorsal fin from second to fifth spines, the second dark blotch from tenth spine to second soft-ray, the dorsal fin pale between these 2 dusky blotches, but with small dark spots. One resting colour phase is broadly mottled with large dark and pale areas; in the pale areas, the usual dark brown spots are mostly whitish, with small dark brown centres. Small juveniles (4 to 8 cm standard length) yellowish brown, with well-separated small black spots (mainly on head and fins) and prominent, irregular white blotches and spots, the largest on middle of dorsal fin.

**Geographical Distribution:** Eastern Indian Ocean and Western Pacific from Cocos-Keeling Islands, Indonesia, Hong Kong, Ryukyu Islands, Ogasawara Islands, Philippines, New Guinea, Great Barrier Reef, Lord Howe Island, New Caledonia, New Ireland, Fiji, Samoa, Palau, Caroline Islands, Marshall Islands, and Kiribati (Gilbert Islands) (Fig. 348).

**Habitat and Biology:** Coral reefs at depths of 2 to 100 m. Prey comprises mainly small fishes, crabs, and octopuses.

**Size:** Attains at least 50 cm standard length.

**Interest to Fisheries:** Not common, but probably of commercial interest in artisanal fisheries. Caught with hook-and-line, spear, and traps.

**Local Names:** HONG KONG: Cheung-gig-paan; JAPAN: Shirobuchihata.

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

**Remarks:** *E. maculatus* was compared with *E. longispinis* in that species account. *E. bilobatus* differs from *E. maculatus* in having 17 or 18 dorsal-fin rays, fewer lateral-scale series (94 to 102) and 3 bilobed dark blotches or close-set pairs of dark brown or black spots along body and base of dorsal fin; it also lacks the 2 large blackish areas on body and dorsal fin where they are separated by a large pale area with small dark spots.

*E. maculatus* is one of 9 "reticulated coral-reef groupers", which have a rounded caudal fin and close-set dark brown spots, resulting in pale interspaces forming a network on the body. The other species in this group are *E. bilobatus*, *E. faveatus*, *E. hexagonatus*, *E. macrospilos*, *E. melanostigma*, *E. merra*, *E. quoyanus* and *E. spilotoceps*. These species have been much confused in the literature, and many museum specimens have been misidentified. *E. maculatus* differs from all of the other "reticulated groupers" in having the dorsal-fin membranes not (or only slightly) incised between the fin spines, and in the colour pattern of small juveniles (4 to 8 cm standard length) being quite different from larger juveniles (15 cm standard length) and adults.

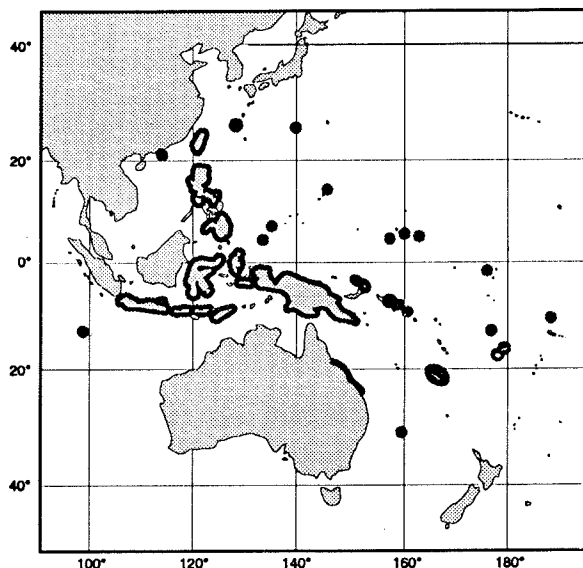


Fig. 348

***Epinephelus magniscuttis*** Postel, Fourmanoir and Guézé, 1963

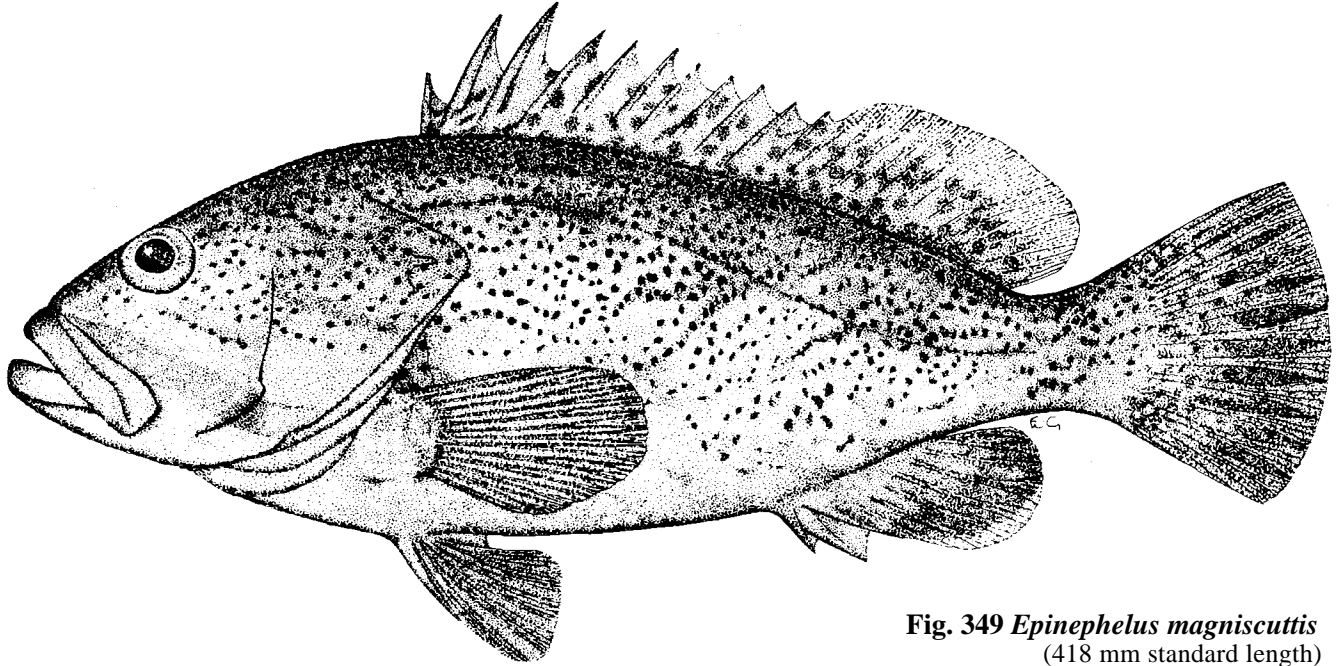
Fig. 349;  
Pl. XVIII

**SERRAN Epin 37**

*Epinephelus magniscuttis* Postel, Fourmanoir and Guézé, 1963:365, fig. 9 (type locality: Reunion).

**Synonyms:** *Epinephelus pseudomorrhua* Postel, Fourmanoir and Guézé, 1963:366, fig. 10 (type locality: Réunion).

**FAO Names:** En - Speckled grouper; Fr - M erou grandes  cailles; Sp - Mero bacalao.



**Fig. 349** *Epinephelus magniscuttis*  
(418 mm standard length)

**Diagnostic Features:** Body depth contained 2.7 to 3.2 times in standard length (for fish 13 to 42 cm standard length). Head length contained 2.2 to 2.4 times in standard length; interorbital area flat to convex, the dorsal head profile almost straight; preopercle angular, with 2 to 4 distinctly enlarged serrae at angle; upper edge of operculum slightly convex; posterior nostrils not much larger than anterior nostrils; maxilla reaches to below rear half of eye, the ventral edge with a low step at the distal expansion; midlateral part of lower jaw with 2 rows of teeth, the inner teeth larger than outer ones. Gill rakers 8 or 9 on upper limb, 16 or 17 on lower limb. Dorsal fin with XI spines and 14 or 15 rays, the third or fourth spine longest, its depth contained 2.5 to 3.0 times in head length and longer than longest dorsal-fin ray, the interspinous membranes deeply incised; anal fin with III spines and 8 rays; pectoral-fin rays 17 to 19; pectoral-fin length contained 1.7 to 2.0 times in head length; pelvic fins not reaching anus, their length contained 2.1 to 2.3 times in head length. Lateral-body scales distinctly ctenoid and without auxiliary scales; lateral-line scales 55 to 62; lateral-scale series 103 to 122. Pyloric caeca 7. **Colour:** Generally pale brown, with small dark brown (or greyish green?) spots unevenly scattered on dorsolateral parts of head (posterior to eyes) and body, dorsal fin and caudal fin; no spots on body below level of pectoral fins or on anal and paired fins. According to Postel et al. (1963), juveniles have 6 or 7 dark lines running horizontally along the body and these disappear with age.

**Geographical Distribution:** Indo-West Pacific from Natal, South Africa, Mozambique, R union, Mauritius, New Caledonia, Philippines, New Guinea, New Ireland, and Fiji. Not known from the Red Sea or Persian Gulf (Fig. 350)

**Habitat and Biology:** *E. magniscuttis* is known only from deep water (128 to 300 m) in the vicinity of coral reefs. Biology unknown.

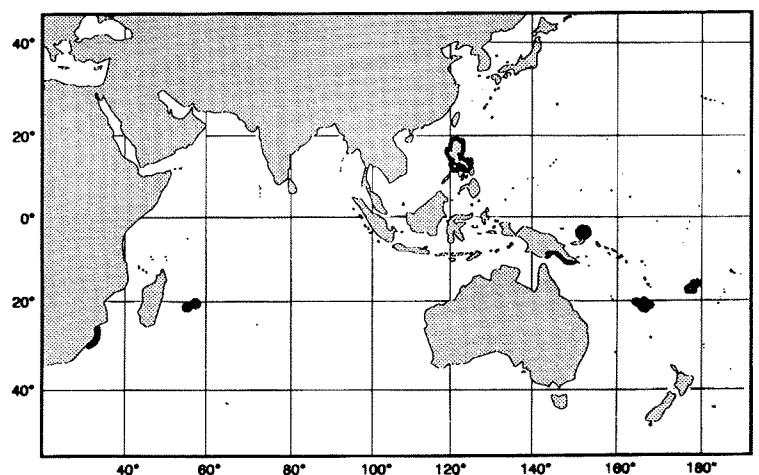
**Size:** According to Postel et al. (1963), this species attains 150 cm total length and a weight of 50 kg.

**interest to Fisheries:** An excellent food fish; apparently of some commercial importance at Reunion, where it is fairly common.

**Local Names:** MAURITIUS: Vieille Saint-Sillac;  
REUNION: Cabot grosse  caille, Petit n gre, Cabot de fond, Cabot aux yeux vert.

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

**Remarks:** *E. magniscuttis* is closely related to *E. epistictus*, which has fewer (and smaller) dark spots on the head and body, and in juveniles the dark spots are arranged in 3 longitudinal rows on the body.



**Fig. 350**

*E. pseudomorrhua* was described by Postel et al. (1963) in the same paper with their description of *E. magniscuttis*. These two species were separated in their key to species on the basis of scale counts (*E. magniscuttis* was said to have only about 75 lateral-scale series), but they were not otherwise compared. The colour patterns that they illustrated for these two species are virtually identical, and both species were caught only in deep water. We have not been able to examine the holotype of *E. magniscuttis* (which was deposited at the oceanographic station in Nossi Bé, Madagascar), but if the lateral-scale count is not erroneous, it probably represents an individual anomaly.

*Epinephelus malabaricus* (Bloch and Schneider, 1801)

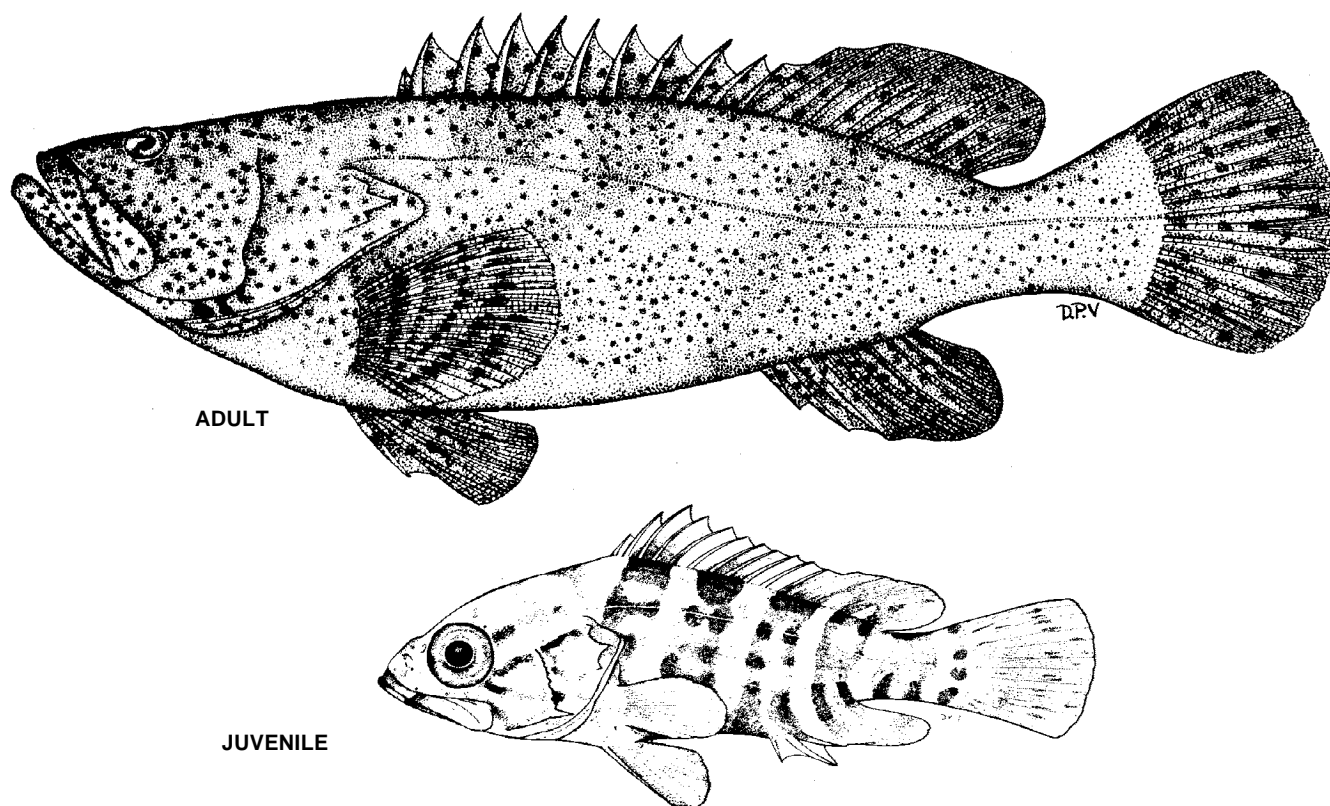
Fig. 351; Pl. XVIII A

SERRAN Epin 38

*Holocentrus malabaricus* Bloch and Schneider, 1801:319 pl. 63 (type locality: Tranquebar, India).

**Synonyms:** *Holocentrus salmoïdes* Lacepède, 1802:389; 1801:pl. 34, fig. 3 (type locality: "Grand Océan" [based on a drawing from the manuscripts of Commerson, hence the locality is probably Mauritius]). *Serranus semi-punctatus* Valenciennes in Cuv. and Val., 1828:341 (type locality: Pondicherry, India). *Serranus salmonoides* Valenciennes in Cuv. and Val., 1828:343 (emendation and redescription of *Holocentrus salmoïdes* Lacepède, 1802). *Serranus crapao* Cuvier in Cuv. and Val., 1829:494 (type locality: Jakarta, Indonesia). *Serranus polypodophilus* Bleeker, 1849:37 (type locality: Jakarta). ?*Serranus estuarius* Macleay, 1884:200 (type locality: Mary River, Queensland, Australia). *Epinephelus cylindricus* Postel, 1965:124, fig. 1 (type locality: Nouméa, New Caledonia).

**FAO Names:** En - Malabar grouper; Fr - Mérou malabare; Sp - Mero malabárico.



**Fig. 351** *Epinephelus malabaricus*  
(adult 500 mm total length, juvenile 23 mm standard length)

**Diagnostic Features:** Body elongate, the depth contained 3.0 to 3.7 times in standard length (for fish 15 to 69 cm standard length); body width contained 1.4 to 1.9 times in the depth. Head length contained 2.3 to 2.6 times in standard length; snout length contained 1.7 to 2.0 times in upper jaw length; interorbital width contained 4.5 to 6.5 times in head length and 2.1 to 3.0 times in upper jaw length; interorbital area flat or slightly convex; preopercle subangular, with enlarged serrae at the angle; upper edge of operculum almost straight; nostrils subequal, except in large adults which have the posterior nostrils slightly larger; maxilla extends past vertical at rear edge of orbit, maxilla width 4.5 to 6.5 % of standard length; upper jaw length 17 to 22% of standard length, midlateral part of lower jaw with 2 to 5 rows of teeth. Gill rakers 8 to 11 on upper limb, 14 to 18 on lower limb, 23 to 27 total; rudiments difficult to distinguish from small bony platelets on outer face of first gill arch. Dorsal fin with XI spines and 14 to 16 rays, the third to fifth spines usually slightly longer than posterior spines, their length contained 3.1 to 4.0 times in head length and distinctly

shorter than longest rays, the interspinous membranes incised; anal fin with III spines and 8 rays, the third spine usually longest; pectoral-fin rays 18 to 20; pectoral-fin length contained 1.7 to 2.2 times in head length, pelvic-fin length contained 2.1 to 2.6 times in head length; caudal fin rounded. Lateral-body scales ctenoid, with auxiliary scales; lateral-line scales 54 to 64; anterior lateral-line tubes of large adults with 2 to 4 branches; lateral-scale series 101 to 117. Pyloric caeca numerous (more than 80 branches). **Colour:** Head and body brownish, covered with small, well-separated, blackish brown spots which extend onto chest, lower jaw and gular area and roof of mouth; head and body also with scattered white spots and blotches; 5 irregular, oblique, dark brown bars (more or less interrupted by pale spots) often visible on body; fins with scattered small black spots. On preserved fish the blackish spots are conspicuous against the drab background.

**Geographical Distribution:** *E. malabaricus* is known from the Red Sea and Indo-Pacific area (South Africa to Japan, Australia, Palau, Yap and Fiji). It occurs in continental and insular localities: Gulf of Aqaba, Sudan, Saudi Arabia, Djibouti, Ethiopia, Kenya, Zanzibar, Tanzania, Mozambique, Oman, Madagascar, Comoros, Seychelles, India, Sri Lanka, Andaman Islands, Indonesia, Singapore, Philippines, Taiwan, China, Papua New Guinea, New Ireland, Caroline Islands, New Caledonia, and Tonga. In Australia, it occurs from the Northern Territory to New South Wales (Fig. 352). It is not known from the Persian Gulf, where the closely related *E. coioides* is common.

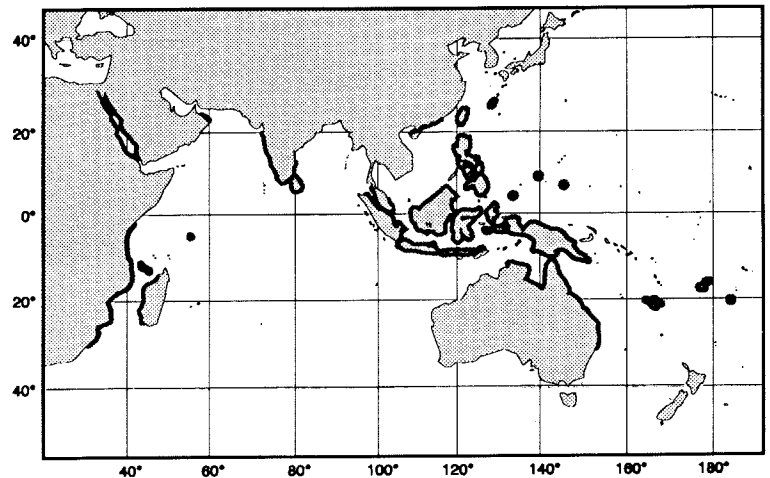


Fig. 352

*E. malabaricus* was reported from the Mediterranean coast of Israel by Randall and Ben-Tuvia (1983), based on the record of "*Epinephelus tauvina*" by Ben-Tuvia and Lourie (1969); but their "*E. tauvina*" were said to have "Head and body covered with bright orange spots more or less regularly dispersed..." which would rule out *E. malabaricus*. The specimen in question, which is now deposited at the Hebrew University in Jerusalem, was recently reexamined by P.C. Heemstra and identified as *E. coioides*, which does have orange or reddish brown spots, is very similar to *E. malabaricus*, and has recently been reported from the Mediterranean (Heemstra, 1991). Although the original record of "*E. malabaricus*" in the Mediterranean (Randall and Ben-Tuvia, 1983), was based on *E. coioides* (which Randall and Ben-Tuvia (1983) confused with *E. malabaricus*), we have recently examined a specimen of *E. malabaricus* (deposited at the Hebrew University in Jerusalem) that was collected at Nahariya on the Mediterranean coast of Israel in June 1966. We also saw a live specimen that was collected in Haifa Bay and is presently residing at the National Center for Mariculture in Eilat.

**Habitat and Biology:** *E. malabaricus* is a common species that is found in a variety of habitats: coral and rocky reefs, tidepools, estuaries, mangrove swamps and sandy/mud bottom from shore to depths of 150 m. It feeds equally on fishes and crustaceans and occasionally on octopuses. No information is available on age and growth of this species.

**Size:** Tan et al. (1982) illustrated a 97.4 cm standard length specimen (= 115 cm total length). Attains at least 25 kg. The maximum size is uncertain because of confusion with other species of large groupers.

**Interest to Fisheries:** *E. malabaricus* is undoubtedly one of the most important groupers in fisheries of the Indo-Pacific region. Because of the confusion of this species with *E. coioides* (= *E. suillus*) and *E. tauvina*, there are no statistical data available for *E. malabaricus*. But this species is one of the most common groupers in markets of the Indo-West Pacific region, and it is widely used in the aquaculture industry. It is caught with trawls, longlines, traps, spear and hook-and-line.

**Local Names:** INDIA: Bontoo, Punni-calawah, Kalava, Hekaru, Gobra; JAPAN: Yaitohata; NEW CALEDONIA: Mére loche, Loche ronde; SINGAPORE: Greasy grouper, Keretang, Hua dun hou.

**Literature:** Heemstra (1991); Randall and Heemstra (1991). Misidentified as *E. tauvina*: Morgans (1966, 1982); Kyushin et al. (1977); Tan et al. (1982).

**Remarks:** Morgans (1966) distinguished *E. malabaricus* from *E. coioides* and *E. tauvina*, but he used the wrong names for these species: his "*E. tauvina*" is *E. malabaricus*; he described *E. tauvina* as a new species, *E. chewa*; and he identified *E. coioides* as "*E. malabaricus*." He also appears to have mistaken large (greater than 150 cm total length) specimens of *E. lanceolatus* for *E. malabaricus* (which he identified as his "big drab" stage of "*E. tauvina*").

Differences between *E. malabaricus*, *E. coioides*, and *E. tauvina* are given in the following table:

**Table 4**

**Comparison of *Epinephelus coioides*, *E. malabaricus*, and *E. tauvina* (for fish of 10 to 61 an standard length)**

	<i>E. coioides</i>	<i>E. malabaricus</i>	<i>E. tauvina</i>
Spots on head and body	orange or reddish brown; no white spots or blotches	dark brown or black; also with irregular white spots and blotches	dull orange-red to dark brown; also with small faint white spots and blotches
Midlateral-body scales	ctenoid (rough)	ctenoid (rough)	smooth on fish 30-60 cm SL
Head length	2.3-2.6 times in standard length	2.3-2.6 times in standard length	2.1-2.3 times in standard length
Interorbital width	5.0-6.2 times in head length	4.5-6.5 times in head length	6.8-8.1 times in head length
Upper jaw length	17-20% of standard length	17-22% of standard length	21-24% of standard length
Maxilla width	4.2-5.5% of standard length	3.9-5.3% of standard length	5.4-6.5% of standard length
Upper jaw snout length	1.8-1.9	1.7-2.0	2.0-2.4
Upper jaw interorbital width	2.1-3.2	2.1-3.0	3.1-4.0
Lower-limb gill rakers	14-17	14-18	17-20
Lateral-line scales	58-65	54-64	63-74
Pyloric caeca	50-60	more than 80 branches	16-18
Bony platelets on lateral side of first gill arch	present	present	absent
Preopercle shape	angular	angular	broadly rounded

*Epinephelus marginatus* (Lowe, 1834)

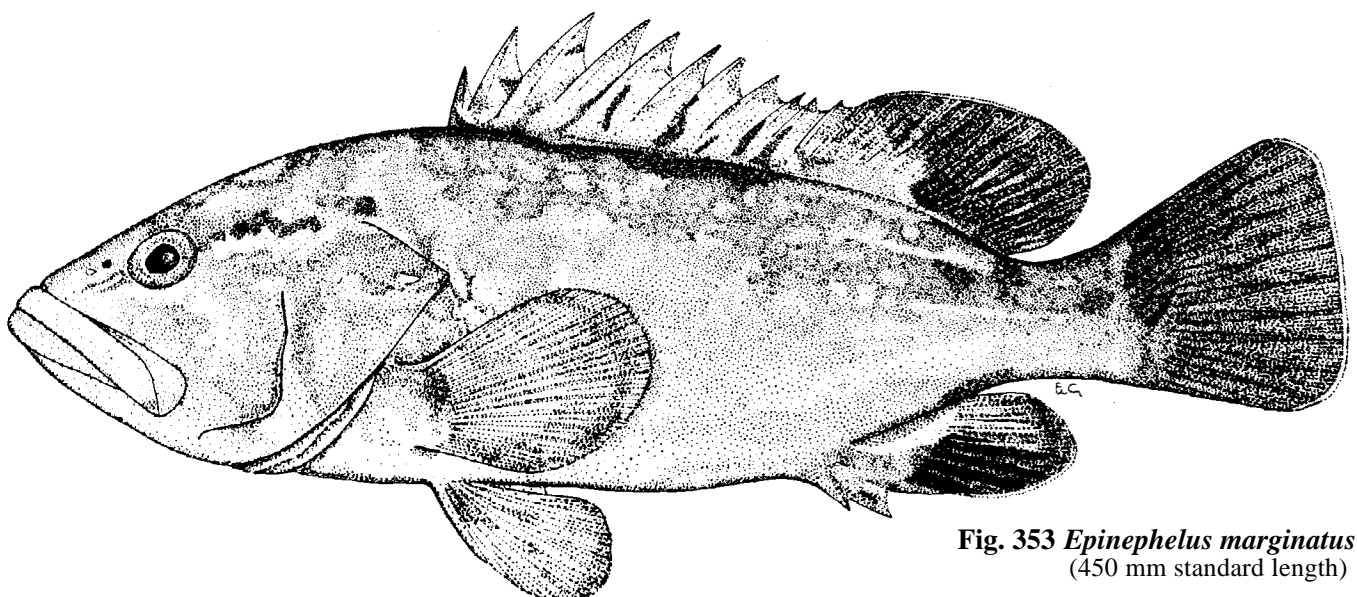
Fig. 353; Pl. XVIIIIB

**SERRAN** Epin 1

*Serranus marginatus* Lowe, 1834:142 (type locality: Madeira).

**Synonyms:** *Serranus fimbriatus* Lowe, 1836:195, pl. I, fig. 1 (replacement name for *Serranus marginatus* Lowe, thought to be preoccupied by *Serranus marginalis* Valenciennes, 1828 [which was based on *Holocentrus marginatus* Lacepède, 1802, an incorrect spelling of *Epinephelus marginalis* Bloch, 1793]). *Serranus aspersus* Jenyns, 1843:6 (type locality: Cape Verde Islands). ?*Serranus cernioides* Capello, 1868:156, pl. 4, fig. 1 (type locality: Lisbon). *Epinephelus brachysoma* Cope, 1871:466 (type locality: Rio de Janeiro). *Epinephelus gigas*: Jordan and Swain, 1885; Jordan and Eigenmann, 1890; Boulenger, 1895 (in part); Barnard, 1927. *Epinephelus guaza* (non Linnaeus): Jordan and Evermann, 1896; Smith, 1949; Rivas, 1964; Smith, 1971; Heemstra and Randall, 1984; Hemmstra and Randall, 1986.

**FAO Names:** En - Dusky grouper; Fr - Mérou noir; Sp - Mero moreno.



**Fig. 353** *Epinephelus marginatus*  
(450 mm standard length)



**Diagnostic Features:** Body depth less than head length, depth contained 2.6 to 3.1 times in standard length (for fish 15 to 62 cm standard length). Head length contained 2.3 to 2.5 times in standard length; interorbital area convex; preopercle rounded, finely serrate, the serrae at “angle” slightly enlarged; subopercle and interopercle smooth: eye diameter greater than or subequal to interorbital width in fish 10 to 30 cm standard length, less than interorbital in fish over 40 cm standard length; nostrils subequal or rear nostril slightly larger; maxilla naked, reaching to or slightly past vertical at rear edge of eye; midlateral part of lower jaw with 2 to 4 rows of subequal teeth. Gill rakers 7 to 10 on upper limb, 14 to 16 on lower limb, total 22 to 25. Dorsal fin with XI spines and 14 to 16 rays, third or fourth spine longest, longer than longest dorsal-fin ray and contained 2.3 to 2.8 times in head length, the interspinous membrane distinctly incised; anal fin with III spines and 8 rays (1 of 87 fish counted with 9 rays); pectoral-fin rays 17 to 19, the fin length contained 1.6 to 2.0 times in head length: pelvic fins distinctly shorter than pectoral fins, not reaching anus (except in some fish less than 20 cm standard length), pelvic-fin length contained 1.8 to 2.4 times in head length; pelvic-fin origin below or slightly posterior to base of pectoral fins; caudal fin rounded (in juveniles) or truncate with rounded corners (large adults). Midlateral-body scales ctenoid (at least in area covered by pectoral fins); adults with numerous auxiliary scales; lateral-line scales 62 to 73; lateral-scale series 98 to 116. Pyloric caeca 26 to 50. **Colour:** Head and body dark reddish brown or greyish dorsally, usually yellowish gold ventrally; irregular white, pale greenish yellow or silvery grey blotches usually visible on body and head and mostly arranged in vertical series: black maxillary streak more or less distinct: median fins dark brown: distal edge of anal fin, caudal fin, and often the pectoral fins narrowly white; pelvic fins blackish distally; pectoral fins dark reddish brown or grey; margin of spinous dorsal fin and basal part of paired fins often golden yellow.

**Geographical Distribution:** *E. marginatus*

occurs on both sides of the Atlantic Ocean, throughout the Mediterranean Sea and round the southern tip of Africa to southern Mozambique and Madagascar. We examined specimens from the Azores, Spain, France, Italy, Greece, Lebanon, Israel, Algeria, Madeira, Canary Islands, Cape Verde Islands, Angola, South Africa, Mozambique, and Brazil (Fig. 354). Based on identifiable records as “*Epinephelus guaza*”, the species is also known from Egypt, Tunisia, Morocco, Mauritania, Senegal, Côte-d'Ivoire, and the Congo. According to Wheeler (1969), “*Epinephelus guaza*” is rare in British Seas. Reported from India by Reddy (1984; as “*Epinephelus guaza*”), but we have not examined any Indian Ocean specimens from north of 24°S.

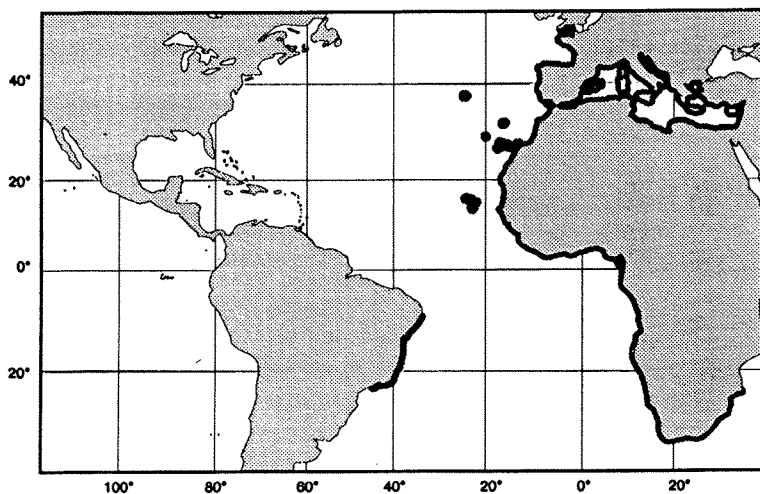


Fig. 354

In the western Atlantic, *E. marginatus* is known from southern Brazil, and it has also been reported (as “*Epinephelus guaza*”) from Uruguay and Argentina by Ringuelet and Aramburu (1960).

**Habitat and Biology:** *E. marginatus* prefers rocky bottoms. It is the most common species of grouper in South African waters, where it is well known as the “yellowbelly rockcod” (“*Epinephelus guaza*”). It occurs from shallow water out to depths of 50 m, and is readily taken by anglers. Smale (1986) found that crabs and octopus were the principal prey and that larger specimens fed on a greater proportion of fishes, of which the majority were reef-associated species.

Considerable information has been published on the age, growth, and reproduction of “*E. guaza*” in the Mediterranean, but many authors who have published on the Mediterranean species of *Epinephelus* (e.g., Boulenger, 1895; Tortonese, 1970; Bauchot and Pras, 1980; Bauchot, 1987) may have confused *E. marginatus* (which they called “*E. guaza*”) with the similar species *E. haifensis*. Consequently, it is uncertain that all of the published information on the biology of “*E. guaza*” in the Mediterranean applies only to the species here recognized as *E. marginatus*.

In Tunisian waters, Bouain et al. (1983) found that females were mature at 44 to 53 cm total length (estimated age 6 to 8 years); and the smallest mature male was 85 cm total length (estimated to be 16 years old). Chauvet (1988) calculated the following growth equation for the Tunisian population:

$$LT_t = 114.49(1 - e^{-0.093(t+0.075)})$$

where  $LT_t$  is total length in millimetre.

Extrapolating from the graph of this equation, he estimated a theoretical maximum age of 35 years for a fish of 118 cm total length. Chauvet (1988) also determined that females become mature at 5 years of age (38 to 58 cm total length) and change sex between ages 9 and 16 (68 to 90 cm total length).

**Size:** Maximum size 120 cm total length and 35 kg (for Tunisian fish, according to Bouain et al., 1983). In Brazilian waters, *E. marginatus* is reported to attain 60kg (Figueiredo and Menezes, 1980).

**Interest to Fisheries:** This species is of considerable importance to sport and commercial fisheries in South Africa, and it appears to be one of the most common species of groupers in Mediterranean markets. Landings for the years 1976-1982 in Portugal and several Mediterranean countries were given by Bruslé (1985). It is also common in the markets of Madeira and Rio de Janeiro, and of major commercial importance along the southeast coast of Brazil. Groupers are generally among the highest priced fishes in markets, and *E. marginatus* is no exception.

**Local names:** BRAZIL: Garoupa, Garoupa-verdadeira; ITALY: Cernia bruna; COTE-D'IVOIRE: Awro; MAURITANIA: Madeija; PORTUGAL (including the Azores and Madeira): Mero; SENEGAL: Dialakh, Kotj; SOUTH AFRICA: Yellowbelly rockcod; TUNISIA: Mérrou rouge.

**Literature:** Probably most of the literature published on "*Epinephelus guaza*" of the Mediterranean applies to this species (but see "Remarks" below). Good illustrations were published by Tortonese (1975: colour photograph), Séret (1981: monochrome painting by P. Opic), Maigret and Ly (1986: colour photograph) and Saldanha (1979: monochrome photographs 100 to 105). Bruslé (1985) summarized the biological and fisheries literature on "*Epinephelus guaza*." Randall and Heemstra (1991) included this species in their revision of the Indo-Pacific groupers.

**Remarks:** A detailed explanation of the nomenclatural confusion involving *E. marginatus* is given by Heemstra (1991). A summary of this exposition is given here in order to justify the change in name of this well known and commercially important species. Jordan and Evermann (1896), in their influential and comprehensive work, *The Fishes of North and Middle America*, were the first to use the Linnaean name *E. guaza* [sic] for the species that currently bears this name. Previously, the species had been identified as *Serranus gigas* (Brünnich, 1768) by Valenciennes (1828), Gunther (1859) and Steindachner (1877) or *Cerna gigas* by Doderlein, 1882 or *Epinephelus gigas* by Jordan and Swain (1885), Jordan and Eigenmann (1890), Boulenger (1895) etc.; or it was described as a new species (*Serranus marginatus* Lowe, 1834 and *Epinephelus brachysoma* Cope, 1871). After Jordan and Evermann's (1896) publication, *E. marginatus* and *E. haifensis* were confused under the names *E. guaza* or *E. gigas*.

Unfortunately, the species name "*Epinephelus guaza*" (originally *Labrus Gvuza* Linnaeus, 1758) cannot be used for this well-known species, because the original description clearly applies to a species of the genus *Mycteroperca* from the coast of Venezuela. Linnaeus's description of *Labrus Gvaza* (1758:285) was taken verbatim from the travel diary of his student Pehr Löfling (spelt "Loebling" on the title page). This diary was published in 1758, two years after the death of Löfling and in the same year as the tenth edition of Linnaeus's *Systema Naturae*. Löfling spent two years in Spain waiting for the Spanish to organize the expedition to South America in which he was to participate (Wheeler, 1980). While he was in Spain, Löfling collected plants and animals, recording descriptions of the various species in his travel diary. In South America, Löfling added descriptions of more plants and animals to his journal, but he died not long after his arrival. In the published version of this diary (Loebling, 1758) the page with the description of *Labrus guaza* is headed with the rubric "CUMANA," which is the name of a port on the Caribbean coast of Venezuela; and all of the animals described on this page are from this locality. Although most of the species descriptions by Löfling that were incorporated in the *Systema Nature* (indicated by the reference "Loebl. epist.") are of plants and animals that he observed in Spain, that of *Labrus guaza* is clearly not from Spain. For some reason or perhaps as an oversight, Linnaeus gave as the type-locality of this species "in pelago," rather than the more explicit mention of Cumana or South America or the Caribbean.

The original description of *Labrus Gvaza*, as given by Linnaeus (1758) is typically brief:

"*L. [Labrus] fuscus, cauda rotundata, radiis caudatus membranam superantibus. Loebl. epist. D.11/27. P.16. V.6. A.13. C.15. Habitat in Pelago.*" ("Dusky *Labrus*, caudal fin rounded, the rays projecting past the membrane. Dorsal fin with 27 rays, of which the first 11 are spines and the last 16 soft-rays; pectoral-fin rays 16; pelvic-fin rays 6 [i.e., I,5]; anal fin with 13 rays [= 3 spines + 10 soft-rays]. Habitat: in the open ocean.")

This description does not fit the well-known amphi-Atlantic/Mediterranean dusky grouper that is commonly identified as *Epinephelus guaza*. In fact, it cannot apply to any species of *Epinephelus*, as they all have 7 to 9 anal-fin rays (one specimen of 29 *E. morio* that were counted has 10 anal-fin rays), and no *Epinephelus* species has the caudal-fin rays projecting beyond the membrane. The description does, however, fit *Mycteroperca cidi* Cervigón, 1966, *M. interstitialis* (Poey, 1860), and *M. phenax* Jordan and Swain, 1885; and these three species are common in the vicinity of Cumana (the type locality given by Löfling for *Labrus guaza*). Since the description could apply to any one of these three species of *Mycteroperca* and there is no extant type-specimen, the name *Labrus gvaza* Linnaeus, must be considered a doubtful name (*nomen dubium*) and is thus not available as the valid name of any species.