

Mycteroperca Gill, 1863**SERRAN Myct**

Mycteroperca Gill, 1863:236; type species, *Serranus olfax* Jenyns by subsequent designation of Gill, 1866:105.

Synonyms: *Trisotropis* Gill, 1866:104; type species, *Johnius guttatus* Bloch and Schneider (= *Mycteroperca venenosa*), by original designation. *Parepinephelus* Bleeker, 1876:257; type species, *Serranus acutirostris* Valenciennes, (= *Mycteroperca acutirostris*) by monotypy. *Archoperca* Jordan and Evermann, 1896:1171; type species, *Mycteroperca boulengeri* Jordan and Starks (= *Mycteroperca xenarcha*) by monotypy. *Xystroperca* Jordan and Evermann, 1896:11 69; type species, *Mycteroperca pardalis* Gilbert (= *Mycteroperca rosacea*) by monotypy.

Diagnostic Features: Body oblong, the depth less than head length and contained 2.7 to 3.6 times in standard length. Head length contained 2.5 to 3.0 times in standard length; snout distinctly longer than eye diameter; dorsal head profile evenly convex; interorbital area convex, the width greater than eye diameter in fish more than 20 cm standard length; preorbital depth less than eye diameter, preorbital depth contained 8 to 13 times in head length; preopercle finely serrate, the serrae at corner enlarged or not; upper edge of operculum convex: rear nostrils equal to or distinctly larger than anterior nostrils; distal part of ventral edge of maxilla straight, no knob, distinct step or hook; supramaxilla well developed; lower jaw projecting in front of upper jaw; well-developed canines at front of jaws; teeth present on palatines. Dorsal fin with XI spines and 15 to 18 rays: anal fin with III spines and 10 to 13 rays; pectoral fins rounded, with 15 to 18 rays, the middle rays longest; caudal fin truncate, emarginate or distinctly concave, with 8 branched rays and 9 to 12 procurrent rays in upper part and 7 branched rays and 9 to 12 procurrent rays in lower part. Midlateral-body scales ctenoid. Supraneural bones 2, the second one distinctly smaller than the first; epipleural ribs on first 10 vertebrae; no trisegmental pterygiophores supporting dorsal- or anal-fin rays; cranial crests well developed, the frontoparietal crests parallel, joining supraorbital ridge; anterior ends of frontals contiguous, meeting transverse wall of supraethmoid; supraoccipital crest not carried forward onto frontals; interorbital width greater than vomer width; parasphenoid straight.

Habitat and Biology: Adults occur on coral reefs and rocky bottoms in depths of 12 to 200 m; juveniles occur in shallow rocky areas, seagrass beds and in estuaries. Except for the *Mycteroperca rubra* species-complex (*M. acutirostris*, *M. fusca*, and *M. rubra*, which may feed on macro-zooplankton), adults feed almost exclusively on fishes; juveniles eat mainly invertebrates (primarily crustaceans).

Geographical Distribution: Tropical and subtropical waters of the Atlantic and eastern Pacific oceans; in the western Atlantic, some species of *Mycteroperca* range from Massachusetts and Bermuda to southern Brazil. In the eastern Atlantic, the genus is represented by two species: *M. rubra*, known from the Mediterranean to the Bay of Biscay and along the west coast of Africa south to Angola, and *M. fusca* which occurs at Madeira, the Azores, and the Canary and Cape Verde Islands. In the eastern Pacific, species of *Mycteroperca* range from southern California (one unconfirmed report of *M. xenarcha* from San Francisco Bay) to Peru and the Galapagos.

Interest to Fisheries: The species of *Mycteroperca* are of considerable importance to commercial and recreational fisheries.

Species: We recognize 15 species: 2 in the eastern Atlantic, 8 in the western Atlantic and 5 in the eastern Pacific. Heemstra (1991) discussed the taxonomy of the *M. rubra* species-complex.

Remarks: The genus *Mycteroperca* appears to be closely related to *Epinephelus*. Species of both genera have XI dorsal-fin spines and lack the trisegmental pterygiophores in the dorsal and anal fins and the terminal knob on the lower corner of the maxilla that are characteristic of species of *Cephalopholis*.

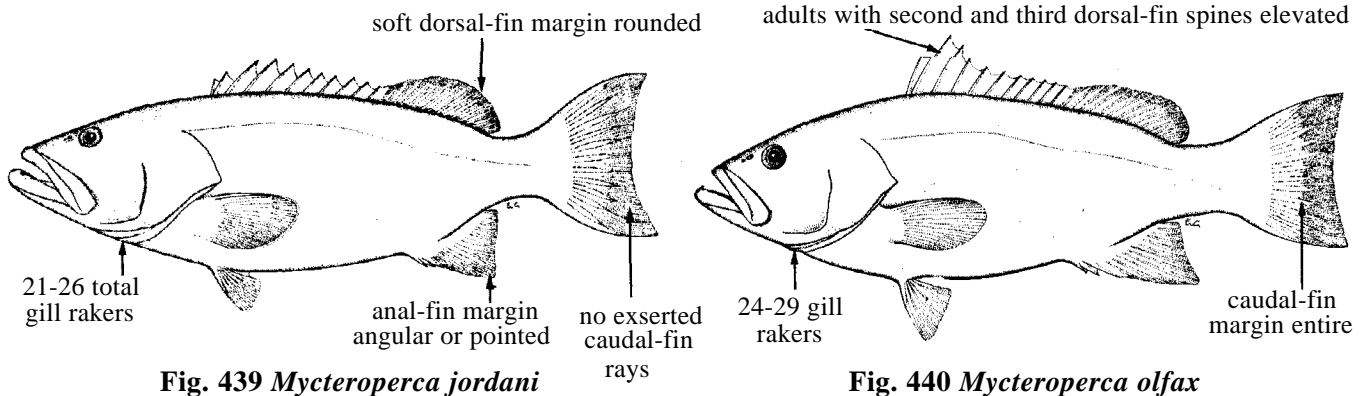
Key to the Eastern Pacific Species of *Mycteroperca*

1a. Total developed gill rakers 21 to 26; no exerted caudal-fin rays; soft dorsal-fin margin rounded; anal-fin margin angular or pointed (rounded in small juveniles) (Fig. 439) (southern California, Gulf of California) *M. jordani*

1b. Total developed gill rakers 24 to 43 →2

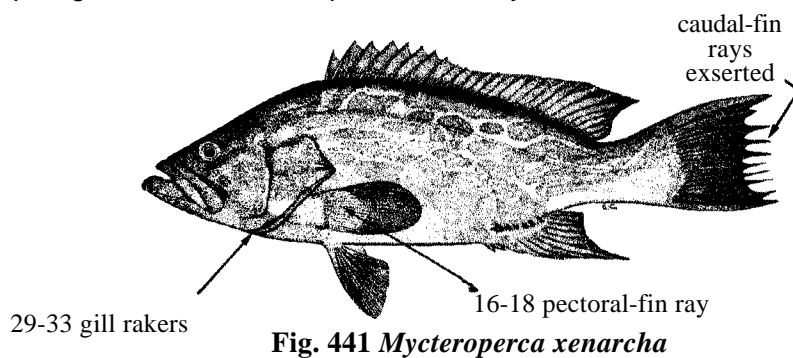
2a Gill rakers 24 to 29; adults with second and third dorsal-fin spines elevated, distinctly longer than fifth spine; caudal-fin margin entire (Fig. 440) (Cocos and Galapagos Islands) *M. olfax*

2b. Gill rakers 29 to 43; third to tenth dorsal-fin spines subequal → 3



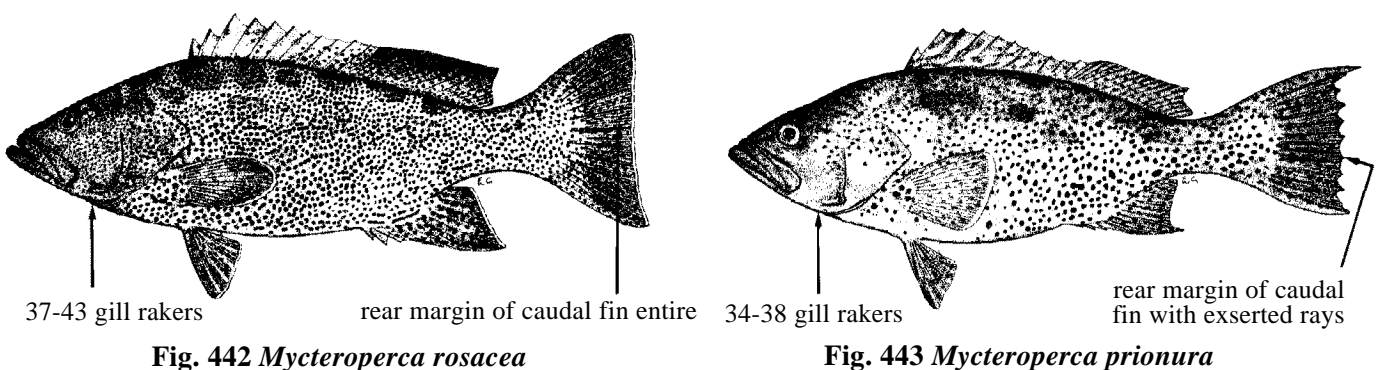
3a. Gill rakers 29 to 33; pectoral-fin rays 16 to 18; caudal-fin rays exerted; body uniform greyish brown or greyish green, with irregular dark oval blotches enclosing a pale line (Fig. 441) (southern California to Peru) *M. xenarcha*

3b. Total developed gill rakers 34 to 43; pectoral-fin rays 15 to 17; colour not as in 3a → 4



4a. Gill rakers 37 to 43; rear margin of caudal fin entire (Fig. 442, Plate XXVIII) (Baja California, Gulf of California to Jalisco, Mexico) *M. rosacea*

4b. Gill rakers 34 to 38; rear margin of caudal fin of fish larger than 40 cm standard length jagged (with exerted rays) (Fig. 443, Plate XXVII) (Gulf of California to Jalisco, Mexico) *M. prionura*



Key to the Atlantic species of *Mycteroperca*

- 1a. Total gill rakers 33 to 55; adults usually uniform dark brown (rarely orange-yellow); juveniles brownish, with white spots and blotches and wavy dark lines on head and body→ 2
- 1b. Total gill rakers 11 to 41; colour pattern not as in 1a → 4
- 2a. Total gill rakers 48 to 55; maxilla width 4.4 to 5.8% of standard length (for fish 10 to 34 cm standard length) (Fig. 444, Plate XXV) (western Atlantic). *M. acutirostris*
- 2b. Total gill rakers 33 to 49; maxilla width 3.6 to 5.0% of standard length (for fish 13 to 55 cm standard length) (eastern Atlantic). → 3

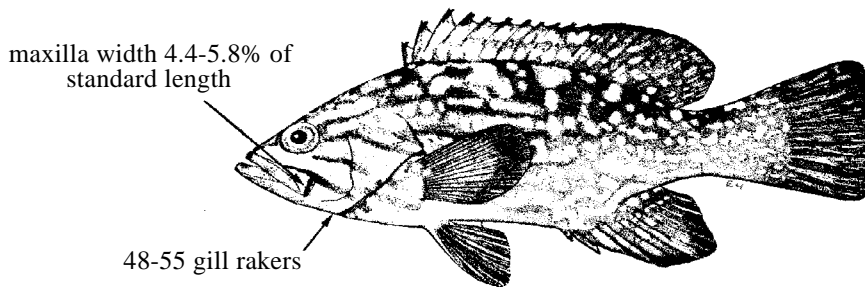
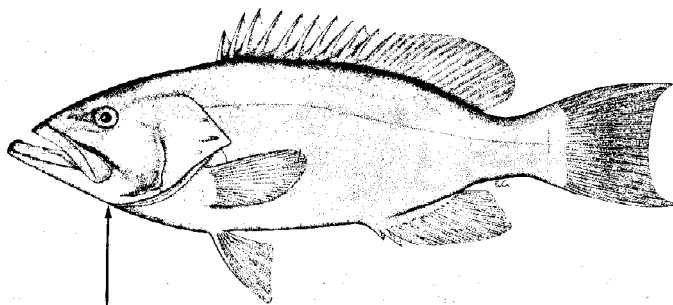
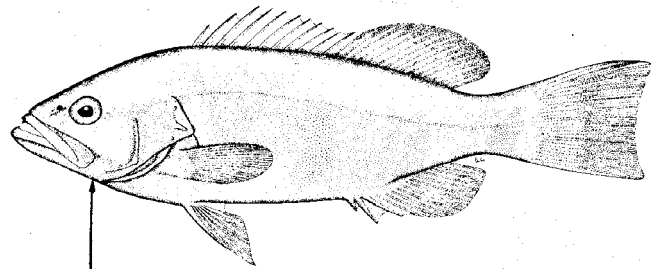


Fig. 444 *Mycteroperca acutirostris*

- 3a. Lower gill rakers 28 to 31 (Fig. 445, Plate XXVIII) (continental shores of eastern Atlantic Ocean, Mediterranean). *M. rubra*
- 3b. Lower gill rakers 20 to 24 (Fig. 446, Plate XXVI) (Madeira, Azores, Canary and Cape Verde Islands) *M. fusca*



28-31 lower gill rakers **Fig. 445 *Mycteroperca rubra***



20-24 lower gill rakers **Fig. 446 *Mycteroperca fusca***

- 4a. Preopercle of fish larger than 25 cm standard length with a distinct notch above the serrate lobe at angle (Fig. 447). → 5
- 4b. Preopercle rounded, without a distinct notch or lobe (Fig. 448) → 8

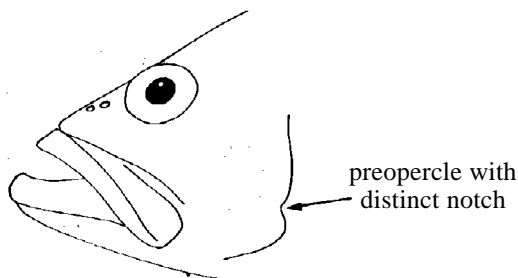


Fig. 447

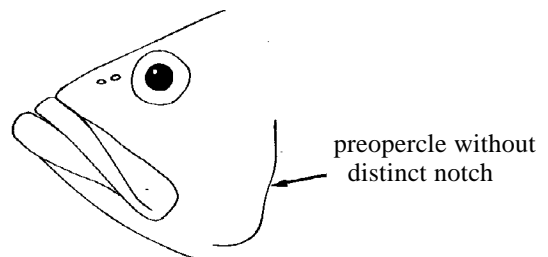


Fig. 448

5a. Median fins of adults without exerted rays; head and body brownish or grey, with dark blotches or mottling on sides and dorsally; ventral parts generally pale, but large males often have a dark grey swath from above pelvic fins to underside of caudal peduncle (Fig. 449, Plate XXVII) (Gulf of Mexico and north to North Carolina, southern Brazil). *M. microlepis*

5b. Some median fin rays produced beyond fin membranes in large adults. → 6

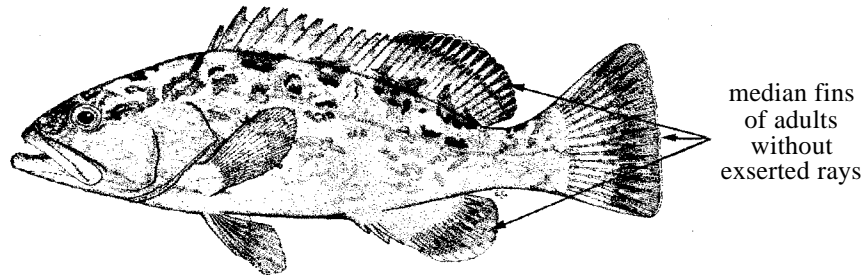


Fig. 449 *Mycteroperca microlepis*

6a. Total gill rakers 23 to 27; adults with dorsal half of body almost uniform brown or with small close-set brown spots; pectoral fins dark with white margin; juveniles bicoloured, dark above and light below; mouth and margin of spinous dorsal fin yellow; exerted caudal-fin rays project equally beyond fin membrane (Fig. 450, Plate XXVI) (Gulf of Mexico, Caribbean islands, southern Brazil) *M. interstitialis*

6b. Total gill rakers 27 to 41; colour not as in 6a; exerted caudal-fin rays (present only in large specimens) uneven → 7
dorsal half of body uniform brown or with close-set brown spots

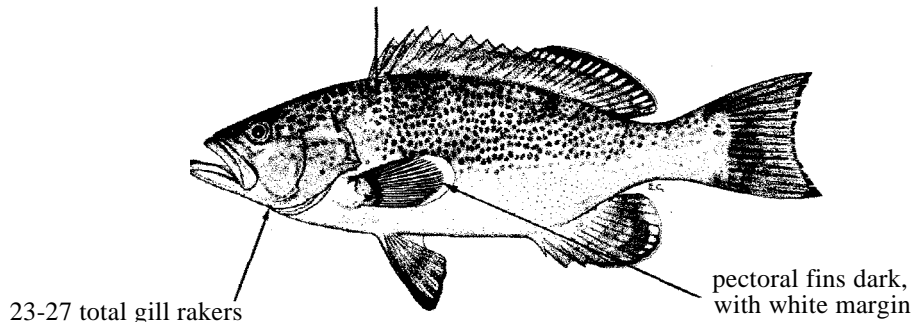


Fig. 450 *Mycteroperca interstitialis*

7a. Body pale greyish brown, covered (except ventrally) with small, dark reddish brown spots; pectoral-fin membrane clear, the rays dark, the fin margin pale; lower gill rakers 17 to 21 (Fig. 451, Plate XXVII) (eastern and southern coast of USA and along southern coast of Caribbean Sea) ... *M. phenax*

7b. Adults pale brown, with yellowish grey pectoral fins; juveniles: greenish brown with irregular brown spots on body; soft dorsal and anal fins with white edge and broad dark submarginal zone; lower gill rakers 21 to 26 (Fig. 452) (Caribbean coast of Venezuela, Jamaica) *M. cidi*

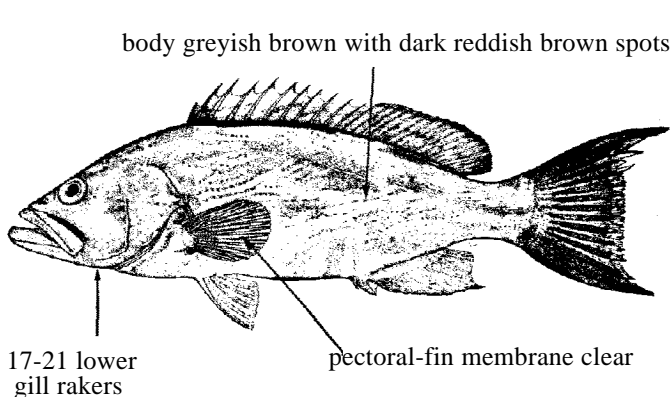


Fig. 451 *Mycteroperca phenax*

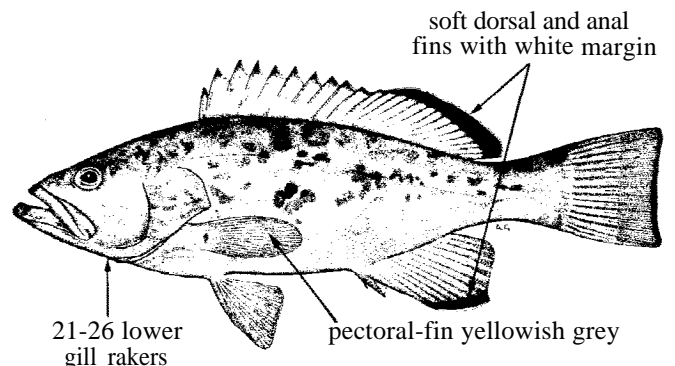
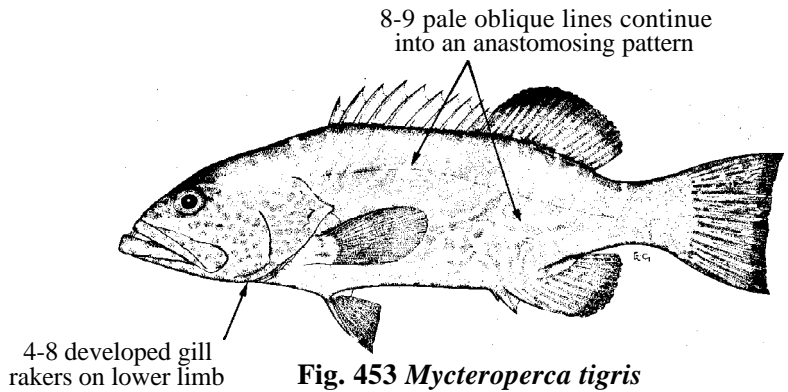
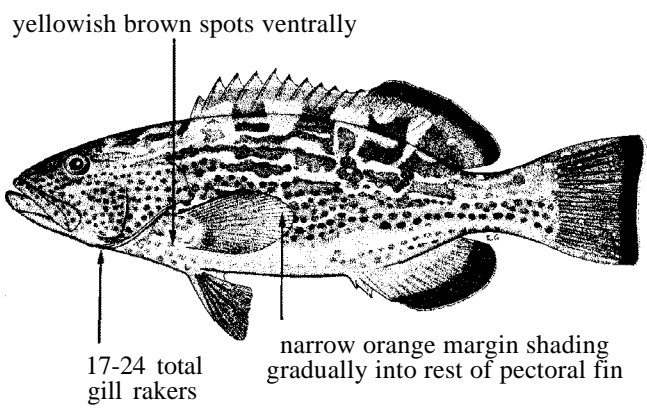
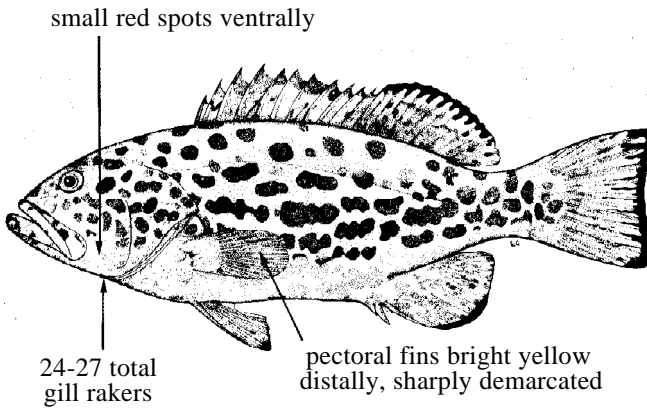


Fig. 452 *Mycteroperca cidi*

- 8a. Developed gill rakers on lower limb 4 to 8; body with 8 or 9 pale oblique lines dorsally, continued below into a pale anastomosing pattern; median-fin rays exerted in adults (Fig. 453, Plate XXVIII) (throughout Caribbean, southern Brazil) *M. tigris*
- 8b. Developed gill rakers on lower limb 9 to 16; colour pattern not as in 8a; no exerted fin rays → 9



- 9a. Distal third of pectoral fins bright yellow, sharply demarcated from rest of fin: total gill rakers 24 to 27; adults with small red spots on ventral parts of head and body (Fig. 454, Plate XXVIII) (Caribbean, southern Brazil) *M. venenosa*
- 9b. Pectoral fins with narrow orange margin that shades gradually into rest of fin; total gill rakers 17 to 24; sides of head and body ventrally with yellowish brown spots separated by a pale blue network (Fig. 455, Plate XXV) (Gulf of Mexico, Caribbean, southern Brazil) *M. bonaci*



Mycteroperca acutirostris (Valenciennes, 1828)

Fig. 456; Pl. XXVE

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Serranus acutirostris Valenciennes in Cuv. and Val., 1828:286 (type locality: Brazil).

Synonyms: *Serranus undulosus* Valenciennes in Cuv. and Val., 1828:295 (type locality: Brazil). *Epinephelus chalinus* Cope, 1871:465 (type locality: St. Martin, West Indies). *Epinephelus Cuvieri* Bleeker, 1875:46 (replacement name for *Serranus undulosus* Valenciennes, 1828 [thought to be preoccupied in *Epinephelus* by *Bodianus undulosus* Quoy and Gaimard, 1824]).

FAO Names: En - Comb grouper; Fr - Badèche peigne; Sp - Cuna negra.

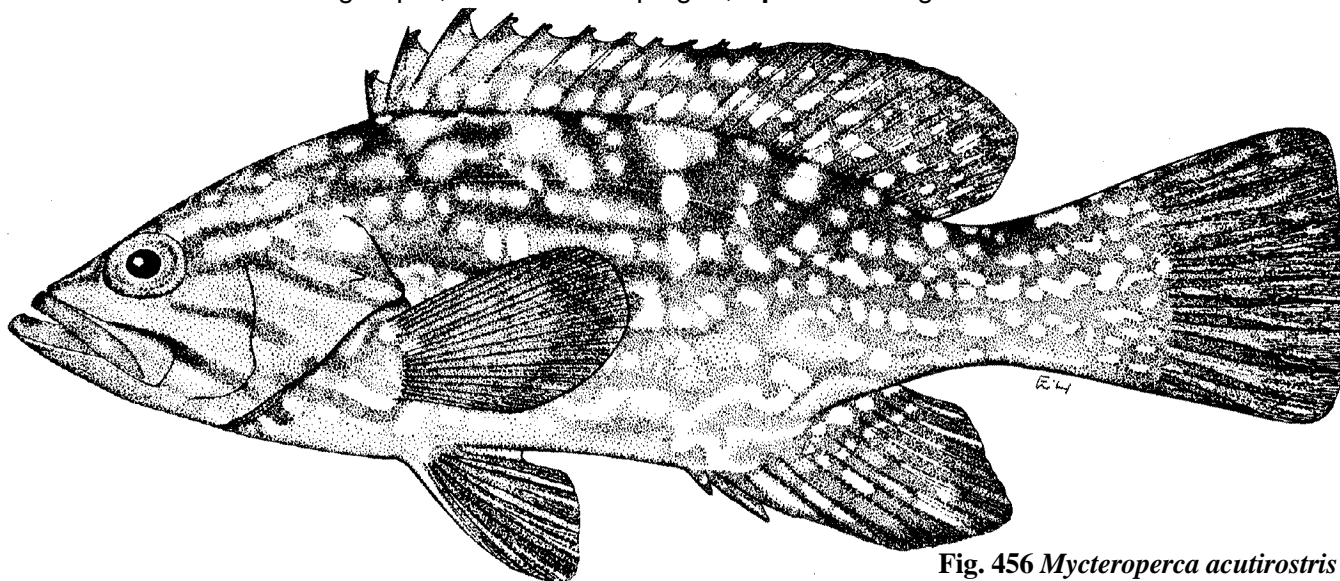


Fig. 456 *Mycteroperca acutirostris*
(170 mm total length)

Diagnostic Features: Body oblong, compressed, the depth contained 2.7 to 3.2 times in standard length (for 13 fish 10 to 34 cm standard length). Head length contained 2.5 to 2.7 times in standard length; maxilla width 4.4 to 5.8% of standard length; interorbital area convex; preopercle angular, with serrae at the angle enlarged, forming a weak lobe; nostrils subequal. Gill rakers 16 to 20 on upper limb, 32 to 36 on lower limb, total 48 to 55 (mean 51.9, $n = 25$). Dorsal fin with XI spines and 15 to 17 rays, the interspinous membranes indented, the margin of posterior part of fin rounded; anal fin with III spines and 10 to 12 rays, the fin margin distinctly pointed in adults; pectoral-fin rays 15 to 17; caudal fin rounded in fish less than 10 cm standard length, truncate in fish 12 to 20 cm and concave in fish larger than 25 cm standard length; no exerted caudal-fin rays, although the fin lobes are pointed in large adults. Lateral-line scales 67 to 77; lateral-scale series 85 to 106. **Colour:** Head and body greyish brown, covered with irregular white spots and blotches; 3 or 4 dark brown stripes radiating posteriorly from eye and continuing along ventral half of body as wavy dark stripes; another dark brown stripe continuing backwards from maxillary streak to edge of preopercle; median fins darker than body and also with white spots and streaks; juveniles less than 15 cm with a small black saddle on caudal peduncle; large adults mostly uniform greyish.

Geographical Distribution: Western Atlantic: Bermuda and the northwestern Gulf of Mexico (where it is rare), Cuba, Jamaica, Virgin Islands, Leeward Islands, Panama, Colombia, Venezuela (abundant at Isla Margarita and adjacent islands), Curaçao, and Brazil (common along south coast) (Fig. 457). Valenciennes' (1837: 11; 1843:pl. 3, fig. 1) reference to "*Serranus acutirostris*" at the Canary Islands is probably a misidentification of *M.fusca*.

Habitat and Biology: Juveniles occur in turtle grass beds, mangrove areas, and in shallow water amongst soft corals and coral reefs; adults are found on rocky bottoms with high relief. Probably feeds on plankton, but no information is available on the food of *M. acutirostris*.

Size: Maximum total length 80 cm; maximum weight probably 4 kg.

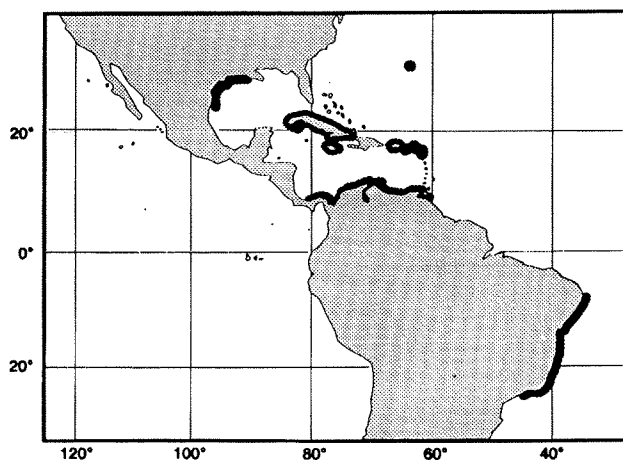


Fig. 457

Interest to Fisheries: *M. acutirostris* is of considerable commercial importance in the Venezuelan fishery where it is caught mainly with traps.

Local Names: BRAZIL: Badejo-mira; VENEZUELA: Cuna negra.

Literature (references to "*M. rubra*" in the western Atlantic): Cervigón and Velasquez (1966); Cervigón (1966); Randall (1968); Smith (1971). Heemstra (1991) discussed the taxonomy of the *Mycteroperca rubra* species-complex.

Remarks: *Mycteroperca acutirostris* has generally been known as *M. rubra* and thought to be a single species that occurs on both sides of the Atlantic Ocean. Although Smith (1971) synonymized nominal species from the eastern and western Atlantic under the name of *M. rubra* and gave the distribution as both sides of the Atlantic plus the Mediterranean, he did not examine any specimens from the eastern Atlantic. We compared 20 specimens, 10 to 34 cm standard length, of *M. acutirostris* from the western Atlantic with 34 specimens, 6 to 59 cm, from the eastern Atlantic and Mediterranean. These 34 specimens (which are here identified as *M. rubra*) have fewer gill rakers (lower-limb rakers 28 to 31, versus 32 to 36 in *M. acutirostris*) and a narrower maxilla (greatest width 3.8 to 4.5% of standard length, for 14 fish 13 to 45 cm standard length, versus 4.4 to 5.8% of standard length, for 13 *M. acutirostris* of 10 to 34 cm standard length). These differences between *M. rubra* and *M. acutirostris* are relatively minor, and in view of the allopatric distributions of these two taxa, they might be considered as only subspecifically distinct. But the presence of a third distinct population (*M. fusca*) that occurs at the Azores, Madeira, Canaries, and Cape Verde Islands in the Eastern Atlantic implies that each of these populations is genetically distinct from the other two.

Mycteroperca bonaci (Poey, 1860)

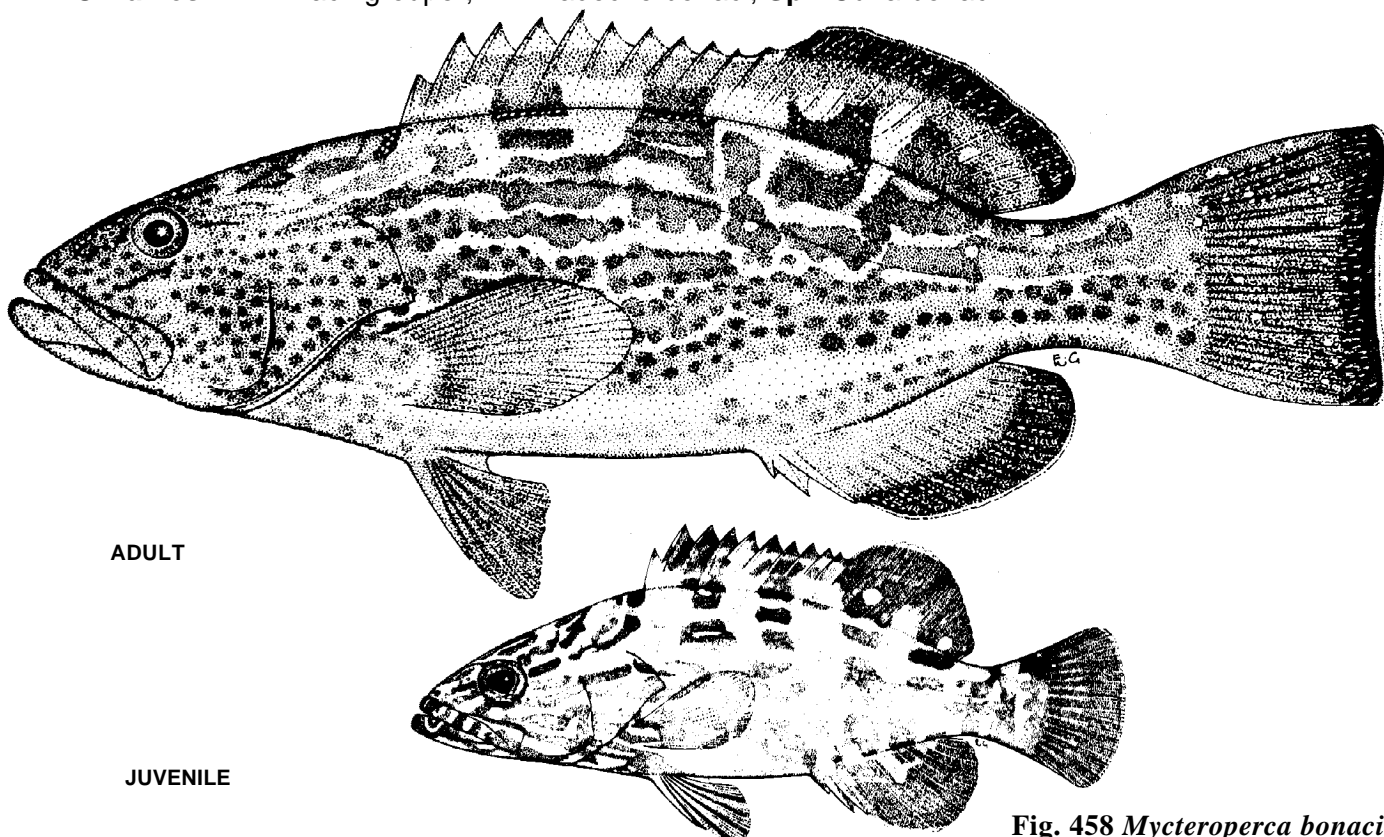
Fig. 458; Pl. XXVF

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Serranus bonaci Poey, 1860:132 (type locality: Cuba).

Synonyms: *Bonaci arara* Parra, 1787:30, pl. 16, fig. 2 (type locality: Cuba). *Serranus arara* Storer, 1846:279 (after Parra, preoccupied by *Serranus arara* Valenciennes, 1828 [= *Epinephelus guttatus*]). *Serranus brunneus* Poey, 1860:131 (type locality: Cuba). *Serranus decimalis* Poey, 1860:138 (type locality: Cuba). *Serranus cyclopomatus* Poey, 1861:353 (type locality: Cuba). *Serranus latepictus* Poey, 1861:353 (type locality: Cuba). *Trisotropis aguaji* Poey, 1867:229 (type locality: Cuba). *Mycteroperca bonaci* variety *xanthosticta* Jordan and Swain, 1885:371 (type locality: Pensacola, Florida).

FAO Names: En - Black grouper; Fr - Badèche bonaci; Sp - Cuna bonaci.



ADULT

JUVENILE

Fig. 458 *Mycteroperca bonaci*

(adult about 400 mm standard length; juvenile about 90 mm standard length)

Diagnostic Features: Body depth distinctly less than head length, depth contained 3.3 to 3.5 times in standard length (for fish 15 to 59 cm standard length). Head length contained 2.5 to 2.8 times in standard length; preopercle evenly rounded, without a distinct notch or lobe at the angle; nostrils subequal. Developed gill rakers 2 to 5 on upper limb, 8 to 12 on lower limb. Dorsal fin with XI spines and 15 to 17 rays, the interspinous membranes distinctly incised; anal fin with III spines and 11 to 13 rays; pectoral-fin rays 16 or 17; no median fin rays exerted; margins of dorsal and anal fins rounded; caudal fin truncate (convex if widely spread) to slightly emarginate. Lateral-line scales 78 to 83; lateral-scale series 119 to 126. **Colour:** Head and body greyish or dark brown, with close-set, irregular, bronze, or brassy spots separated by a bluish reticulum (some brassy spots join to form chain-like horizontal streaks); dorsolateral part of body sometimes with 7 or 8 columns of rectangular dark blotches, the first above opercle and the last on caudal peduncle. Pectoral fins dusky brown, gradually becoming orange at the margin; soft dorsal and anal fins and leading edge of pelvic fins-with dark margin:

Geographic Distribution: Western Atlantic from Bermuda and Massachusetts to southern Brazil, including the southern Gulf of Mexico, Florida Keys, Bahamas, Cuba, and throughout the Caribbean (Fig. 459). Adults are not known from the northeastern coast of the USA.

Habitat and Biology: *M. bonaci* is found on rocky bottoms and coral reefs in depths of 10 to 30 m; but in the eastern Gulf of Mexico, Bullock and Smith (1991) state that it "is usually found at depths of 30 m or greater". Adults feed primarily on fishes, and juveniles prey mainly on crustaceans. Smith (1959) presented evidence for protogynous hermaphroditism in this species. Bullock and Smith (1991) reported ripe females of 50 to 100 cm and ripe males 96 to 116 cm from the Gulf of Mexico. Specimens in spawning condition were caught on the Campeche Bank in July and August (Smith, 1961). The egg count of 5 035 240 reported by Smith (1961) for an 805 mm standard length fish with an ovary weight of 587.2 g is off by a factor of 10; the correct egg count calculated from his 0.8 g sample of ovary tissue which contained 686 eggs would be 503 524 eggs. The fecundity counts of the other three species in Smith's (1971) paper are also erroneous.

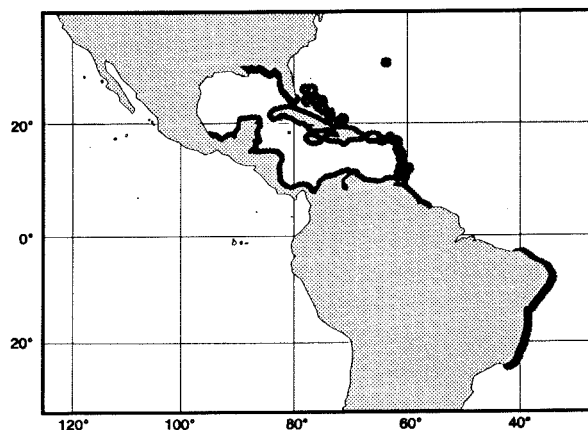


Fig. 459

The weight-length relationship and von Bertalanffy growth equation given by Manooch and Mason (1987) are as follows:

$W = 5.548 \times 10^{-6} L^{3.141}$, where W is weight in grammes and L is total length in millimetres.

$L_t = 1,325(1 - e^{-0.1156(t+0.927)})$, where L_t is total length in mm at age t .

The weight-length relationship for 46 *M. bonaci* from the eastern Gulf of Mexico was given by Bullock and Smith (1991) as follows:

$W = 3.42 \times 10^{-9} TL^{3.210}$ ($r^2 = 0.99$), where W is whole weight in kilogrammes and TL (total length) is in millimetres.

Size: Attains at least 133 cm total length and a weight of 65 kg. Mowbray (1950) reported that *M. bonaci* at Bermuda attain a weight of 81 kg.

Interest to Fisheries: *M. bonaci* is one of the most important species in the fishery at Bermuda and also in the fisheries of the southern Gulf-of Mexico, Cuba, and the east coast of Venezuela.

Local Names: BERMUDA: Rockfish; BRAZIL: Badejo-quadrado; CUBA: Bonaci; VENEZUELA: Cuna guarei.

Literature: Cervigón and Velasquez (1966); Smith (1971); Randall (1967); Thompson and Munro (1983); Manooch and Mason (1987).

Remarks: Adults of *M. cidi*, *M. interstitialis*, *M. microlepis*, and *M. phenax* differ from *M. bonaci* in having a projecting bony lobe at the corner of the preopercle; adults of *M. cidi*, *M. interstitialis*, and *M. phenax* also have exerted caudal-fin rays; *M. microlepis* has more lateral-line scales (88 to 96) and usually fewer (10 to 12) anal-fin rays. *M. tigris* differs in having fewer gill rakers (4 to 8 developed rakers on lower limb), interorbital area flat, adults with exerted caudal-fin rays, and rear nostrils 3 to 5 times larger than anterior nostrils. *M. venenosa* differs in having the rear nostrils of adults distinctly larger than the anterior nostrils, the dorsolateral parts of head and body with oblong dark blotches scattered over groups of small black spots, the ventral parts with small dark red spots, and the distal third of pectoral fins abruptly yellow.

Mycteroperca cidi Cervigón, 1966

Fig. 460

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Mycteroperca cidi Cervigón, 1966:300, fig. 117 (type locality: Isla Cubagua, Venezuela).

Synonyms: ?*Labrus gvaza* Linnaeus, 1758:285 (type locality: "in pelago"; based on *Labrus guaza* Loeffling, 1758:104 (type locality: Cumana, Venezuela; see "Remarks" for *Epinephelus marginatus* of this catalogue).

FAO Names: En - Venezuelan grouper; Fr - Badèche blanche; Sp - Cuna blanca.

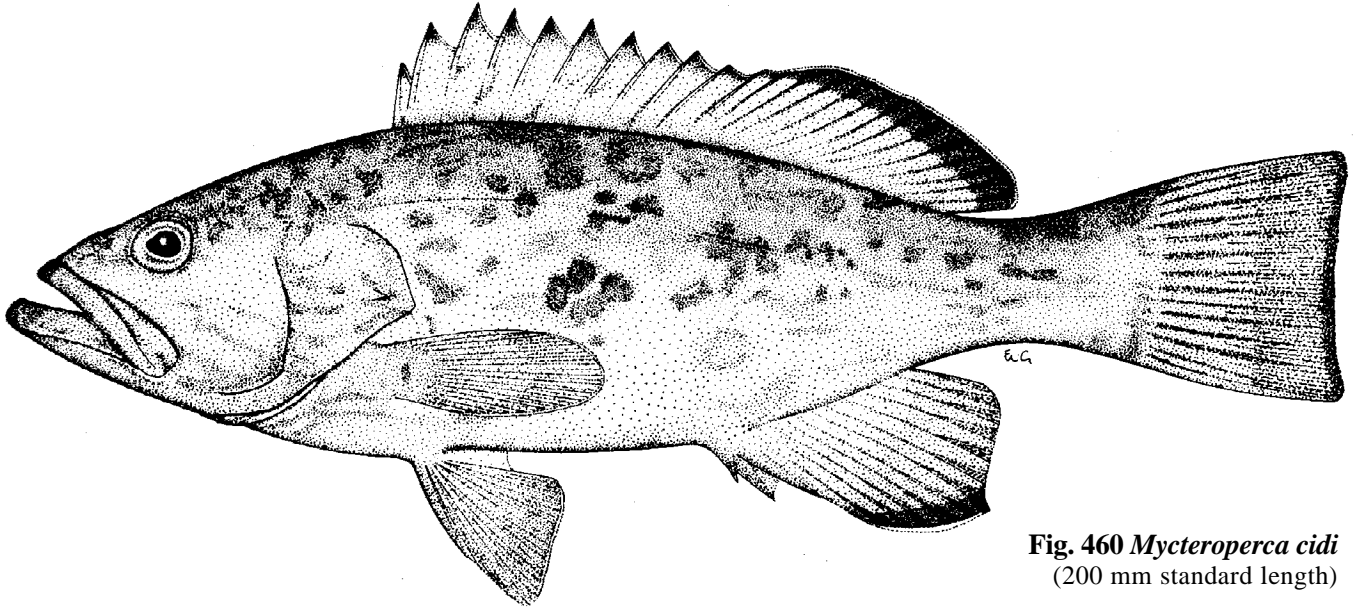


Fig. 460 *Mycteroperca cidi*
(200 mm standard length)

Diagnostic Features: Body depth less than head length, depth contained 3.1 to 3.3 times in standard length (for fish 14 to 93 cm standard length). Interorbital area distinctly convex; preopercle angular, with a distinct lobe bearing enlarged serrae at the angle; nostrils subequal in fish less than 25 cm, but in fish larger than 40 cm the posterior nostrils are much larger than the anteriors. Gill rakers well developed, the longest is longer than eye diameter; 9 to 13 on upper limb, 18 to 23 on lower limb (not counting 2 to 4 rudiments on each limb). Dorsal fin with XI spines and 15 to 17 rays, the 9th to 11th rays distinctly longer than the others in adults, giving the fin an angular aspect; anal fin with III spines and 10 to 12 rays, the fin margin pointed in adults with fourth to sixth rays elongated; pectoral-fin rays 15 to 17; caudal fin truncate to slightly emarginate, with greatly exerted rays in adults (greater than 40 cm total length). Lateral-body scales smooth; lateral-line scales about 75; lateral-scale series 108 to 126. **Colour:** Adults pale greyish brown; juveniles greenish brown with irregular brown spots on body; soft dorsal and anal fins with white edge and dark submarginal band.

Geographical Distribution: Caribbean coast of Venezuela (Fig. 461). Three specimens were reported from the Port Royal reefs off Jamaica (Thompson and Munro, 1983) indicating that this recently described species may be found at other Caribbean localities.

Habitat and Biology: *M. cidi* is common on coral reefs in depths of 5 to 8 m; large adults are caught in 20 to 40 m; juveniles are found in shallow water over sandy bottom near coral reefs and seagrass beds.

Size: Maximum total length 109 cm; maximum weight 14.5 kg.

Interest to Fisheries: An important species in the fisheries off the Caribbean coast of Venezuela where it is one of the three most abundant groupers in shallow water. Caught with traps and hook-and-line. Marketed fresh.

Local Names: VENEZUELA: Cuna rabo rajao.

Literature: Cervigón and Velasquez (1966).

Remarks: *M. intersialis* differs from *M. cidi* in colour pattern and in having fewer gill rakers 4 to 6 on upper limb, 11 to 15 on lower limb (not counting rudiments). *M. phenax* differs from *M. cidi* in having the body covered (except ventrally) with close-set, small dark spots which extend onto the median fins and in having the lateral-body scales ctenoid.

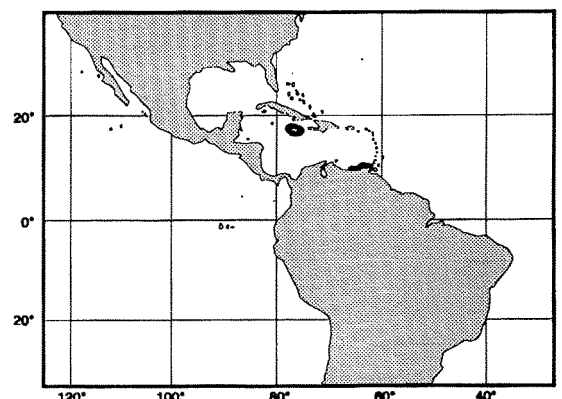


Fig. 461