

Size: Maximum size to about 50 cm total length, commonly to around 30 cm total length.

Interest to Fisheries: Caught primarily by handlines, traps, trawls, beach seines, and gillnets. Marketed mostly fresh. An important fishery resource in some areas. In Saudi Arabia, this species claims the highest market price for finfish. In Tuwwal, Saudi Arabia, separate catch statistics have been gathered for this species; annual totals for 1981 and 1982 were 21.4 and 28.4 tonne respectively. This catch represented 8.1% and 9.8% respectively of the total landings for the area and a stock assessment indicated that the stocks were fully exploited.

Local Names: AUSTRALIA: Pink-eared emperor, Purple-eared emperor; BELAU: Metngui; INDIA: Pig-face bream; JAPAN: Shimofuri-fuefuki; KUWAIT: Sheiry; MADAGASCAR: Tsangou; PAPUA NEW GUINEA: Dragi, Gwasawa; PHILIPPINES: Batilya, Kilawan, Katambak; SAUDI ARABIA: Shaoor, Sheiry; SOUTH AFRICA: Redspot emperor, Rooikol-keiser; TANZANIA: Changu, Changu n'jana.

Literature: Gloerfelt-Tarp & Kailola (1984); Grant (1982); Lee (1986, as *L. mahsenoides* and *L. lentjan*); Masuda *et al.* (1984); Randall (1983); Sainsbury *et al.* (1985); Schroeder (1980); Smith (1959, 1986).

Remarks: There has been speculation that *L. opercularis* should be recognized as a separate species because it lacks scales in the pectoral axil and does not have a red mark on the base of the pectoral fin. I have examined hundreds of fresh specimens of the '*opercularis*' and '*lentjan*' forms in the Philippines, Thailand, and the Arabian Gulf and, looked at museum specimens from many localities. There are no consistent differences in red markings as all populations observed had a red posterior margin of the opercle and usually but not always a red mark at the base of the pectoral fin. There are consistent differences in scalation of the pectoral axil for different location within this species. *Lethrinus lentjan* populations around the Indian Ocean most frequently have the axil of the pectoral fin densely scaled. In the Philippines, the pectoral axil is most frequently naked, sometimes with a few scales in the lower part of the axil. In eastern Australia it is variable, specimens having a densely scaled, partially scaled or a naked pectoral axil. All other characters are constant between populations of *L. lentjan*. The allopatric differences in pectoral axil scalation appear to be population variation.

Lethrinus mahsena (Forsskål, 1775)

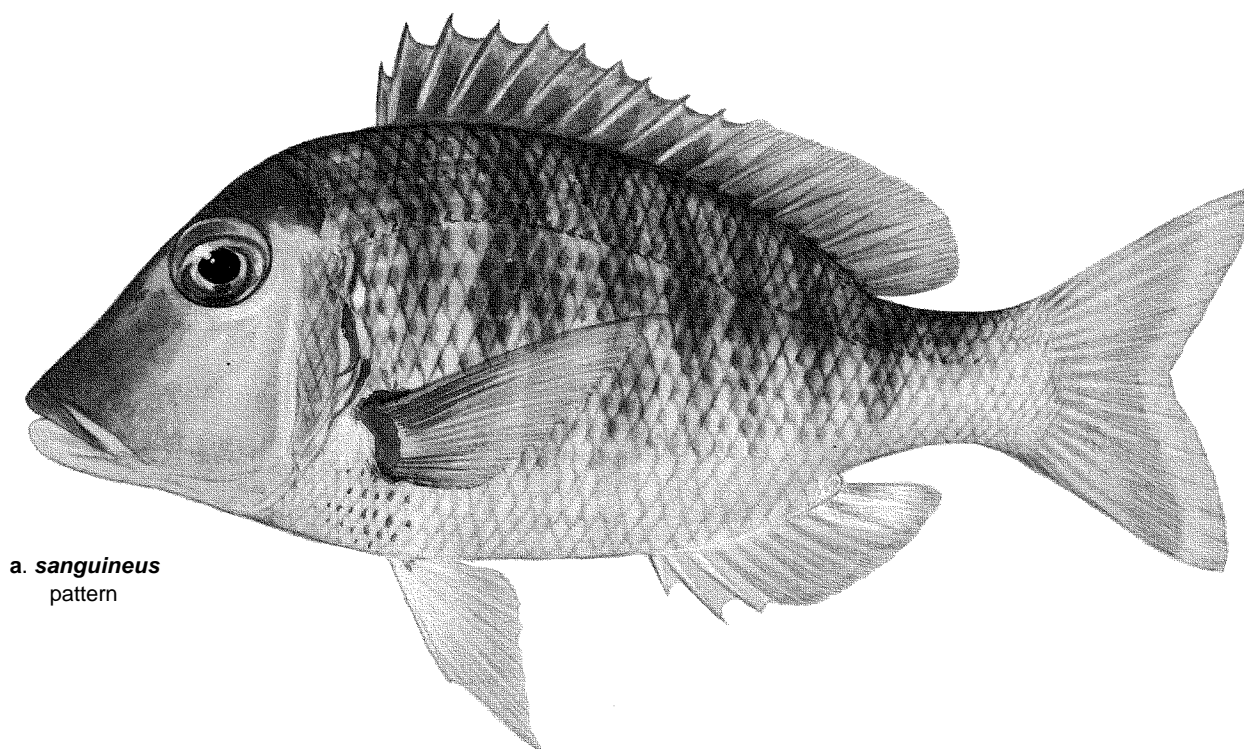
Fig. 127, Plate V, 28,29

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Sciaena mahsena Forsskål, 1775, *Descrip. Animal.*, :xi, 52 (Arabia).

Synonyms: *Lethrinus abbreviatus* Valenciennes (1830); *Lethrinus caeruleus* Valenciennes (1830); *Lethrinus sanguineus* Smith (1955).

FAO Names: En - Sky emperor.



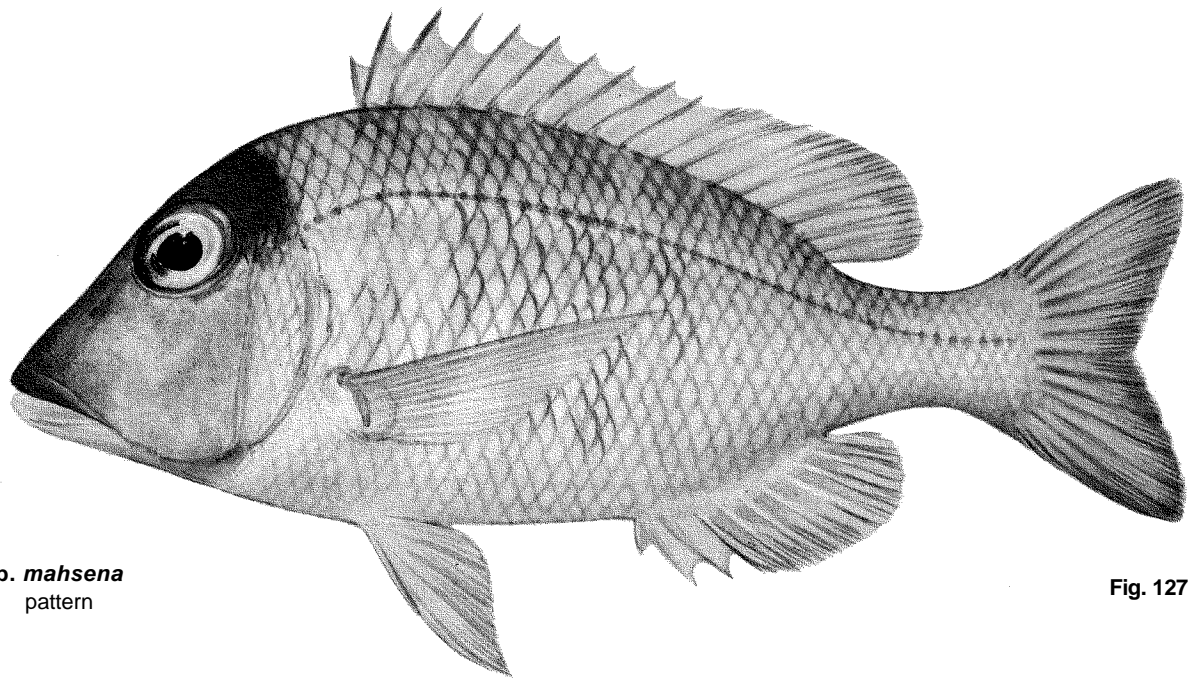


Fig. 127

Diagnostic Features: Body relatively deep, its depth 2.3 to 2.5 times in standard length. Head length 0.8 to 0.9 times in body depth, 2.7 to 2.9 times in standard length, dorsal profile near eye nearly straight; snout moderately short, its length about 1.7 to 2.3 times in head length, measured without the lip the snout is 1.0 to 1.1 times in cheek height, its dorsal profile nearly straight or slightly concave, snout angle relative to upper jaw between 60 and 80 degrees; interorbital space convex; posterior nostril an oblong longitudinal opening, closer to orbit than to anterior nostril or slightly closer to anterior nostril than to orbit; eye situated close to or removed from the dorsal profile, its length 3.3 to 5.5 times in head length; cheek high, its length 1.9 to 2.5 times in head length; lateral teeth in jaws rounded or molars; outer surface of maxilla usually with a longitudinal ridge. Dorsal fin with 10 spines and 9 soft rays, the third or fourth dorsal spine the longest, its length 2.9 to 3.8 times in body depth; anal fin with 3 spines and 8 soft rays, the first soft ray usually the longest, its length almost equal to or greater than the length of the base of the soft-rayed portion of the anal fin and 0.7 to 0.8 times in the length of the entire anal fin base; pectoral rays 13; pelvic fin membranes between the rays closest to the body with or without dense melanophores. Lateral-line scales usually 46 to 48; cheek without scales; 4 1/2 scale rows between lateral line and base of middle dorsal fin spines; usually 15 or 16 scale rows in transverse series between origin of anal fin and lateral line; usually 14 or 15 rows in lower series of scales around caudal peduncle; 3 to 6 scales in supratemporal patch; inner surface of pectoral fin densely covered with scales; posterior angle of operculum fully scaled. **Colour:** head purplish grey, sometimes with a red blotch on nape; body yellow to greenish-blue, lighter ventrally, usually with nine or ten dusky yellow-green or brown bars; base of scales sometimes dark; a red bar at base of pectoral fin, sometimes extending broadly below and above pectoral fin base to edge of operculum; base of upper and sometimes cover rays of pectoral fin red; base and tips of pelvic fin often red; membranes of dorsal fin red (sometimes restricted to base of fin); anal fin whitish, with the membranes between the forward rays often red; caudal fin, especially the tips, reddish.

Geographical Distribution: Western Indian Ocean, including the Red Sea, East Africa to Sri Lanka (Fig. 128).

Habitat and Biology: Inhabits coral reefs and adjacent sandy and seagrass areas to depths of 100 m. Feeds primarily on echinoderms (most frequently sea urchins), crustaceans, and fishes; molluscs, tunicates, sponges, polychaetes and other worms are consumed in lesser quantities.

At Saya de Malha, this species was observed to be a protogynous hermaphrodite. Sex change was found to commonly occur between the ages of 5 and 6 years. Fecundity ranged between 26 700 and 166 200 eggs per mature female. Peaks in reproductive maturity were observed in October and November but this was variable depending on locality.

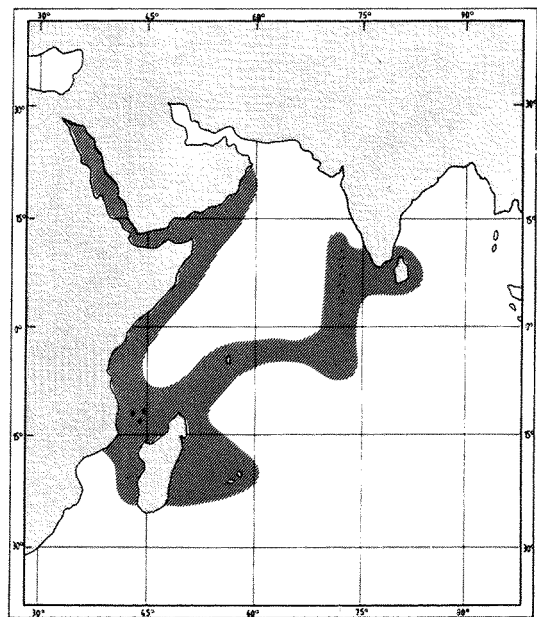


Fig. 128

Estimates of asymptotic length (L_{∞}) and coefficient of growth (K) have been made for the Gulf of Aden: L_{∞} = 58.9 cm fork length and $K = 0.32$.

Size: Maximum reported size 65 cm total length, commonly 35 to 45 cm total length.

Interest to Fisheries: Caught mainly with handlines, traps, and trawls. Considered an excellent food fish in most areas of the Red Sea but in some areas around the Indian Ocean it sometimes has an unpleasant 'coral' smell and taste. Marketed mostly fresh. Considerably important in fisheries where it occurs. An important species in some fisheries. At Saya de Malha it is the main species fished by handlines (annual landings around 2 000 t).

Local Names: JAPAN: Iso-fuefuki; KENYA: Changu suku; LACCADIVES: Filolu, Metti; MAURITIUS: Dame berri, Dame berri blanc; SAUDI ARABIA: Shaoor, Sheiry; SEYCHELLES: Lascar; SOUTH AFRICA: Sky emperor, Hemel-keiser; TANZANIA: Changu.

Literature: Randall (1983); Sato in Fischer & Bianchi (eds) (1984); Smith, J.L.B. (1959); Smith, M.M. (1986).

Remarks: The name *L. sanguineus* is sometimes applied to the form of this species with a bright red oblique streak from above to below the pectoral fin base. I have examined the types of both *L. mahsena* and *L. sanguineus* and numerous specimens that have been recorded as one colour type or the other and can find no morphological differences between the two forms. Moreover, I have examined a number of colour photographs and find the red marking to be highly variable with intermediates between the 'red sash' (*sanguineus*) and the red pectoral base form (*L. mahsena*). The intensity of red on the fin membranes also waxes and wanes concomitantly with the intensity of the 'red sash'. I have no definite hypothesis for the cause of variation in the red colour forms; variation could perhaps be due to a population, environmental or reproductive mechanism. Because of the variation in colour and no apparent morphological differences, I recognize only one species.

Lethrinus microdon Valenciennes, 1830

Fig. 129, Plate V, 30 and Plate VI, 31

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Lethrinus microdon Valenciennes in C. & V., 1830 *Hist.nat.poiss.*, 6: 295 (Bourou).

Synonyms: *Lethrinus elongatus* Valenciennes, 1830; *Lethrinus acutus* Klunzinger, 1884.

FAO Names: En - Smalltooth emperor.

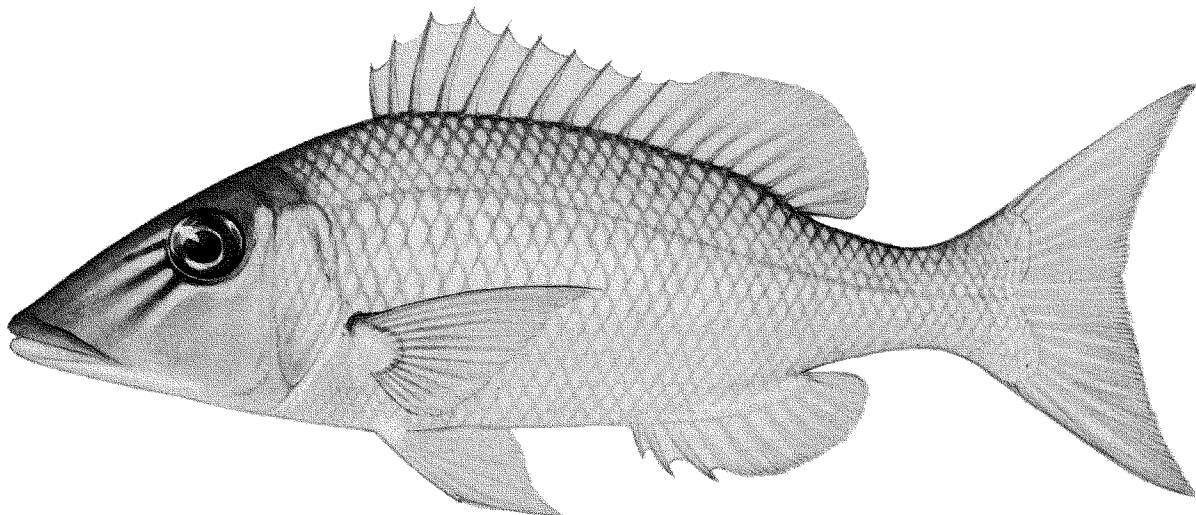


Fig. 129

Diagnostic Features: Body relatively elongate, its depth 2.9 to 3.4 times in standard length. Head length 1.1 to 1.2 times in body depth, 2.6 to 3.0 times in standard length, dorsal profile near eye nearly straight; snout moderately long, its length about 1.8 to 2.2 times in head length, measured without the lip the snout is 0.7 to 0.8 times in cheek height, its dorsal profile slightly concave, snout angle relative to upper jaw between 47 and 57 degrees; interorbital space convex to flat; posterior nostril an oblong longitudinal opening, closer to orbit than to anterior nostril; eye situated close to or removed from the dorsal profile, its length 4.0 to 6.2 times in head length; cheek not high, its length 2.7 to 3.4 times in head length; lateral teeth in jaws conical; outer surface of maxilla smooth. Dorsal fin with 10 spines and 9 soft rays, the third or fourth dorsal spine the longest, its length 2.4 to 3.0 times in body depth; anal fin with 3 spines and 8 soft rays, the first soft ray usually the longest, its length almost equal to or shorter than the length of the base of the soft-rayed portion of the anal fin and 0.6 to 0.7 times in the length of the entire anal fin base; pectoral rays 13; pelvic fin membranes between the rays closest to the body with or without dense melanophores. Lateral-line scales 47 or 48; cheek without scales; 4 ½ scale rows between lateral line and base of middle dorsal fin spines; 16 or 17 scale rows in transverse series between origin of anal fin and lateral line; usually 15 rows in lower series of scales around caudal peduncle; 9 to 11 (rarely fewer) scales in supratemporal patch; inner surface of pectoral fin densely covered with scales; posterior angle of operculum fully scaled. **Colour:** body bluish grey or brown often with scattered irregular dark blotches on sides; sometimes three dark streaks radiating forward from eye; fins pale or orangish.

Geographical Distribution: Wide-spread in the Indo-West Pacific, including the Red Sea, Arabian (Persian) Gulf, East Africa to Sri Lanka, to the Ryukyu Islands and Papua New Guinea (Fig. 130).

Habitat and Biology: Inhabits sandy areas near coral reefs to depths of around 80 m. Swims in small schools, sometimes together with *Lethrinus olivaceus*. Feeds primarily on fish, crustaceans, cephalopods and polychaetes during both night and day. Spawning in Belau occurs throughout most of the year, during the first five days of the lunar month, near the edge of reefs.

Estimates of asymptotic length (L_{∞}), coefficient of growth (K) and rate of natural mortality (M) have been made for the population in the waters around Djibouti: L_{∞} = 82 cm total length, K = 0.213, and M = 0.4.

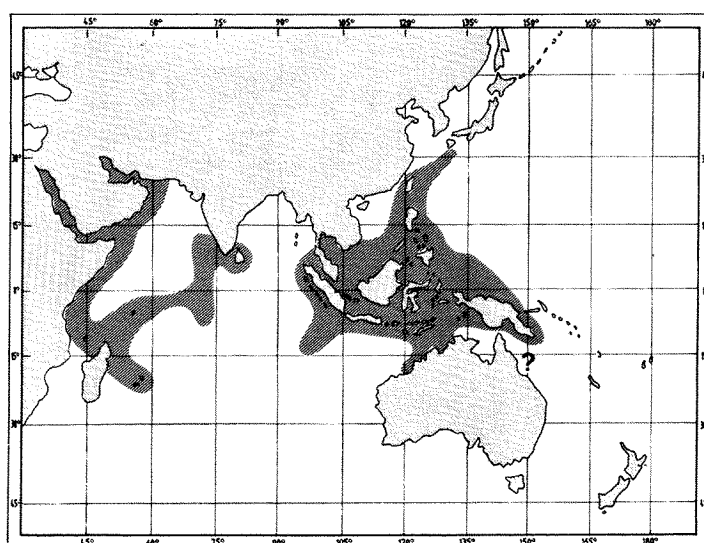


Fig. 130

Size: Maximum size to around 70 cm, commonly 30 to 50 cm total length.

Interest to Fisheries: Caught mostly with handlines, traps, gill nets and trawls. An excellent food fish. Marketed mostly fresh.

Local Names: BELAU: Mechur; JAPAN: Oo-fuefuki; KENYA: Nyavi, Nyamvi; MAURITIUS: Capitaine gueule longue; SAUDI ARABIA: Shoor, Sheiry; SEYCHELLES: Gueule longue; TANZANIA: Changu n'domo, Changu myamvi, Roba.

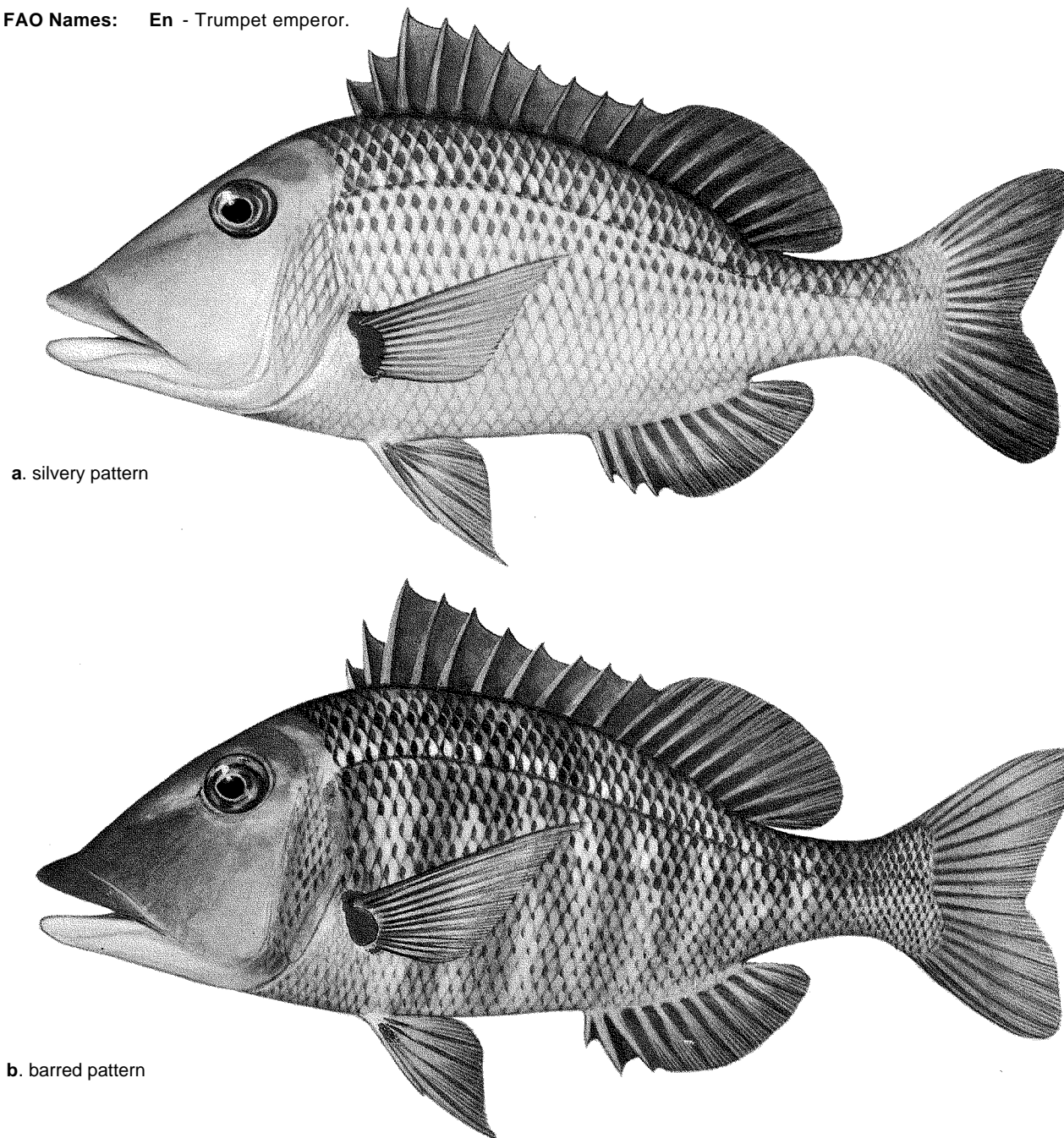
Literature: Gloerfelt-Tarp & Kailola (1984); Masuda *et al.* (1984); Randall (1983, as *Lethrinus elongatus*); Shen (1984).

Remarks: The synonyms for this species are often confused with what is recognized here as *L. olivaceus*. The cause of this confusion is the misconception that the number of scales above the lateral line to the base of the middle dorsal spines is variable in *L. olivaceus*. I find that this character is very consistent but that snout length varies allometrically; there is considerable overlap in the ratio of length of snout from anterior nostril measured without the lip, to cheek length, between species of *L. microdon* and *L. olivaceus*, depending on the overall size of the specimen examined. Another character which I have found useful (but not 100% reliable) in confirming the identity of this species is the number of scales in the supratemporal patch. There are usually 9 to 11 of these in *L. microdon* and 7 or 8 in *L. olivaceus* (Table 8).

Lethrinus elongatus is the same species as *L. microdon* and would seem to have page priority over *L. microdon*. As first revisors however we choose the name *L. microdon* to take precedence, since it has been used more often in the literature (Randall and Wheeler have a paper currently in press that follows this same precedence).

***Lethrinus miniatus* (Schneider, 1801)**

Fig. 131, Plate VI, 32-34

LETH Leth 26***Sparus miniatus*** Schneider in Bloch & Schneider, 1801, *Syst. Ichthy.*, : 281 (New Caledonia).**Synonyms:** *Lethrinus chrysostomus* Richardson (1848); *Lethrinus imperialis* DeVis (1884a); *Lethrinus amamianus* Akazaki (1962).**FAO Names:** En - Trumpet emperor.**Fig. 131**

Diagnostic Features: Body fairly deep, its depth 2.4 to 2.8 times in standard length. Head length 0.9 to 1.0 times in body depth, 2.6 to 2.9 times in standard length, dorsal profile near eye slightly convex; snout moderately long, its length about 1.8 to 2.2 times in head length, measured without the lip the snout is 0.9 to 1.0 times in cheek height, its dorsal profile slightly concave, snout angle relative to upper jaw between 50 and 65 degrees; interorbital space convex to flat; posterior nostril an oblong longitudinal opening, closer to orbit than to anterior nostril; eye situated close to dorsal profile, its length 4.0 to 5.4 times in head length; cheek moderately high, its length 2.1 to 2.9 times in

head length; lateral teeth in jaws conical; outer surface of maxilla smooth or with a longitudinal ridge. Dorsal fin with 10 spines and 9 soft rays, the third dorsal spine usually the longest, its length 2.3 to 2.9 times in body depth; anal fin with 3 spines and 8 soft rays, the first or second soft ray usually the longest, its length almost equal to or slightly longer than the length of the base of the soft-rayed portion of the anal fin and 0.7 to 0.8 times in the length of the entire anal fin base; pectoral rays 13; pelvic fin membranes between the rays closest to the body usually with dense melanophores. Lateral-line scales 47 or 48; cheek without scales; 4 ½ scale rows between lateral line and base of middle dorsal fin spines; 15 to 17 scale rows in transverse series between origin of anal fin and lateral line; usually 15 rows in lower series of scales around caudal peduncle; 4 to 6 scales in supratemporal patch; inner surface of pectoral fin without scales, partially covered with scales or, densely covered with scales; posterior angle of operculum fully scaled. **Colour:** body silvery, tan or yellowish, the base of scales often black, often a series of eight or nine dark bars; base of pectoral fin red; sometimes a red streak originating on upper operculum, passing beneath eye and on to snout; two red spots often on upper rim of eye; lips reddish; fins pale or reddish, sometimes brilliant red on membranes near base of pelvic fin, and between spinous rays of dorsal and anal fin.

Geographical Distribution : Northern Australia, Coral Sea and New Caledonia, and the Ryukyu Islands (Fig. 132).

Habitat and Biology: Inhabits coral reefs during the daytime where it feeds occasionally in sand and rubble areas between coral heads. At night-time they move out over the sandy sea floor surrounding the reef and forage actively. Found at depths between 5 and 30 m, usually in small schools. The major food items are crustaceans, echinoderms, molluscs and fish, with crabs and sea urchins predominating. This species spawns annually between July and August in Australia. Mean maximum egg diameters are recorded as 0.91 mm in the breeding season. A predominance of females and average smaller size of females than males have been observed in the Australian population. Sexual maturity is reached between the ages of two and three years.

Observations of maximum age (t_{max}), and estimates of asymptotic length ($L_{infinity}$), coefficient of growth (K), and rate of natural mortality (M) have been made for two populations. In Australia (Grant Barrier Reef) they are: $L_{infinity}$ = 58.5 cm standard length, K = 0.17. In New Caledonia they are: t_{max} = 22 years for males and 14 years for females, $L_{infinity}$ = 48.9 cm standard length for males and 45.7 cm standard length for females, K = 0.26 for males and 0.27 for females, and M = 0.60 for males and 0.63 for females. The weight-length relationship was determined as $W(g) = 0.1003 * L^{2.8125}$ (L = standard length in cm) for males and $W(g) = 0.2020 * L^{3.0904}$ (L = standard length in cm) for females in the Grant Barrier Reef population.

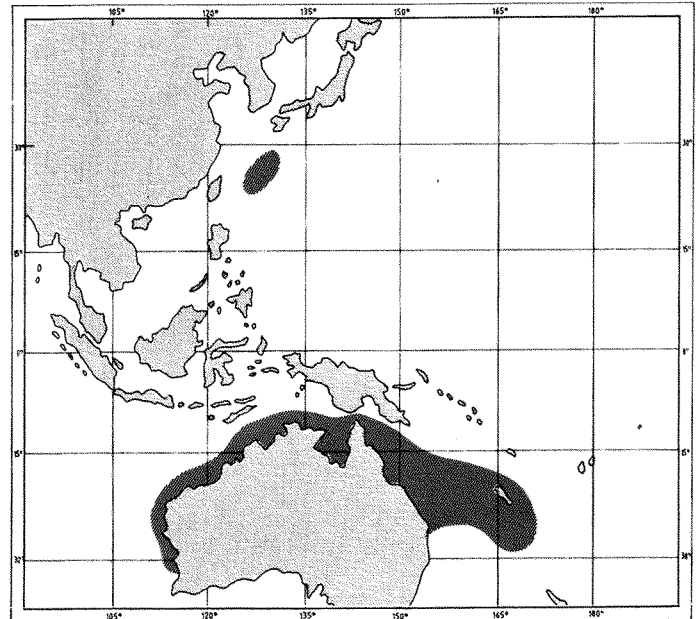


Fig. 132

Size: Maximum size reported to around 90 cm total length and about 9 kg.

Interest to Fisheries: Caught primarily by handlines or droplines. One of the favourite food and sport fishes around the Grant Barrier Reef. *Lethrinus miniatus* has contributed around 4% to the total commercial catch of New Caledonia although it is occasionally implicated in case of fish poisoning (ciguatera). Around some of the islands of New Caledonia this species is regularly discarded because of the high frequency of toxic specimens. The dropline fishery at Norfolk Island is dominated by this species.

Local Names: AUSTRALIA: Red-throated emperor, Sweetlip, Lipper, Tricky snapper; NEW CALEDONIA: Gueule rouge; NORFOLK ISLAND: Sweetlip emperor, Trumpeter.

Literature: Listed as *L. chrysostomus* Allen & Steene (1987); Burgess & Axelrod (1976); Coleman (1981); Grant (1982); Sainsbury *et al.* (1985).

Remarks: The name most frequently applied to this species has been *L. chrysostomus* and the name *L. miniatus* has most often been used for what is recognized here as *L. olivaceus*. Randall & Wheeler (in press) examined the iconotype of *L. miniatus* and found the colour pattern incontrovertibly recognizable as the species previously recognized as *L. chrysostomus*.