Mycteroperca fusca (Lowe, 1836) Fig. 462; Pl. XXVIA-C **SERRAN Myct 15**

Serranus fuscus Lowe, 1836:196 (type locality: Madeira).

Synonyms: ?***Serranus emarginatus*** Valenciennes, 1843:10 (type locality: Canary Islands). ***Serranus simonyi*** Steindachner, 1891:352, pl. 1, fig. 1 (type locality: Grand Canary Island).

FAO Names: En - Island grouper; **Fr** - Merou d'île; **Sp** - Abadejo.

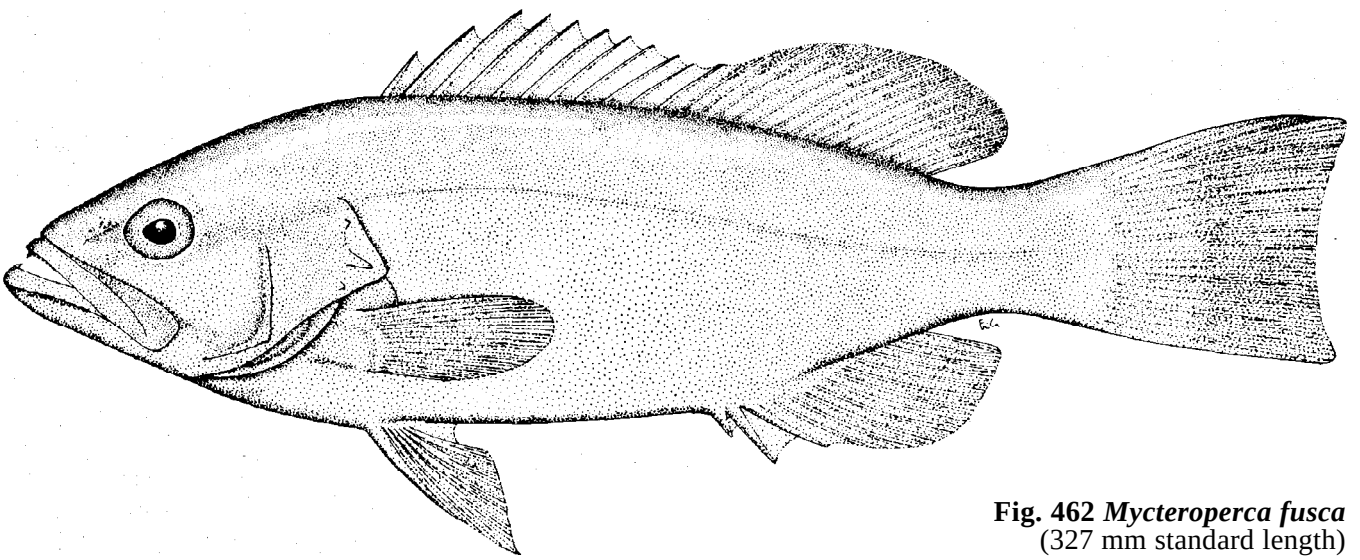

Fig. 462 *Mycteroperca fusca*
(327 mm standard length)

Diagnostic Features: Body oblong, compressed, the depth less than head length, depth contained 3.0 to 3.3 times in standard length (for fish 15 to 51 cm standard length). Head length contained 2.6 to 2.9 times in standard length; interorbital area convex; preopercle serrae enlarged at angle, forming a rounded lobe below a shallow indentation on vertical limb; subopercle and interopercle with a few small serrae; nostrils subequal in juveniles, the diameter of rear ones about 3 times larger than front nostrils in fish larger than 45 cm standard length: maxilla width 3.8 to 5.0% of standard length; lower jaw extends well in front of upper jaw. Gill rakers 11 to 14 on upper limb, 20 to 24 on lower limb, total 32 to 36, Dorsal fin with XI spines and 14 to 16 rays, the interspinous membranes distinctly indented, the margin of soft-rayed part rounded; anal fin with III spines and 10 to 12 rays, the fin margin rounded; pectoral-fin rays 15 to 17; caudal-fin rear margin truncate (juveniles) to concave (adults). Lateral-line scales 72 to 78; lateral-scale series. 96 to 106. **Colour:** At Madeira, most adults are brownish or dark grey, with irregular pale blotches and spots and a prominent maxillary streak; a live fish under stress may reverse this pattern so that the head and body are pale, with irregular dark markings. A 143 mm standard length juvenile caught in a tidepool was mottled greenish brown, with prominent white spots on the head and body, white streaks on the median fins and hyaline golden pectoral fins. ***M. fusca*** that are uniformly golden are occasionally caught at Madeira, and one such xanthic fish was caught in December 1988 and put in an aquarium at the Municipal Museum of Funchal. Manuel Biscoito photographed this fish when it was first put in the aquarium and observed it change, within a few weeks, to the normal brown colour.

Geographical Distribution: ***Mycteroperca fusca*** is known with certainty only from Madeira, the Azores, and the Canary and Cape Verde Islands (Fig. 463).

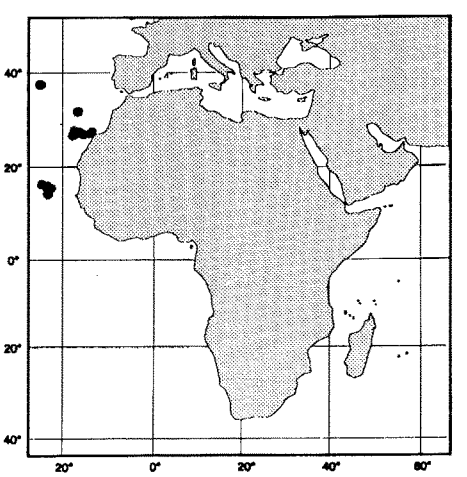

Fig. 463

Habitat and Biology: Like most groupers, ***M. fusca*** occurs near the bottom in rocky areas. At the Azores it was observed by the senior author at depths of 20 to 30 m. Juveniles are found in tidepools. Two specimens from the Cape Verde Islands were collected by J. Cadenat from a depth of “50 m.”

Size: Attains at least 80 cm total length and a weight of 3 kg.

Interest to Fisheries: ***M. fusca*** is a common species in the markets at Madeira.

Local Names: PORTUGAL: Badejo (Azores and Madeira); SPAIN (Canary Islands): Abade, Abae, Sama.

Literature: Heemstra (1991) recognized ***M. fusca*** as a valid species and discussed the taxonomy of this species.In their checklist of the shorefishes of the Canary Islands, Dooley et al. (1985) included the paper in which Steindachner described ***M. simonyi*** in their list of cited literature, but they omitted ***Serranus simonyi*** in their text. They list ***Mycteroperca rubra*** (with Valenciennes' descriptions of ***Serranus fuscus, S. acutirostris,*** and ***S. emarginatus*** as synonyms) as the only species of ***Mycteroperca*** at the Canary Islands.It is possible that both ***M. rubra*** and ***M. fusca*** occur there, but there is no evidence for the presence of ***M. rubra*** in the Canaries.

Waschkewitz and Wirtz (1990) reported on the annual migration and return to the same site in Madeira of a xanthic grouper identified as ***Epinephelus alexandrinus.*** This fish is probably M.fusca, because 1) ***"Epinephelus alexandrinus"*** (= ***E. costae***) does not occur in Madeira; 2) in a recent book on the marine fauna of Portugal, Madeira and the Azores (Saldanha, 1979) a photograph of ***M. fusca*** was misidentified as ***Epinephelus alexandrinus;*** and 3) xanthic specimens of ***M. fusca*** are known at Madeira and the Canary Islands.

Remarks: All 13 specimens of ***Mycteroperca*** that Heemstra (1991) examined from Madeira have the typical low gill-raker counts (11 to 14 on upper limb and 20 to 23 on lower limb) for this species. It appears, therefore, that ***M. rubra*** (with gill-raker counts of 16 to 18 on upper limb and 28 to 32 on lower limb) does not occur at Madeira. Although Lowe's (1836) original description of ***Serranus fuscus*** clearly applies to a species of ***Mycteroperca,*** he did not give gill-raker counts for his specimen; and this holotype is apparently not extant. Heemstra (1991) redescribed ***M. fusca*** and designated a neotype for ***Serranus fuscus*** Lowe.

Serranus simonyi, described by Steindachner (1891) from two specimens collected at the Canary Islands, was included in the synonymy of ***Mycteroperca rubra*** by Boulenger (1895) and Fowler (1936) but it was overlooked by C.L. Smith (1971). The smaller of the two syntypes in the Naturhistorisches Museum of Vienna (NMW 39457, 314 mm standard length) has a misshapen anal fin (as is evident in Steindachner's original illustration) with only 7 soft anal-fin rays, but the 336 mm standard length syntype has a normal anal fin with 12 soft rays. And the dorsal-fin count of XI spines and 16 rays (XI spines, 15 rays in the illustrated specimen) also matches the dorsal-fin counts for ***M. rubra.*** However, the gill-raker count of 12 on upper limb and 23 on lower limb given by Steindachner (and confirmed on both syntypes by Dr Barbara Herzig) is considerably fewer than counts for ***M. rubra.*** In view of this significant difference in the number of gill rakers, we recognize ***M. simonyi*** as a synonym of ***M.fusca.***

Mycteroperca interstitialis (Poey, 1860) Fig. 464; PI. XXVID-F **SERRAN Myct 3**

Serranus interstitialis Poey, 1860:127 (type locality: Cuba).

Synonyms: ?***Labrus gvaza*** Linnaeus, 1758:285 (type locality: "in pelago"; based on ***Labrus guaza*** Loefling, 1758:104 (type locality: Cumana, Venezuela; see "Remarks" for ***Epinephelus marginatus*** in this catalogue). ***Serranus dimidiatus*** Poey, 1860:129 (type locality: Cuba). ***Serranus falcatus*** Poey, 1860:138 (type locality: Cuba). ***Mycteroperca calliura*** Poey, 1865: 181 (type locality: Cuba). ***Trisotropis chlorostomus*** Poey, 1867:231 (type locality: Cuba). ***Mycteroperca roquensis*** Martin, 1956:100 (type locality: Gran Roque Island, Venezuela).

FAO Names: En - Yellowmouth grouper; **Fr** - Badèche gueule jaune; **Sp** - Cuna amarilla.

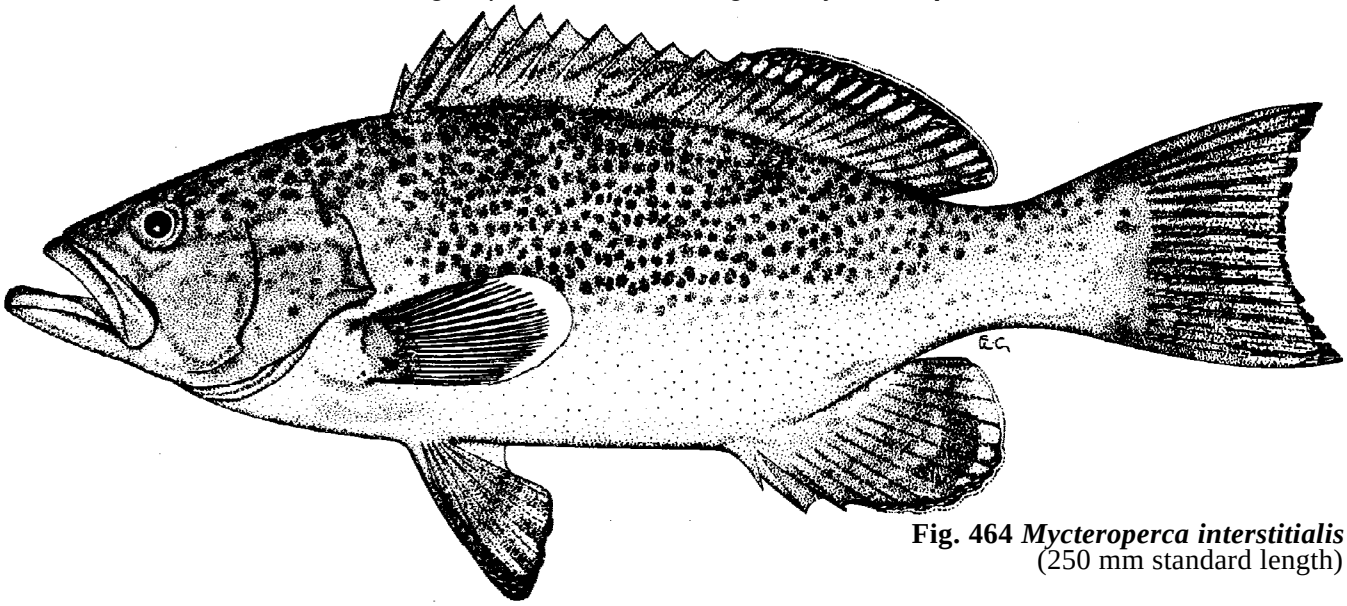

Fig. 464 ***Mycteroperca interstitialis***
(250 mm standard length)

Diagnostic Features: Body depth less than head length, depth contained 3.0 to 3.4 times in standard length (for fish 22 to 65 cm standard length). Head length contained 2.8 to 3.0 times in standard length; preopercle angular, with a prominent lobe bearing enlarged serrae at the angle and a distinct notch above the serrate lobe; posterior nostrils greatly enlarged in adults. Gill rakers 4 to 6 on upper limb, 11 to 15 on lower limb, plus 3 to 5 rudiments on each limb, total 23 to 27. Dorsal fin with XI spines and 16 to 18 rays, the 12th and 13th rays elongated in adults, giving the fin a pointed rear margin; anal fin with III spines and 10 to 12 rays, the fin margin pointed in adults, with sixth to eighth rays distinctly longer than others; pectoral-fin rays 16 or 17; caudal fin emarginate, with evenly exserted rays in adults. Lateral-body scales ctenoid (weakly so in large adults); lateral-line scales 70 to 74; lateral-scale series 112 to 128. **Colour:** Pale brownish grey, with close-set small brown spots on dorsal part of body; margin of spinous dorsal fin and mouth yellowish; pectoral-fin membranes clear, the rays dark and the fin margin with a white edge; dark moustache streak present above maxilla. Some specimens are uniform brown dorsally, and others may have faint, irregularvertical bars. Juveniles bicoloured: head and body dark brown dorsally (the dark dorsal colour may be broken into broad dark bars or saddle blotches) and abruptly white below; a white middorsal stripe from tip of lower jaw along top of snout, head, and base of dorsal fin.

Geographical Distribution: Western Atlantic Ocean: Gulf of Mexico, Bermuda, Caribbean (mainly insular localities), and southern Brazil (Fig. 465).

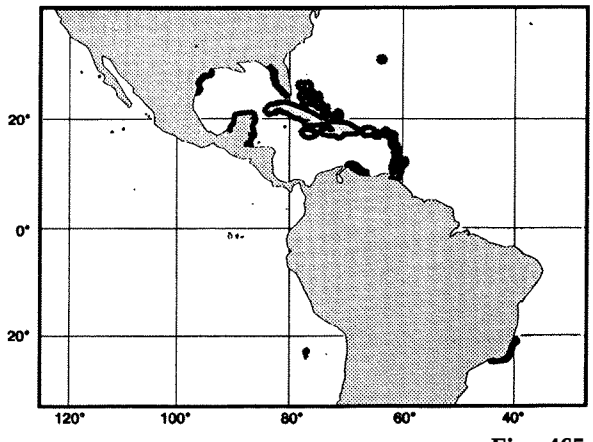

Fig. 465

Habitat and Biology: ***M. interstitialis*** occurs on coral reefs and rocky bottom in depths of 20 to 150 m. Dennis and Bright (1988) found that it was common (along with its continental "replacement," ***M. phenax***) on the algal-sponge zone of the Flower Garden Banks in the northwestern Gulf of Mexico. Spawning in Bermuda occurs from June to August (Smith, 1971); in Jamaican waters, ripe fish were found in April (Thompson and Munro, 1983). On the Florida Middle Grounds, Bullock and Smith (1991) reported ripe fish in December, March to July and September, and spent females were found in August and September; ovulated oocytes measured 0.80 to 1.20 mm in diameter. Randall (1967) reported that all 5 of the ***M. interstitialis*** that he found with food in their stomachs contained only fishes, and Bullock and Smith (1991) also found a variety of fishes in the stomachs of specimens from the Gulf of Mexico.

The weight-length relationship for 97 ***M. interstitialis*** from the Gulf of Mexico was given by Bullock and Smith (1991) as follows: $W = 4.7 \times 10^{-8} SL^{2.893}$ ($r^2 = 0\ 95$) where W is the whole weight in kilogrammes and SL (standard length) is in millimetres.

Size: Maximum total length 74 cm, maximum weight 7 kg.

Interest to Fisheries: Although separate statistics are not published for ***M. interstitialis*** it is an important species in the fishery of Bermuda, the Gulf of Mexico, and throughout the Caribbean. Caught with hook-and-line, traps, and spear. According to Nagelkerken (1981) the population in Curação decreased sharply as a result of intensive spearfishing.

Local Names: CUBA: Abadejo; VENEZUELA: Cuna chulinga, Cuna raba rajao.

Literature: Cervigón and Valasquez (1966); Randall (1967, 1968); Smith (1971); Thompson and Munro (1983); Bullock and Smith (1991).

Remarks:. ***M. interstitialis*** is very similar to ***M. phenax;*** both species have a projecting lobe at the corner of the preopercle, similar colour pattern, and fin counts, and adults with enlarged posterior nostrils and exserted median fin rays. ***M. interstitialis*** of 20 to 57 cm standard length usually has shorter pelvic fins and a shorter head (15 to 17% and 30 to 36% of standard length, versus 18 to 20% and 36 to 38% of standard length respectively in ***M. phenax; M. interstitialis*** also lacks dark spots on the dorsal and anal fins, and the exserted caudal-fin rays are of similar length; whereas ***M.phenax*** has small brown spots on these fins and the exserted caudal-fin rays are more uneven. Juveniles of ***M. interstitialis*** are distinctly bachelorhood, but juveniles of ***M. phenax*** are coloured much the same as adults. Contrarv tc C.L. Smith's (1971 :194) statement. the body depth of ***M. interstitialis*** is not greater than that of other species of ***Mycteroperca.***

M. cidi differs from ***M. interstitialis*** in colour pattern and in more gill rakers (9 to 13 on upper limb,18 to 23 on lower limb, plus 2 to 4 rudiments on each limb).

Mycteroperca jordani (Jenkins and Evermann, 1889) Fig. 466; Pl. XXVIIA-C **SERRAN Myct 9**

Epinephelus jordani Jenkins and Evermann, 1889:140 (type locality: Guaymas, Sonora, Mexico).

Synonyms: ***Mycteroperca venadorum*** Jordan and Starks, in Jordan, 1895:446 (type locality: Isla Blanca, off Sinaloa, Mexico).

FAO Names: En - Gulf grouper; **Fr** - Mérou golfe; **Sp** - Mero baya.

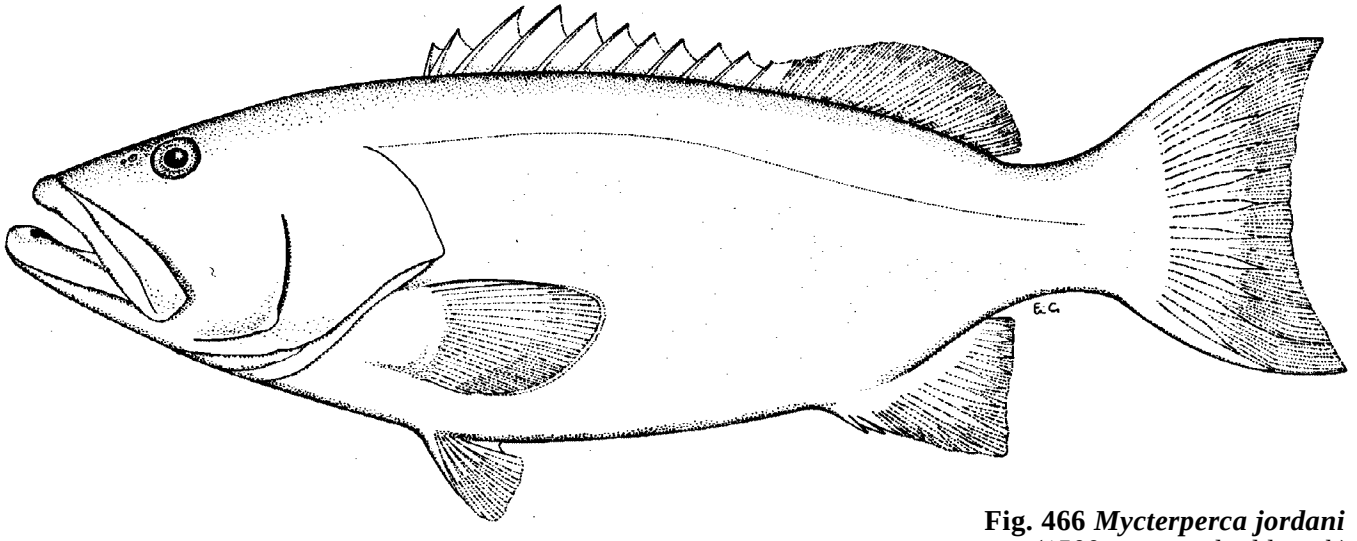

Fig. 466 ***Mycterperca jordani***
(1500 mm standard length)

Diagnostic Features: Body depth much less than head length, depth contained 3.1 to 3.4 times in standard length (for fish 23 to 51 cm standard length). Head length contained 2.5 to 2.7 times in standard length; preopercle rounded, finely serrate, without a distinct lobe at the angle; posterior nostrils not notably enlarged, their diameter less than twice that of anterior nostrils. Total gill rakers 21 to 26, not counting rudiments. Dorsal fin with XI spines (fourth or fifth longest) and 16 or 17 rays, the interspinous membranes deeply incised in adults; posterior margin of dorsal fin rounded; anal fin with III spines and 10 or 11 rays, the fin margin pointed in large adults; pectoral-fin rays 16 to 18; no fin rays exserted; caudal fin rounded in juveniles, truncate to emarginate in adult. Midlateral-body scales ctenoid on small juveniles, smooth on adults; lateral-line scales 75 to 85; lateral-scale series 125 to 128. **Colour:** Adults usually uniform dark brown or grey, but they can rapidly assume the juvenile pattern if disturbed or excited. In large adults, the pectoral-fin margin is white and the median fins have a narrow white edge. Juveniles greyish brown, with large, dark grey oblong blotches on dorsal part of body and fins.

Geographical Distribution: Eastern Pacific from La Jolla, California to Mazatlan, Mexico (Fig. 467).

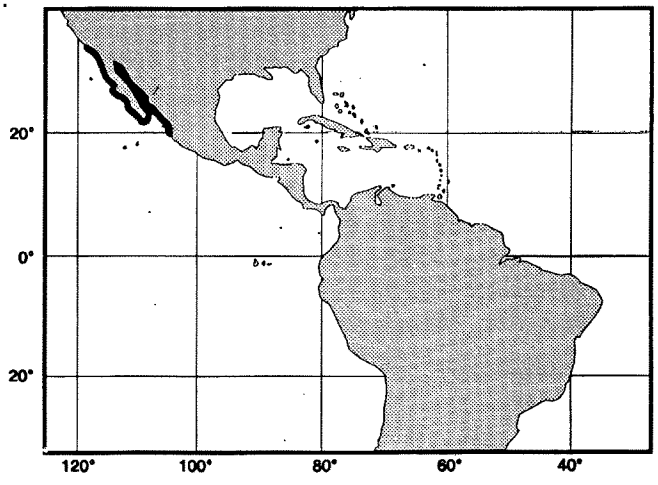

Fig. 467

Habitat and Biology: Rocky reefs and kelp beds in depths of 5 to 30 m. Little has been published on the biology of this large species. Rosenblatt and Zahuranec (1967) found fish remains in the stomach of a large adult, and Thompson et al. (1979) report juvenile hammerhead sharks as prey of large ***M. jordani.*** Juveniles are unknown in California waters, and the few large adults that have been taken there are probably expatriates from a more southerly breeding population (Rosenblatt and Zahuranec, 1967).

Size: Maximum total length 150 cm; maximum weight 91 kg.

Interest to Fisheries: Because of its large size, this species is sought by anglers and spearfishermen.

Local Names: MEXICO: Cabrilla de astillero, Garlopa.

Literature: Walford (1937); Rosenblatt and Zahuranec (1967); Smith (1971); Thomson et al. (1979).

Remarks: ***M. prionura*** and ***M xenarcha*** differ from ***M. jordani*** in colour pattern and in having more gill rakers (34 to 38 and 29 to 33 total, not counting rudiments), 15 or 16 pectoral-fin rays, and adults with a projecting serrate lobe at the angle of the preopercle and exserted caudal-fin rays. ***M. rosacea*** also has more gill rakers (38 to 43 total, not counting rudiments).

Mycteroperca microlepis (Goode and Bean, 1880) Fig. 468; Pl. XXVIIA-C **SERRAN Myct 4**

Trisotropis microlepis Goode and Bean, 1880:141 (type locality: west Florida).

Synonyms: ***Trisotropis stomias*** (in part) Goode and Bean, 1883:427 (type locality restricted to Florida by lectotype designation of C.L. Smith, 1971:189).

FAO Names: En - Gag; **Fr** - Badèche baillou; **Sp** - Cuna aguají.

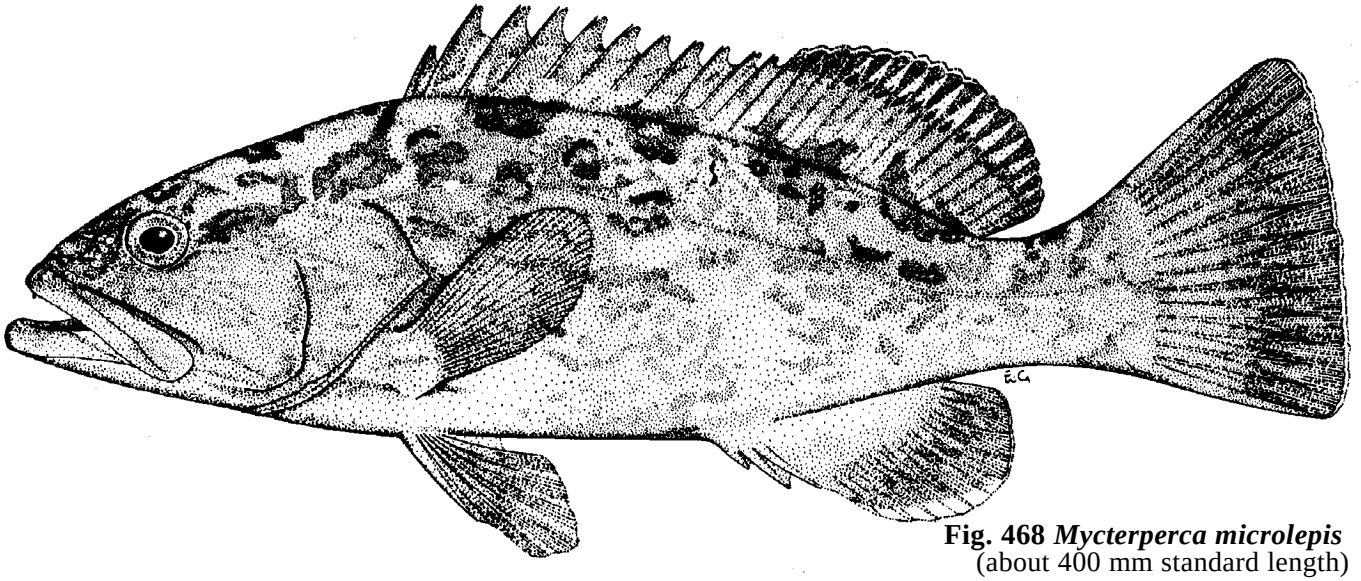

Fig. 468 ***Mycterperca microlepis***
(about 400 mm standard length)

Diagnostic Features: Body depth much less than head length, depth contained 3.0 to 3.5 times in standard length (for fish 12 to 42 cm standard length). Head length contained 2.5 to 2.7 times in standard length; interorbital area convex; corner of preopercle (on fish larger than about 40 cm standard length) produced into a rounded lobe bearing enlarged serrae; adults (larger than 60 cm) with posterior nostrils much larger than anterior ones. Gill rakers 8 or 9 on upper limb, 16 on lower limb, including 5 or 6 rudiments on each limb. Dorsal fin with XI spines and 16 to 18 rays, the third or fourth spine longest and the membranes distinctly incised between the spines; anal fin with III spines and 10 to 12 rays; dorsal and anal fins rounded at all sizes; no exserted dorsal- and anal-fin rays; pectoral-fin rays 16 to 18; caudal fin emarginate. Lateral-body scales smooth, except those covered by pectoral fin; lateral-line scales 88 to 96; lateral-scale series 128 to 146. **Colour:** Adult females and juveniles are generally brownish grey with darker vermiculations; a resting or "camouflage phase" shows 5 dark brown saddles separated by short white bars below the dorsal fin; this pattern is characteristic of fish that are sitting on the bottom. Unlike the camouflage phase, the "black-belly" and "black-back" phases are not ephemeral and are displayed only by large adults (males). The black-belly phase is mostly pale grey, with faint dark reticulations below the soft dorsal fin; the belly and ventral part of the body above the anal fin are black, as are the margin of the soft dorsal fin, central rear part of caudal fin and rear margins of pectoral and pelvic fins. The black-back phase is similar to the black-belly phase, but with more black pigment on rear part of body, dorsal half of peduncle, all of soft dorsal and anal fins, and also over the snout and front of jaws; the caudal fin is white with a black margin posteriorly.

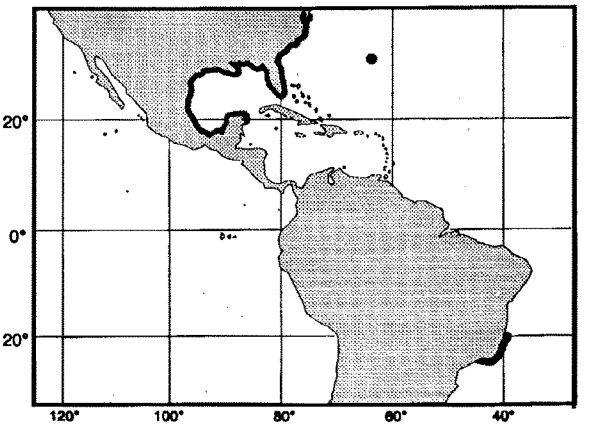

Fig. 469

Geographical Distribution: Western Atlantic: mainly continental in distribution, from North Carolina to the Yucatan Peninsula; juveniles occur as far north as Massachusetts; rare in Bermuda (Fig. 469); one record from Cuba (Rodriguez, 1976); also reported from eastern Brazil.

Habitat and Biology: Juveniles occur in estuaries and seagrass beds; adults are usually found offshore on rocky bottom in depths of 40 to 100 m (rarely to 152 m), and occasionally inshore on rocky or grassy bottom. ***M. microlepis*** is the most common species of grouper on rocky ledges in the eastern Gulf of Mexico. Adults are solitary or in groups of 5 to 50 individuals well above the bottom; they feed mainly on fishes and also take some crabs, shrimps, and cephalopods. Juveniles (less than 20 cm) feed mainly on the crustaceans that live in shallow grass beds.

Spawning is thought to occur at depths greater than 70 m. Females are sexually mature at 5 or 6 years (67 to 75 cm total length) and most change sex between 10 and 11 years old (95 to 100 cm total length). Fecundity of a 95 cm female was estimated at 1.5 million eggs. Roberts and Schlieder (1983) report the artificial spawning of males produced by induced Sex inversion.

Bullock and Smith (1991) reported weight-length curve for 902 ***M. microlepis*** from the eastern Gulf of Mexico: $W = 2.68 \times 10^{-8} SL^{2.95}$ ($r^2 = 0\ 98$) where W is whole weight in kilogrammes and SL (standard length) is in millimetres.

Size: Maximum total length about 120 cm. The 1990 edition of ***World Record Game Fishes*** published by the International Game Fish Association lists the all-tackle record for ***M. microlepis*** as 32.11 kg for a fish caught off Destin, Florida.

Interest to Fisheries: This is one of the most important groupers in the sport and commercial fisheries of the southeast coast of the US and in the Gulf of Mexico. Caught with hook-and-line, longlines, and occasionally in trawls.

Local Names: BRAZIL: Badejo-da-areia; USA: Charcoal belly.

Literature: McErlean (1963); McErlean and Smith (1964); Smith (1971); Manooch (1984); Figueiredo and Menezes (1980); Collinsetal. (1987); Keeneretal. (1988); Bullockand Smith (1991); Gilmoreand Jones(1992).

Remarks: Juveniles of ***M. microlepis*** (less than 40 cm standard length) that have not yet developed the distinctive notch and rounded lobe at the corner of the preopercle might be confused with ***M. bonaci,*** and preserved specimens (without indication of the original colour pattern) may be difficult to identify. ***M. microlepis*** has higher scales counts (lateral line 88 to 96 and lateral-scale series 128 to 146, versus 78 to 83 and 119 to 126 respectively for ***M. bonaci***).

Kendall (1979) described and illustrated the larval development of specimens 4.0 to 14.2 mm that were presumed to be ***M. microlepis*** based on fin counts and collection locality.

Mycteroperca olfax (Jenyns, 1843) Fig. 470 **SERRAN Myct 10**

Serranus olfax Jenyns, 1843:9, pl. 4 (type locality: Galapagos Islands).

Synonyms: ***Mycteroperca olfax*** variety ***ruberrima*** Jordan and Bollman in Jordan and Eigenmann, 1890:367 (type locality: Abingdon Island, Galapagos).

FAO Names: En - Sailfin grouper; **Fr** - Mérou voile; **Sp** - Garropa parda.

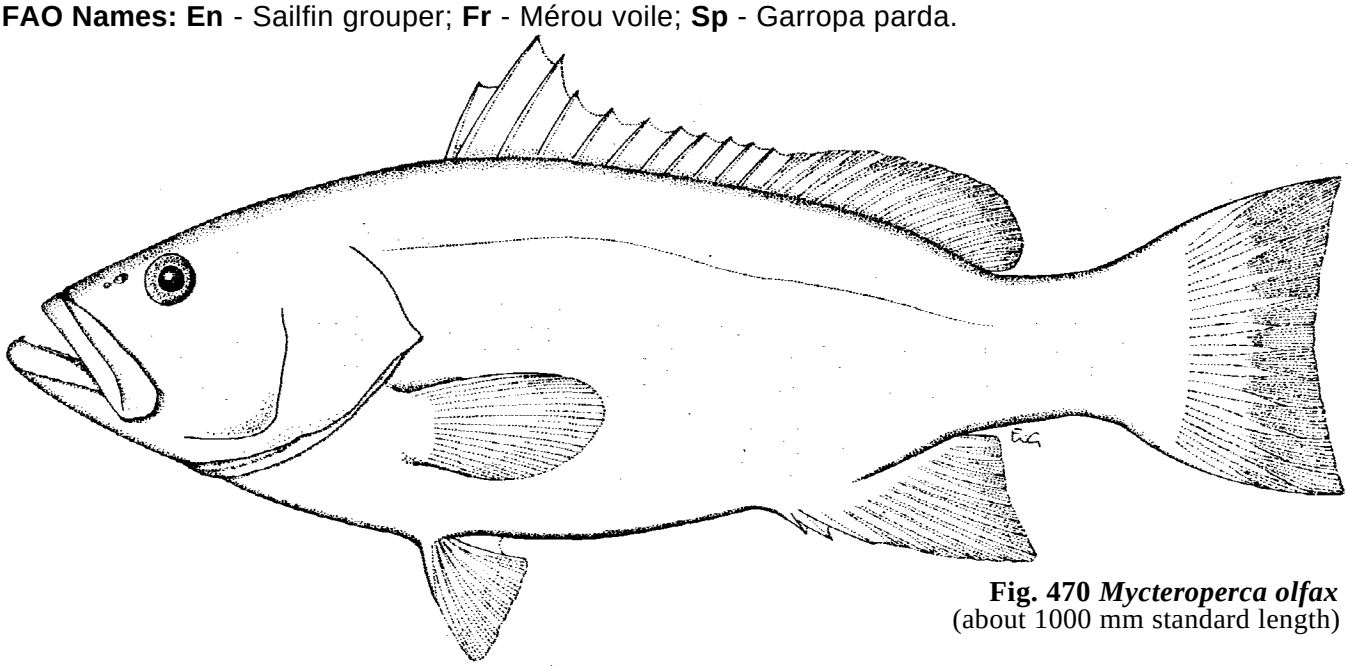

Fig. 470 ***Mycteroperca olfax***
(about 1000 mm standard length)

Diagnostic Features: Body depth less than head length, depth contained 2.9 to 3.2 times in standard length (for fish 27 to 59 cm standard length). Head length contained 2.6 to 2.9 times in standard length; interorbital slightly convex; preopercle angular, with a serrate lobe at the angle; posterior nostrils of adults (more than 40 cm standard length) greatly enlarged, more than twice size of anterior nostrils. Total gill rakers 24 to 29 (not counting rudiments). Dorsal fin with XI spines and 16 or 17 rays, the second and third dorsal-fin spines elongated, forming an elevated lobe, the interspinous membranes not deeply indented; soft-rayed part of dorsal fin rounded; anal fin with III spines and 11 rays, the fin pointed in specimens longer than 25 cm standard length; pectoral-fin rays 16 or 17; caudal fin truncate in juveniles, slightly emarginate in adults, without exserted rays. Lateral-scale series 92 to 110. **Colour:** "typically dark olive-brown on back, sides, and head, spotted with purplish and lighter brown. The belly is greyish brown. There is variation in this colour, however, even within a small geographical area. Some specimens may be plain dark brown; others may have the body covered with faint circular dark brown spots.In some, these spots may be of fairly even distinctness. These spots seem to disappear with age, but the age at which they fade varies." (Walford, 1937). A xanthic morph is bright yellow over all. Rosenblatt and Zahuranec (1967) reported that the brown colour morph has the fins margined with white, and there is a dark brown "moustache mark" above the maxilla.

Geographical Distribution: Cocos and Galapagos Islands. Rosenblatt and Zahuranec (1967) discounted reports from Panama and Peru (Fig. 471). Rosenblatt and Zahuranec (1967) and C.L. Smith (1971) overlooked Snodgrass and Heller's (1905) record of ***M. olfax*** from Cocos Island.

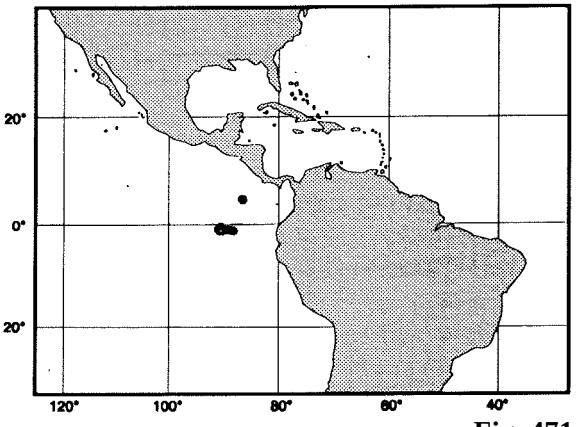

Fig. 471

Habitat and Biology: Snodgrass and Heller (1905) reported ***M. olfax*** as extremely abundant at the northern and western islands of the Galapagos Archipelago. Juveniles were found in shallow sandy lagoons. Adults are primarily piscivorous.

Size: According to Walford (1937), ***M. olfax*** attains a total length of 120 cm.

Interest to Fisheries: Probably of importance in the grouper fishery of the Galapagos Islands. Caught with hook-and-line.

Local Names: ECUADOR: Colorado grouper (Galapaos Islands).

Literature: Smith (1971).

Remarks: ***M. olfax*** seems to be the only species of ***Mycteroperca*** that occurs at the Galapagos Islands.

Mycteroperca phenax Jordan and Swain, 1885 | Fig. 472; Pl. XXVIID-F | **SERRAN Myct 5**

Mycteroperca falcata variety phenax Jordan and Swain, 1885:363 (type locality: Key West, Florida).

Synonyms: None.

FAO Names: En - Scamp; **Fr** - Badéche galopin; **Sp** - Cuna garopa.

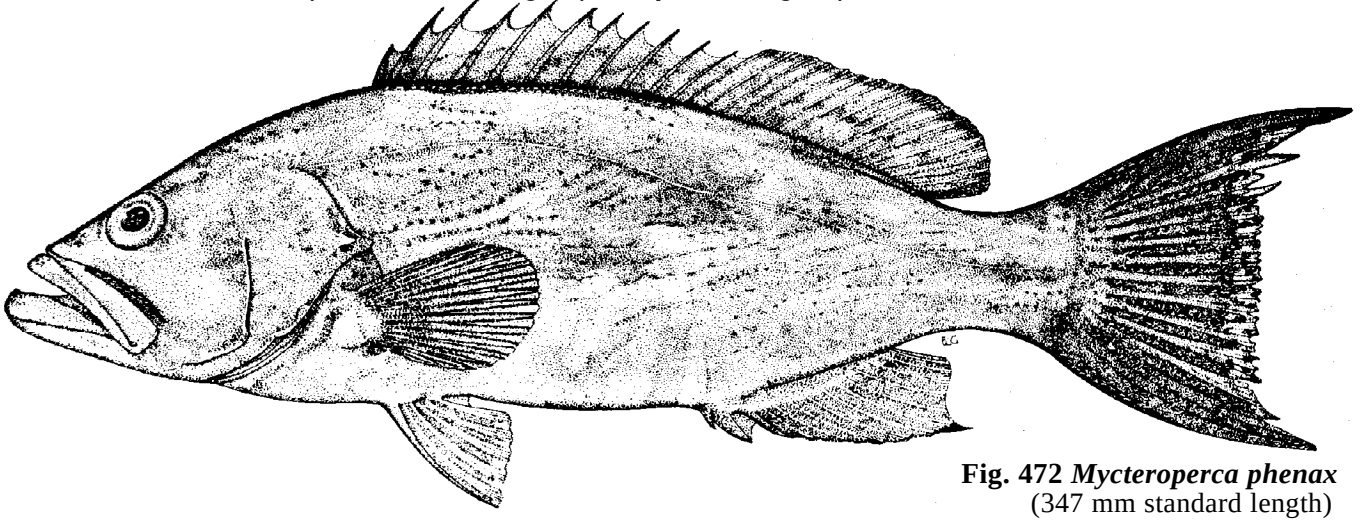

Fig. 472 *Mycteroperca phenax*
(347 mm standard length)

Diagnostic Features: Body depth less than head length, depth contained 3.0 to 3.4 times in standard length (for fish 20 to 57 cm standard length). Head length contained 2.6 to 3.0 times in standard length; interorbital area convex; preopercle angular, with a distinct bony lobe at the angle (in fish larger than 40 cm standard length); subopercle and interopercle serrate; posterior nostrils of adults 2 to 4 times larger than anterior nostrils. Gill rakers 8 to 10 on upper limb and 17 to 21 on lower limb, 26 to 31 (total, including 3 or 4 rudiments on each limb), the longest raker longer than the longest gill filament. Dorsal fin with XI spines and 16 to 18 rays; anal fin with III spines and 10 to 12 rays; pectoral-fin rays 15 to 17; caudal fin concave; adults with unevenly exserted rays in dorsal, anal, and caudal fins. Lateral-body scales ctenoid; lateral-line scales about 76 to 82; lateral-scale series about 124. **Colour:** Four colour patterns were described and illustrated by Gillmore and Jones (1992); the usual pattern is the brown phase, with head and body pale brown, covered (except ventrally) with small reddish brown spots (1 on each scale) which extend onto the median fins. The "cat's paw" phase is pale brown, the dorsolateral parts of body with several clusters of dark brown spots resembling the paw print of a cat.Larger adults displayed a grey-head phase, with the rear two-thirds of the body dark; the head and the body anterior to the sixth dorsal-fin spine is silvery grey with dark reticulations, the light areas being the same areas that were darkly pigmented in the "cat's paw" phase; belly and ventral part of body above anal fin with several white spots; fins white except for black margin of pectoral fins. The bicolour phase, seen only once, was pale brown anteriorly and abruptly dark chocolate brown posteriorly, with the transition at the origin of the soft dorsal fin. All colour phases are ephemeral, but only large adults (over 50 cm standard length) displayed the grey-head phase.

Geographical Distribution: Gulf of Mexico and east coast of U.S. from North Carolina to Key West and along the southern shore of the Caribbean Sea; juveniles are occasionally found as far north as Massachusetts. Cervigón (1966) reported ***M. phenax*** as common at the islands of Margarita and Cubagua off the east coast of Venezuela (Fig. 473).

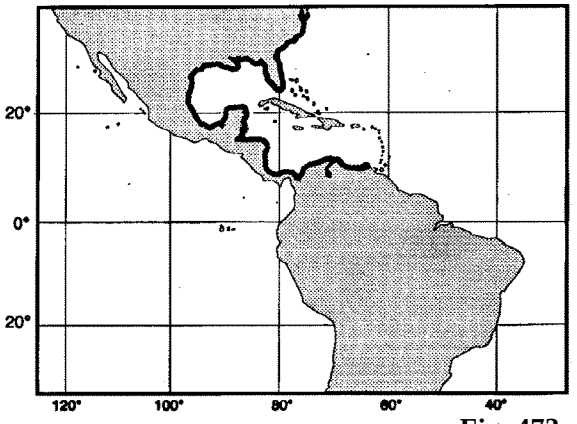

Fig. 473

Habitat and Biology: In the eastern Gulf of Mexico, ***M. phenax*** are usually found over ledges and high-relief rocky bottoms (Bullock and Smith, 1991); but according to Manooch (1984), the preferred habitat from North Carolina to Georgia is low-profile bottoms in depths of 30 to 100 m. Off the east coast of Florida, Gilmore and Jones (1992) found that scamp were the most abundant grouper in areas of living *Oculina* coral formations at depths of 70 to 100 m. This species apparently moved inshore when bottom temperature fell below 8.6 ºC. These authors suggested that, because of their relatively small size, ***M. phenax*** are restricted to areas of topographic complexity where they can find shelter from predators such as sharks and large amberjack *(Seriola dumerili).* Juveniles have been found in shallow water at jetties and in mangrove areas.

The biology of ***M. phenax*** from off the Carolinas was studied by Matheson et al. (1986). They found that scamp grow slowly and attain an age of at least 21 years. Their calculated von Bertalanffy growth equation is: $L_t = 985(1\text{-}e^{-0.092(t+245)})$ where L_t is fork length in millimetres at year t. Their equation describing the relationship of weight to length is $W = 2.46 \times 10^{-8}(L^{2.913})$ with L (fork length) in millimetres and W (weight) in kilogrammes.

Spawning of the Carolinas population occurred from April through August, with a peak in May and June. Maturity is attained at 3 years (40 cm). For the Gulf of Mexico population, Bullock and Smith (1991) reported spawning from March through May and maturity for females at 35 cm standard length; ovulated eggs, 0.75 to 1.23 mm in diameter, were transparent with a single oil droplet. The weight/length curve, based on 1 216 scamp, is $W = 1.104 \times 10^{-7}\ SL^{2.74}$ ($r^2 = 0.95$), where W is whole weight in kilogrammes, and SL (standard length) is in millimetres.

Food of ***M. phenax*** comprises mainly fishes and a few crustaceans and *Octopus.*

Size: Maximum total length (not including exserted caudal-fin rays) is 90 cm, maximum weight about 14 kg.

Interest to Fisheries: ***M. phenax*** is the most highly prized grouper in the fisheries of the Gulf of Mexico and southeastern U.S. From 1973 to 1979, it represented 34% of the total weight of grouper (348 t) in the South Atlantic Bight recreational fishery (Matheson et al., 1986).

Local Names: VENEZUELA: Cuna garopa.

Literature: Cervigón and Velasquez (1966); C.L. Smith (1971).

Remarks: Although adult ***M. phenax*** and ***M. interstitialis*** are very similar (see Remarks in the account of ***M. interstitialis*** abovej, the juveniles of ***M. phenax*** are not bicoloured like those of ***M. interstitialis.***

Mycteroperca prionura Rosenblatt and Zahuranec, 1967 | Fig. 474 | **SERRAN Myct 11**

Mycteroperca prionura Rosenblatt and Zahuranec, 1967:241, figs 3A and 4A (type locality: Baja California Sur, Inner Gorda Bank, 23º02'N, 109º31'W).

Synonyms: ***Mycteroperca xenarcha*** (non Jordan): Walford, 1937.

FAO Names: En - Sawtail grouper; **Fr** - Mérou scie-queue; **Sp** - Garropa aserrada.

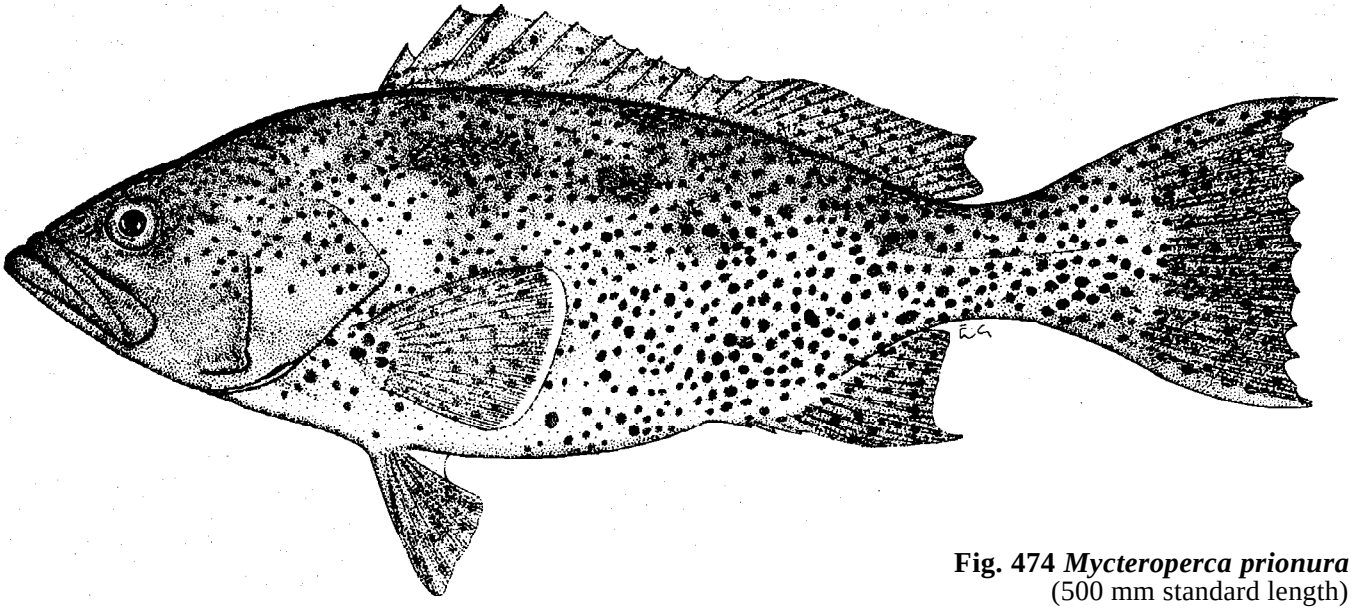

Fig. 474 ***Mycteroperca prionura***
(500 mm standard length)

Distinctive Features: Body depth less than head length. Preopercle angular, with a serrate lobe at the angle; posterior nostrils not greatly enlarged in adults. Total gill rakers 34 to 38, not counting rudiments. Dorsal fin with XI spines and 16 to 18 rays, the third spine longest, but not much longer than fourth, the succeeding spines gradually shortening to the tenth, which is slightly shorter than the last spine, the interspinous membranes not indented; anal fin with III spines and 10 to 12 rays; margin of soft dorsal and anal fins pointed in fish larger than 35 cm standard length; pectoral-fin rays 15 or 16; caudal fin of juveniles (less than 20 cm standard length) rounded or truncate; in adults (larger than 25 cm standard length), rear margin of caudal fin scalloped, with exserted rays. Lateral-scale series 85 to 109. **Colour:** Adults pale brown, the body, median fins, and rear part of head (except ventrally) covered with small dark reddish brown spots; pectoral fins and pelvic fins dusky, with faint irregular dark spots; live fish may show dusky blotches on dorsolateral part of body. Juveniles less than 10 cm standard length yellowish tan, with round, well-spaced, reddish brown spots on body and similar but smaller spots on head and median fins; dark stripe from eye to tip of lower jaw. With growth, the dark spots on the body become smaller and more numerous. A colour photograph of a large juvenile (ca. 30 cm total length) was published by Burgess and Axelrod (1984).

Geographical Distribution: Eastern Pacific, Gulf of California south to Jalisco, Mexico (Fig. 475).

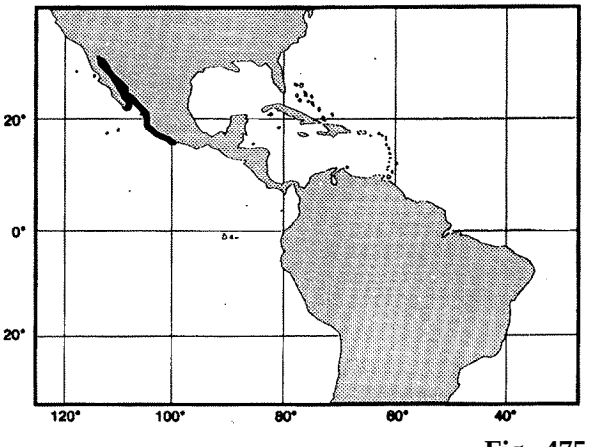

Fig. 475

Habitat and Biology: ***M. prionura*** is found on rocky reefs at depths of 8 to at least 40 m. No information is available on the biology.

Size: Rosenblatt and Zahuranec (1987) reported their largest specimen as 68 cm standard length.

Interest to Fisheries: ***M. prionura*** is apparently too rare to be of significant commercial importance.

Local Names:

Literature: Rosenblatt and Zahuranec (1967).

Remarks: ***M. jordani*** and ***M. xenarcha*** differ from ***M. prionura*** in having fewer gill rakers (21 to 26 and 29 to 33 total, not counting rudiments), and ***M. rosacea*** has more gill rakers (38 to 43 total, not counting rudiments); in addition, adults of ***M. jordani*** and ***M. rosacea*** lack exserted caudal-fin rays and a distinctly projecting lobe at the angle of the preopercle.