

Macrourus Bloch, 1786**MACROUR** Macr

Genus with Reference : *Macrourus* Bloch, 1786, *Naturgeschichte der ausländischen Fische*, Pt. II :150, pl. 177 (type species *Coryphaena rupestris* Fabricius, 1780 [non *Coryphaenoides rupestris* Gunnerus, 1765], by monotypy).

Diagnostic Features : Head large, broad, its depth 4.2 to 4.8 times in total length; snout rounded to bluntly pointed, with a stout modified spinous scale at tip; a strong, suborbital ridge that extends posteriorly onto preopercle, ending in a sharp point; orbit diameter about 1/3 of head length; mouth subterminal, jaws extend beyond vertical through midorbit; outer gill rakers on first arch absent; branchiostegal rays 6. Teeth small, in moderate to broad bands in premaxilla, none much enlarged, the bands tapering posteriorly and ending well short of rictus; mandibular band about 3 or 4 teeth wide at symphysis, narrowing to 1 row posteriorly and extending to about end of rictus. A serrated spinous dorsal fin ray; pelvic fin rays usually 8 or 9. Anus at anal fin, no light organ; swimbladder shallowly bilobed anteriorly, with 4 retia mirabilia. Body scales with an enlarged median row of spinules flanked by parallel rows of much smaller spinules.

Habitat, Distribution and Biology : A small, benthopelagic group of four upper- to middle-slope species confined to cold temperate and polar waters of the North and South Atlantic and in the Southern Ocean. Depth range from about 200 m to more than 3 000 m. Temperature preferences usually about 1 to 4 °C, although the Antarctic roughhead, *M. whitsoni*, has been captured at temperatures slightly below 0 °C.

Size : Maximum size for all species probably near to, or exceeding 100 cm total length

Interest to Fisheries : Important food fishes in the North Atlantic and off the Patagonian coast of Argentina. Apparently, the North Atlantic stocks of the roughhead grenadier are harvested primarily by vessels of the Soviet Union, German Democratic Republic, and Poland. With the reduced availability of the more desirable roundnose grenadier (*Coryphaenoides rupestris*), the roughhead grenadier has been increasingly targeted. No catch statistics were available to the author.

Although little information was available to the author on the South Atlantic *Macrourus* fishery, it is known that Argentina is currently importing the granadero into the United States. Because of the apparent mixing of stocks of *Macrourus holotrachys* and *M. carinatus* on the Patagonian slope, and the difficulty of distinguishing the two, it is possible that both species are being harvested under the name granadero.

As with other grenadiers, most *Macrourus* are marketed as fillets or gutted and scaled, with head, tail, and fins removed. Because of the large head, the recovery rate for fillets is less than 20%. The flesh of *Macrourus* is excellent: white, firm, and with a mild or little flavour.

Literature : Bigelow & Schroeder (1953); Makushok (1972); Marshall (1973); Trunov & Konstantinov (1986).

Remarks : The taxonomic status of the southern hemisphere species has been confused because of the difficulty of differentiating the three species, and the paucity of comparative material. After a detailed study of 47 specimens from the Antarctic, South Georgia, the Falklands/Malvinas, and Argentine Patagonia, Makushok (1972) found no specific differences between *Macrourus whitsoni*, *M. carinatus*, and *M. holotrachys*, but he refrained from synonymizing the three because he had not examined the types. Marshall (1973), in his key to the species, recognized *M. whitsoni*, *M. berglax*, and *M. holotrachys*, sinking *M. carinatus* into the synonymy of *M. holotrachys*. Iwamoto & Geistdoerfer (1985) included *M. carinatus* and *M. whitsoni* in *M. holotrachys*. Iwamoto (1986) later suggested that *M. whitsoni* "...may be another synonym."

Trunov & Konstantinov (1986) examined 119 specimens collected by Soviet vessels in 1975 at 7 stations on the Atlantic Patagonian slope and clearly demonstrated the presence of two species there: *M. holotrachys* (of which they had 71 specimens from 7 localities) and *M. carinatus* (48 specimens from 2 localities). The 2 stations at which the species were collected together were in depths of 300-330 and 650 m. The characters they used to distinguish the two species show some variation and overlap, but are effective when used in combination. The absence, or virtual absence, of squamation on the underside of the head is probably the most effective means of separating specimens of *M. holotrachys* from specimens of *M. carinatus* and *M. whitsoni*, but problems arise when scales get sloughed off (which happens frequently in trawled specimens). Although the authors did not treat *M. whitsoni*, that species is readily distinguished from the other two by its smaller, more delicate scales, its generally deeper habitat, and its distribution, which is generally confined to inside the Antarctic Convergence.

During the present author's visit to the Zoological Institute in Leningrad in 1988, Dr. Trunov generously provided useful information on differences between the three species. The key given below is adapted from one provided by Dr. Trunov, who will use it in a forthcoming publication treating the genus on a broader scale. His original key has

been altered here by placing *M. berglax* in the first couplet, because the few specimens of that species the present author has examined, showed a virtual absence of scales on the underside of head. That character and others used must, however, be more carefully checked with adequate specimen series.

Key to Species (Adapted from key provided by I.A. Trunov, July 1988):

1a. Underside of head without scales, or if present, only 1 to 3 above corner of mouth (Figs 529, 530 a)

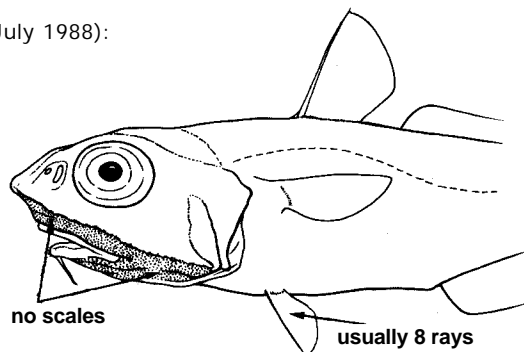
2a. Pelvic fin rays usually 8; pyloric caeca about 20 *M. berglax*
(North Atlantic)
(Fig. 529)

2b. Pelvic fin rays usually 9; pyloric caeca 8 to 16 *M. holotrachys*
(South Atlantic (Argentina))
(Fig. 531)

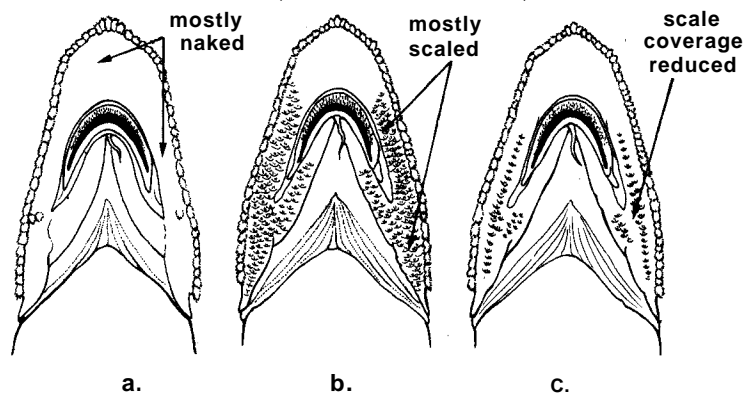
1b. Scales usually present between suborbital ridge and jaws, and on underside of lower jaw (scales sometimes small and thin, and scarcely visible without magnification) (Figs 530b, c)

3a. Scales in oblique rows between anal fin origin and lateral line more than 27; interorbital space 1.1 to 1.6 times (1.7 to 1.9 in small specimens) into orbit; length of 1st gill slit usually 1.4 to 1.5 times length of last slit *M. whitsoni*
(Southern Ocean)
(Fig. 532)

3b. Scales in oblique rows between anal fin origin and lateral line fewer than 27; interorbital space 1.5 to 2.3 times into orbit; 1st gill slit about equal to or slightly longer than last slit..... *M. carinatus*
(South Atlantic)
(Fig. 533)

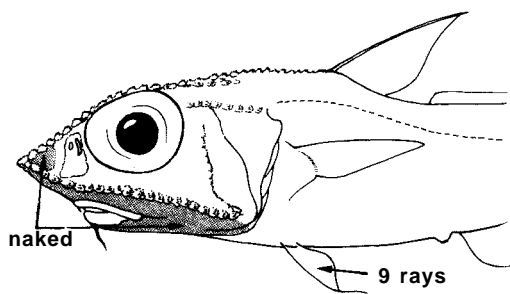


M. berglax
(after Goode & Bean, 1896) **Fig. 529**

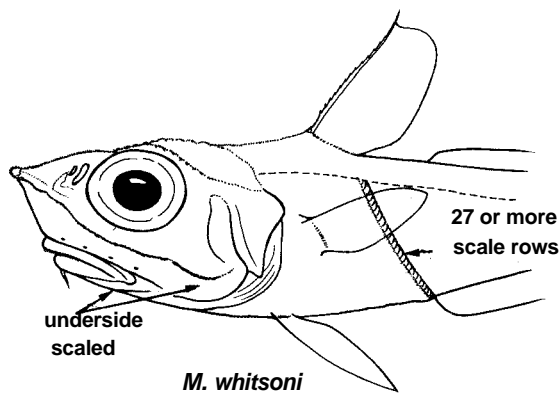


M. holotrachys *M. carinatus* **Fig. 530**

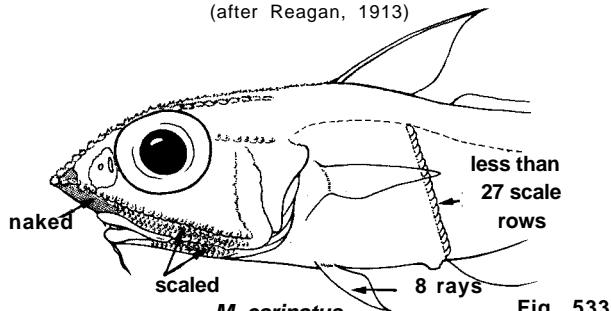
underside of head
(after Trunov & Konstantinov, 1986)



M. holotrachys **Fig. 531**
(after Trunov & Konstantinov, 1986)



M. whitsoni
(after Reagan, 1913)



M. carinatus **Fig. 533**
(after Trunov & Konstantinov, 1986)

List of Species of *Macrourus*

- Macrourus berglax* Lacepède, 1810
- Macrourus carinatus* (Günther, 1878)
- Macrourus holotrachys* Günther, 1878
- Macrourus whitsoni* (Regan, 1913)

Macrourus berglax Lacepède, 1810

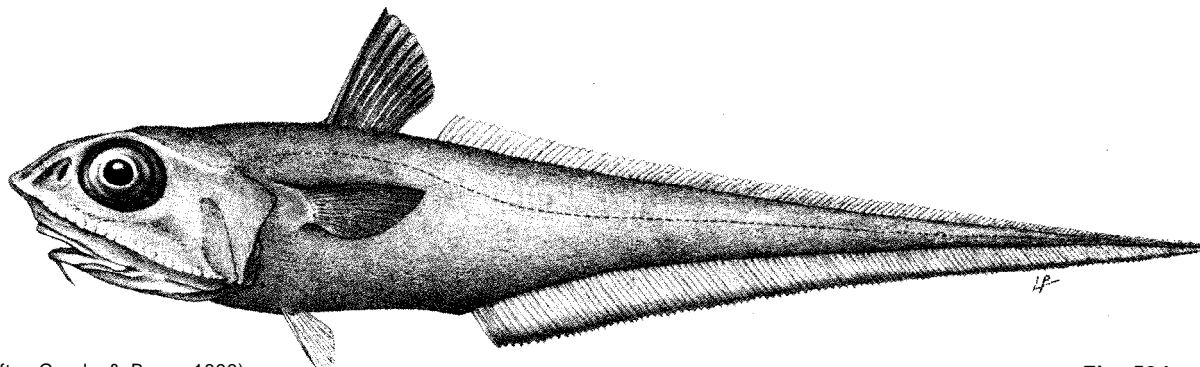
Fig. 534

MACROUR Macr 1

Scientific Name with Reference : *Macrourus berglax* Lacepède, 1810, *Histoire Naturelle de Poissons*, Paris, 3: 170, pl. 10 (fig. 1).

Synonyms : *Coryphaena rupestris* [non Gunnerus, 1765] -- Fabricius, 1780; *Macrourus rupestris* [non Gunnerus, 1765] -- Bloch, 1786; *Macrurus fabricii* Sundevall, 1842; *Macrurus holotrachys* [non Gunther, 1887] -- Collett, 1896; *Macrourus berglax* -- Goode & Bean, 1896; *Coryphaenoides (Macrourus) berglax* -- Collett, 1905.

FAO Names : En - Onion-eye grenadier.



(after Goode & Bean, 1896)

Fig. 534

Diagnostic Features : Body depth about 60 to 80% of head length; snout rather strongly pointed, preoral length 24 to 29% of head length; underside of head almost or entirely naked; mouth small, notably inferior, upper jaw 27 to 31% of head length; opercular region short, distance from orbit to angle of preopercle 32 to 35% of head length; outer gill slit 10 to 12% of head length, about equal to barbel length (which is 11 to 14%); gill rakers on first arch and inner series of second arch 8 to 10 total. First dorsal fin with 9 or 10 segmented rays, its height 48 to 56% of head length; second dorsal fin beginning well forward of origin of anal fin; pectoral fin rays 115 to 118, length of fin about 45 to 50% of head length; pelvic fins with 8 rays (rarely 7 or 9), the outermost ray 34 to 40% of head length. Pyloric caeca about 19 or 20. Scale rows below second dorsal fin origin 5.5 to 6.5. **Colour**: overall grey, darker ventrally on trunk; anal fin dark edged, first dorsal and pectoral fins dusky.

Geographical Distribution : Temperate to arctic waters of the North Atlantic, from Norfolk Canyon (about 37° N off Virginia, USA) and Georges Bank north to Labrador, Davis Strait, eastern and western Greenland, Iceland, and from the Irish Atlantic slope north to the Faeroe Islands, Norwegian coast, to Spitzbergen, and into the Barents Sea north to 82°N (Fig. 535).

Habitat and Biology : Benthopelagic in about 100 to 1 000 m depth (greatest concentrations in about 300 to 500 m). Temperature preferences appear to range from about 1° to 4° C, although bottom temperatures below 0° C have been recorded at capture depths. Amphipods predominate in the diet, although polychaetes and various natant crustaceans are also important. Bivalves, isopods, echinoderms (notably ophiuroids), and ctenophores are important at times. Age determination studies have shown a life span of at least 25 years. Spawning probably takes place between late winter and early summer, and may vary with regions. Some evidence suggests a prolonged reproductive period. Yanulov (1962) counted 25 000 eggs in a female 70.5 cm long. Females mature at 42 cm, males at 53.7cm. The largest catches have been made off the Lofoten Islands, up to 1 440 kg/h of trawling, at 700 to 800 m depth.

Size : To more than 100 cm total length.

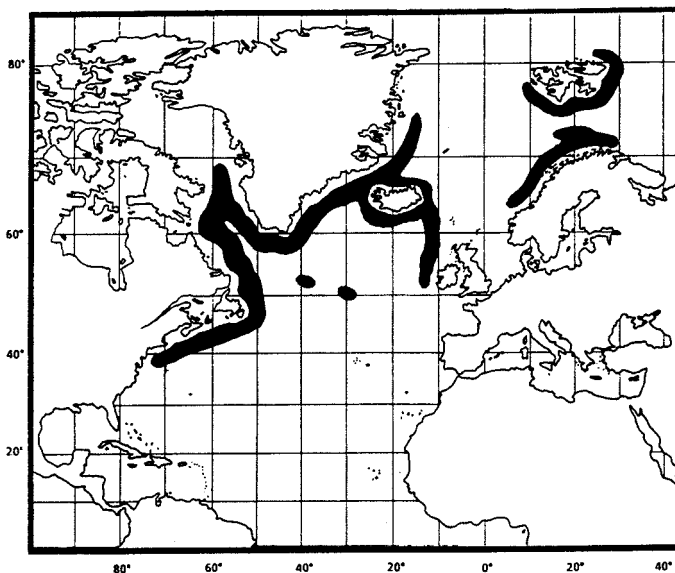


Fig. 535

Local Names : CANADA: Onion eye, Roughhead grenadier; FRANCE: Grenadier berglax; GERMANY: Rauhköpfiger Grenadier-fisch; USA: Onion eye, Roughhead grenadier

Interest to Fisheries : One of two grenadiers actively targeted by fishermen in the North Atlantic. Catch statistics for the species are not separated from that of the roundnose (or rock) grenadier, *Coryphaenoides rupestris*. Landings of grenadiers in the North Atlantic have shown a steady decline since the high in 1972 of more than 83 000 metric tons (to 3 587 metric tons in 1983). It is not known whether the decline is attributable to reduced stocks of the roundnose grenadier or to reductions in both species.

Literature : Parr (1946); Marshall (1973); Geistdoerfer (1979); Gordon (1979); Sahrhage (1986).

Macrourus carinatus (Günther, 1878)

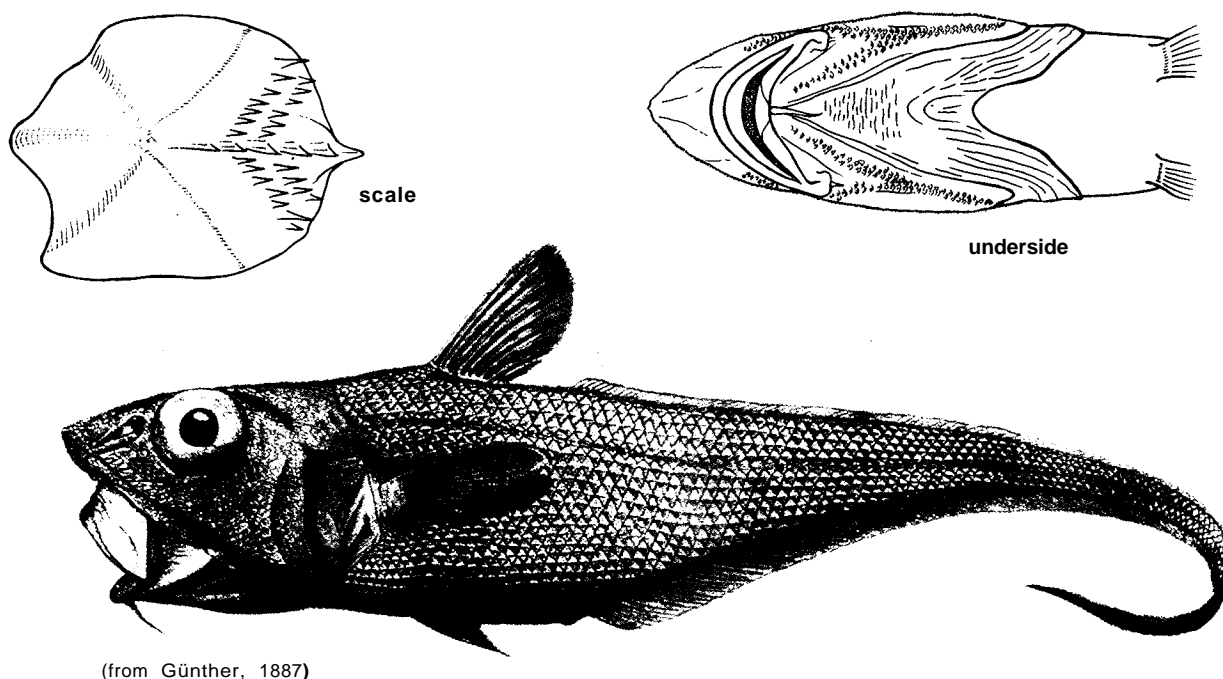
Fig. 536

MACROUR Macr 2

Scientific Name with Reference : *Coryphaenoides carinatus* Günther, 1878: 28, (near Prince Edward Island, 310 fm Holotype: BMNH 1887.12.7.89).

Synonyms : *Macrurus carinatus*: Günther, 1887; *Macrourus holotrachys* (nec Günther, 1878): Golovan and Pakhorukov, 1983; Trunov, 1982; Iwamoto and Geistdoerfer, 1985 (partim); Iwamoto 1986 (partim); *Coryphaenoides holotrachys*: Norman, 1937 (non Günther, 1878).

FAO Names : En -



(from Günther, 1887)

Fig. 536

Diagnostic Features : Head 4.4 to 4.8 times in total length; snout 29 to 40% of head length; naked patches on dorsal surface of snout behind leading edges small; underside of head posterior to snout moderately to extensively scaled, but sometimes only a file or narrow band of small scales below suborbital and preopercular ridges, and posteriorly on lower jaw; orbit 31 to 46%. interorbital space 14 to 24%. and upper jaw 27 to 39% of head length; barbel 2.2 to 3.9, suborbital space 2.0 to 3.1 times in orbit; outer gill slit 9 to 14% of head length; inner gill rakers 8 to 11 total. First dorsal fin with 2 spines and 9 to 11 rays; pectoral fin rays i17 to i20; pelvic rays 8 (rarely 9); dorsal interspace 4.5 to 7.2 in head length; origins of anal and second dorsal fin about on same vertical. Pyloric caeca 13 to 21. Scales below midbase of first dorsal fin usually 4.5 to 6.5; scale rows from lateral line to anal fin origin less than 27. **Colour**: medium brown to somewhat straw coloured; fins darker, blackish in some; dorsal and pelvic fins darker distally; mouth lining dark grey or brown.

Geographical Distribution : Subantarctic to temperate waters on both sides of South America, Falkland/Malvinas Islands, Discovery Tablemount and Meteor Seamount, South Africa, off Crozet and Prince Edward Island, and off New Zealand and Macquarie island (Fig. 537).

Habitat and Biology : Apparently benthopelagic in about 300 to 1 100 m depth, although it is most often taken between 500 and 800 m.

Size : To at least 87 cm, and probably more than 100 cm total length.

Interest to Fisheries : Abundant off the Patagonian coast, and perhaps elsewhere. Catches of the two Patagonian species of *Macrourus* are probably mixed; some are known to be exported to the United States.

Literature : Günther (1878, 1887); Makushok (1967); Barnard (1925); Trunov & Konstantinov (1986).

Remarks : According to Trunov & Konstantinov (1986) *M. carinatus* and *M. holotrachys* differ in: squamation on the underside of the head (more extensive in *M. carinatus*); lunate areas behind the leading edges of the snout (broader, more naked in *M. holotrachys*); pelvic fin rays (fewer in *M. carinatus*, usually 8 compared with 9); pyloric caeca (more in *M. carinatus* 13 to 21 vs. 8 to 16); and relative positions of the origins of the second dorsal and anal fins (second dorsal in advance of anal in *M. holotrachys*, above anal origin in *M. carinatus*). The first character should be evaluated carefully in attempting to identify specimens, as considerable variation can be found. In some specimens of *M. carinatus*, scales densely cover most of the underside, whereas in others, only a file or narrow patch of small thin scales can be found above the jaws.

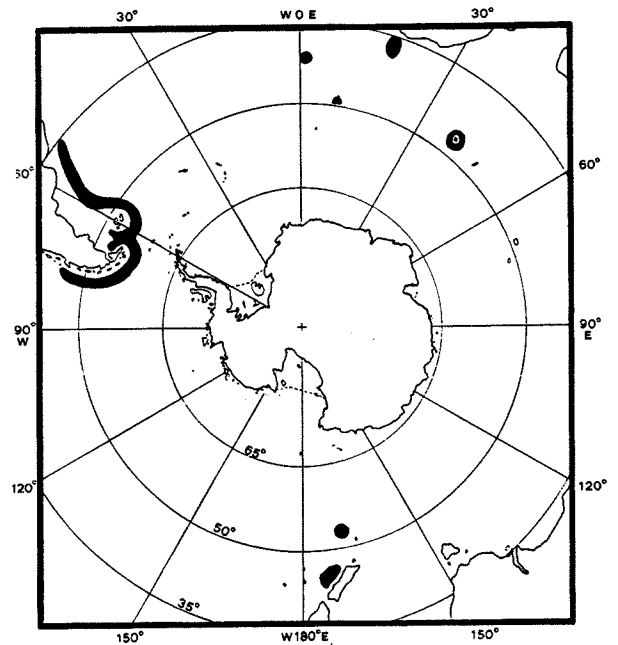


Fig. 537

Macrourus holotrachys Günther, 1878

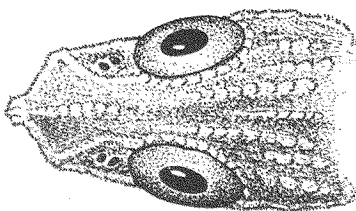
Fig. 538

MACROUR Macr 3

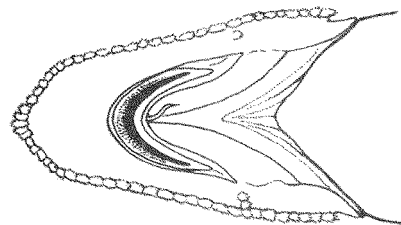
Scientific Name with Reference : *Macrurus holotrachys* Günther, 1878: 24 (east of mouth of Rio de la Plata, CHALLENGER sta. 320,600 fm).

Synonyms : None

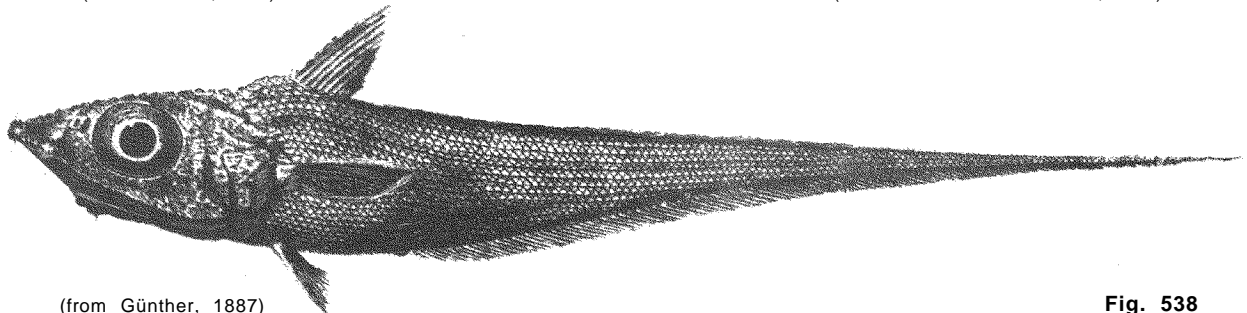
FAO Names : En - Bigeye grenadier



top of head
(after Günther, 1887)



underside
(after Trunov & Konstantinov, 1986)



(from Günther, 1887)

Fig. 538

Diagnostic Features : Head 4.4 to 4.6 times in total length; snout 29 to 37% of head length; upper side of snout with a broad naked patch on either side behind anterolateral margins; underside of head entirely naked, or at most, only 1 to 3 small scales just above corner of mouth; orbit 33 to 41%, interorbital width 16 to 21%, upper jaw 24 to 42% of head length; barbel 3.3 to 4.5, suborbital 2.4 to 2.5 times in orbit; outer gill slit 8 to 12% of head length; total inner gill rakers 8 to 11. First dorsal fin with 2 spines and 9 to 11 rays; pectoral fin rays 17 to 19; pelvic rays 9 (rarely 8); interspace between dorsal fins 4.1 to 8.1 times in head length; origin of anal fin behind that of second dorsal, usually on a vertical below 2nd to 4th ray of second dorsal. Pyloric caeca 8 to 16. Scales below midbase of first dorsal fin usually 4.5 to 6.5; diagonal scale rows from anal fin origin to lateral line fewer than 27. **Colour**: light to medium brown or greyish brown; fins darker, especially distally; mouth and gill cavities dark.

Geographical Distribution : So far positively known only from the Patagonian slope from east of the Rio de la Plata to north of the Falkland/Malvinas Islands, and off Shag Rock west of South Georgia. It can be expected also on the west coast of Chile, but its presence there, as well as in other regions where it has been reported, must be confirmed (Fig. 539).

Habitat and Biology : Benthopelagic from about 300 to more than 1 200 m depth.

Size : To more than 80 cm total length.

Interest to Fisheries : Of a large size and undoubtedly taken as part of the granadero catch off Argentina.

Local Names : ARGENTINA: Granadero; JAPAN: Patagonia-sokodara

Literature : Günther (1878, 1887); Trunov & Konstantinov (1986).

Remarks : See also Remarks section under *M. carinatus*. *Macrourus holotrachys* has been reported numerous times from different localities, but the previous confusion with its close relative, *M. carinatus*, leaves doubtful most of these identifications. These records should be rechecked to firmly establish the limits of its distribution.

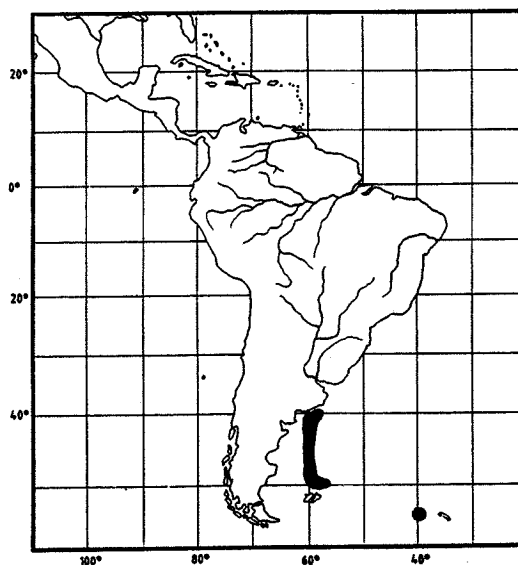


Fig. 539

Macrourus whitsoni (Regan, 1913)

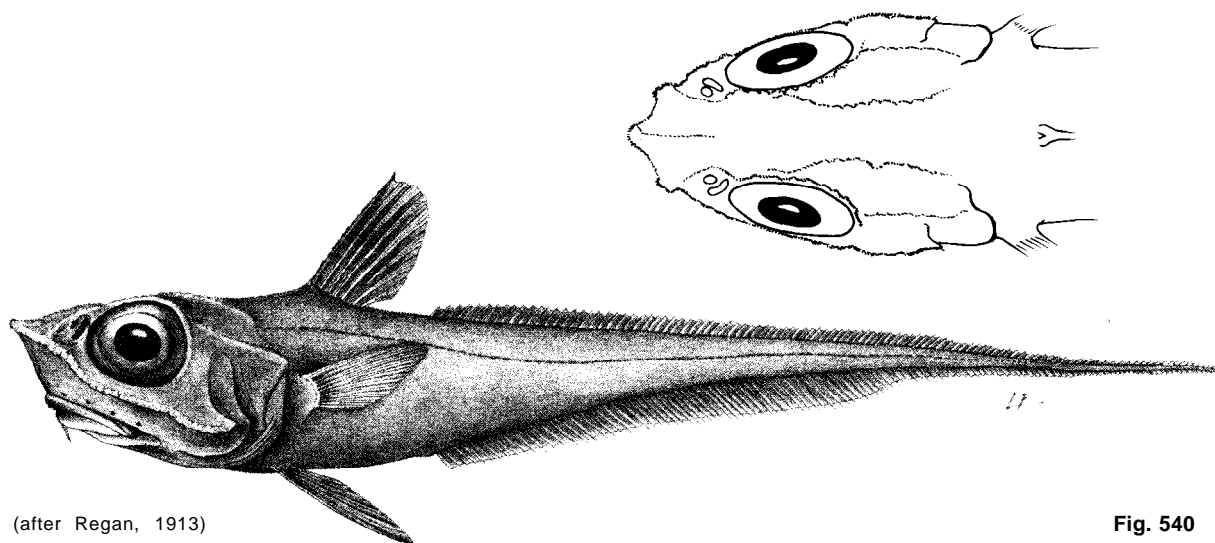
Fig. 540

MACROUR Macr 4

Scientific Name with Reference : *Chalinura whitsoni* Regan, 1913, *Trans. Roy. Soc. Edinburgh* 49 (pt. 2): 236, pl. 2, fig. 2 (off Coats Land, Antarctica; 71°22'S, 16°W; 2579 m).

Synonyms : *Coryphaenoides whitsoni* - Gilbert & Hubbs, 1916; *Macrourus whitsoni* - Makushok, 1967; *Macrourus holotrachys* (non Günther, 1878) - Iwamoto and Geistdoerfer, 1985 (partim).

FAO Names : En - Whitson's grenadier.



(after Regan, 1913)

Fig. 540

Diagnostic Features : Body depth about 65 to 90% of head length; snout usually somewhat rounded with a high dorsal profile in adults, but often with prominent tubercles at tip and lateral angles; preoral length 19 to 27% of head length; mouth rather large, lips thin, upper jaw 32 to 44% of head length; distance from orbit to angle of preopercle 34 to 44% of head length; underside of head generally covered with small scales below suborbital, preopercle, and posteriorly on mandible (but scales sparse on some individuals); outer gill slit 14 to 22% of head length, longer than barbel length (which is 7 to 15%); inner gill rakers on first and second arches 10 to 12 total (rarely 13). First dorsal fin with 8 to 11 (usually 9 or 10) segmented rays, its height about 55 to 65% of head length; second dorsal fin begins about over or slightly ahead of origin of anal fin; pectoral fin with a splintlike uppermost ray and 17 to 20 lower rays, its length about 50 to 60% of head length; outermost ray of pelvic fins usually about 45 to 60% of head length. Pyloric caeca 18 to 28 (in 11 specimens). Scale rows below second dorsal origin usually 6.5 to 7.5 (rarely 5.5). **Colour**: overall dark brown to swarthy in most individuals, but some are much paler; fins and lips blackish.

Geographical Distribution : Circumpolar in Antarctic waters; generally confined inside the Convergence except in the Falkland/Malvinas Islands area (Fig. 541).

Habitat and Biology : Benthopelagic from about 400 to 3 185 m depth (greatest concentrations in about 600 to 1 500 m). Remains of natant crustaceans (especially euphausiids), polychaetes, and fish (gonostomatids) have been found in the stomachs of three specimens examined.

Size : To more than 75 cm total length.

Interest to Fisheries : One of three *Macrourus* species in the southern hemisphere, all of which attain a large size and are taken, sometimes in large quantities, by commercial and research trawlers, especially in the Patagonian region of the South Atlantic. No catch statistics for any of the species were available to the present author, and it is not known if *M. whitsoni* is currently being exploited. Nakamura (1986) estimated the standing stock of *M. whitsoni* off the Patagonian shelf of Argentina at 624 000 metric tons, but it is probable that that figure applies to the two more-northern species, as the present author's specimen data suggest that *M. whitsoni* does not occur very far north of the Antarctic Convergence.

Local Names : JAPAN: Yoroi-sokodara.

Literature : Regan (1913); Wai (1916); Norman (1937a, 1937b); Makushok (1967, 1972); Marshall (1973); Nakamura (1986).

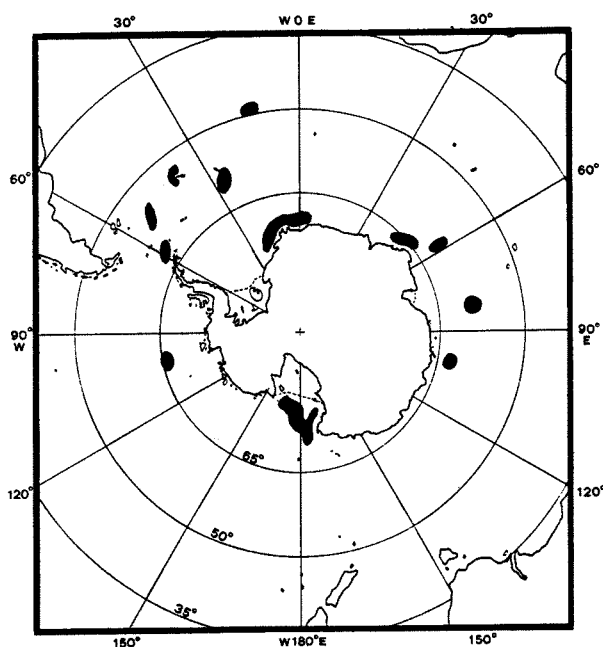


Fig. 541

Remarks : *Macrourus whitsoni* appears to be geographically and bathymetrically separated from its two northern congeners, *M. carinatus* and *M. holotrachys*. *M. whitsoni* is generally confined to depths greater than about 500 m (usually between 600 and 1 500 m) within the Antarctic Convergence, whereas the other two species are most commonly captured around 300 to 800 m outside the Convergence. The species appear to overlap in their distributions, however, in the Falkland/Malvinas Islands, Burdwood Bank, and South Georgia. Feeds on pelagic crustaceans (especially euphausiids), small fish, and polychaetes.

***Malacocephalus* Günther, 1862**

MACROUR Mal

Genus with Reference : *Malacocephalus* Günther, 1862, Cat. Fish. Brit. Mus., 4: 396 (as subgenus of *Macrurus*) (type species *Macrurus laevis* Lowe, 1843, by monotypy).

Synonyms : None

Diagnostic Features : Macrourines with 7 branchiostegal rays. Snout rounded, head laterally compressed, completely and uniformly covered with scales (except on lips, eyes around nostrils, and parts of gill and gular membranes); scale patches on branchiostegals; no coarsely modified tubercular or scutelike scales; suborbital region flat, lacking a raised longitudinal ridge; mouth large, upper jaw usually more than 45% of head length; gill rakers fewer than 16 on inner series of outer arch. Premaxillary teeth in 2 rows to a band, outer row notably enlarged and widely spaced; lower jaw teeth relatively few, widely spaced canines in 1 row. Second spinous ray of first dorsal fin smooth or serrated. Anus removed from anal fin origin, closer to pelvic fin insertion, situated at posterior end of an elongated oval to dumbbell-shaped area of naked black skin (periproct); a small round dermal window of light organ at anterior end of periproct, a second, larger bean-shaped window in a fossa between pelvic fin bases, separated from periproct by a shallow ridge of small scales. Retia mirabilia and gas glands 2; retia short, broad. Pyloric caeca numerous, multiply branching, 50 to 100 or more in distal count. Scales of body densely covered with small, fine, needle-like spinules giving a characteristic velvety texture to the surface.

Habitat, Distribution and Biology : Worldwide in tropical to warm-temperate seas. Benthopelagic in about 200 to 1 000 m depth, but most common in 300 to 700 m.

Size : To about 60 cm total length.

Interest to Fisheries : Often occurs in moderate to large quantities and forms part of the bycatch of trawlers fishing in upper continental-slope waters.

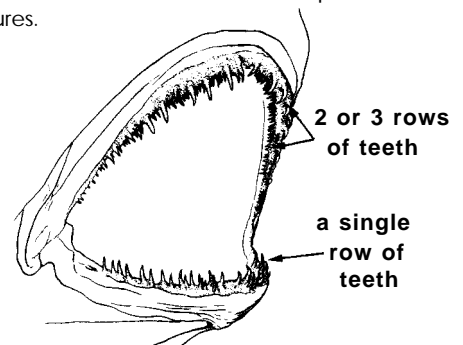
Literature : Parr (1946); Iwamoto (1970, 1979); Okamura (1970a, 1970b); Marshall (1973)

Remarks : The present author (Iwamoto, 1970) provided a key to the subgenera and 6 species of *Malacocephalus*. The recent description of a 7th species, *M. boretzi* Sazonov, 1985, from the central Pacific, and the present author's discovery of other species from the Pacific and Indian oceans renders that key untenable. The intermediacy of several characters in *M. boretzi* clouds the distinction between the two *Malacocephalus* subgenera and also between *Malacocephalus* and *Ventrifossa*.

Some questions remain as to the status of the species *M. nipponensis* and *M. hawaiiensis* because of their close similarity to *M. laevis* -- it has been suggested that the 3 represent a single circumglobal species. The present author found the Atlantic and Indian Ocean populations to differ in one significant character from Pacific populations -- the scale count below the midbase of the first dorsal fin was 10.5 to 11.5 in the former and 8.0 to 9.5 in the latter. The scales appeared to be slightly larger and the spinules slightly longer in the Pacific population, but this was not quantified because of difficulties in making comparisons of these size-related features. Close comparisons of specimens from throughout the range may reveal other distinguishing features.

Key to Species

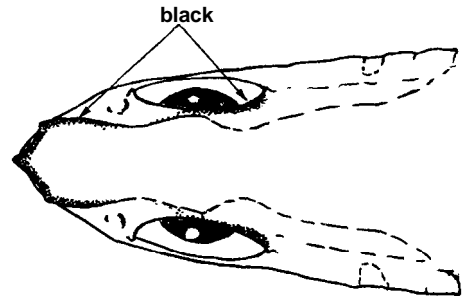
- 1a. Dorsal fin spine smooth.
- 2a. Lower jaw teeth in 2 irregular rows; pelvic fins with 8 rays *M. boretzi*
(C. N. Pacific)
- 2b. Lower jaw teeth in 1 series (Fig. 542); pelvic fins with 9 rays



(from Iwamoto & Arai, 1987)

Fig. 542

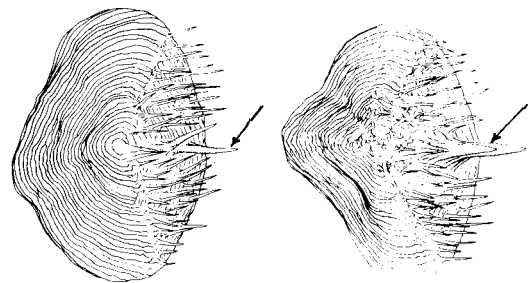
- 3a. Snout short, about 24% of head length, its tip on a horizontal through lower edge of pupil; preoral length 15% of head length; pectoral fins with 16 or 17 rays ***M. luzonensis*** (Philippines)
- 3b. Snout longer, 26% of head length or more; more pointed and higher, its bony tip on a horizontal through upper part of pupil; preoral length 16% of head length or more; pectoral fins usually with 18 to 22 rays
 - 4a. Scales below midbase of first dorsal fin 10 or more ***M. laevis*** (Atlantic, Indian Ocean)
 - 4b. Scales below midbase of first dorsal fin 8.0 to 9.5 (Pacific)...***M. nipponensis*** (Japan)
M. hawaiiensis (Hawaii)



top of head

M. occidentalis Fig. 543

- 1b. Dorsal spine serrated
 - 5a. Interorbital space usually 20 to 24% of head length. Scales below second dorsal fin lacking enlarged median spinules. Margins of orbits and leading edge of snout outlined in black (Fig. 543) ***M. occidentalis*** (Atlantic)
 - 5b. Interorbital space 27 to 34% of head length. Scales below second dorsal fin with enlarged median spinules in adults (Fig. 544). No black margins on orbits or snout..... ***M. okamurai*** (Tropical W. Atlantic)



scales

M. okamurai Fig. 544
(from Iwamoto & Arai, 1987)

List of Species of *Malacocephalus*

Subgenus ***Malacocephalus***

- Malacocephalus (M.) hawaiiensis*** Gilbert, 1905
- Malacocephalus (M.) laevis*** (Lowe, 1843)
- Malacocephalus (M.) luzonensis*** Gilbert & Hubbs, 1920
- Malacocephalus (M.) nipponensis*** Gilbert & Hubbs, 1916

Subgenus ***Pawnurus***

- Malacocephalus (P.) boretzi*** Sazonov, 1985
- Malacocephalus (P.) occidentalis*** Goode & Bean, 1885
- Malacocephalus (P.) okamurai*** Iwamoto & Arai, 1987

Malacocephalus laevis (Lowe, 1843)

Fig. 545

MACROUR Mal 1

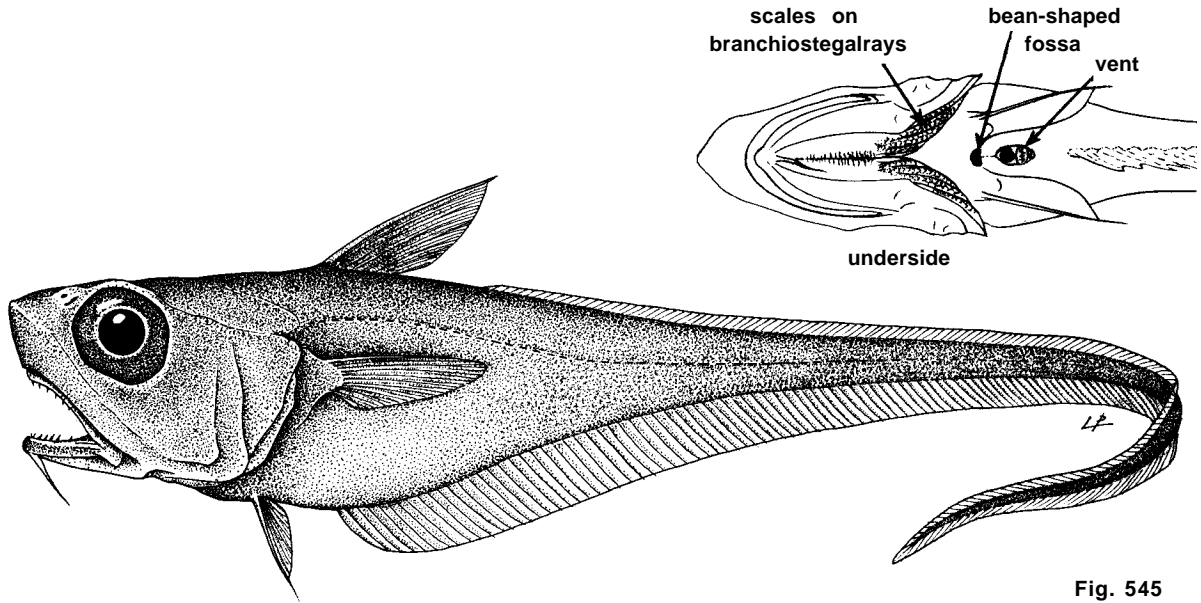
Scientific Name with Reference : *Macrourus laevis* Lowe, 1843, Proc. Zool. Soc Lond. 11:92**Synonyms** : *Malacocephalus laevis* - Günther, 1862:397; *Macrurus (Malacocephalus) laevis* - Günther, 1887.**FAO Names** : **En** - Softhead grenadier; **Fr** - Grenadier barbu; **Sp** - Abambolo de baja.

Fig. 545

Diagnostic Features : Interorbital width (usually 30 to 33% of head length) equal to or shorter than orbit diameter; snout 26 to 31% of head length; distance from orbit to preopercle angle 41 to 47% of head length. Two distinct rows of teeth on premaxillae; 1 wide-spaced row of canines on mandible. Usually a patch of scales on gular membrane; inner gill rakers on first arch 11 to 14 total. Dorsal fin spine smooth; first dorsal fin with 2 spines and 9 to 13 rays; pectoral fin rays i15 to i21.

Geographical Distribution : Warm waters of Atlantic and Indian Oceans; also possibly off Baja California (Fig. 546).

Habitat and Biology : Benthopelagic on continental slopes in depths of 200 to 1 000 m, but most common in about 300 to 700 m.

Size : To about 52 cm total length.

Interest to Fisheries : Commonly taken as bycatch of bottom trawlers in many areas. Used mostly for fishmeal and oil. In the past, fishermen in the North Atlantic were reported to have used the luminescent excretion from the ventral light organ to enhance baits used for codfishing.

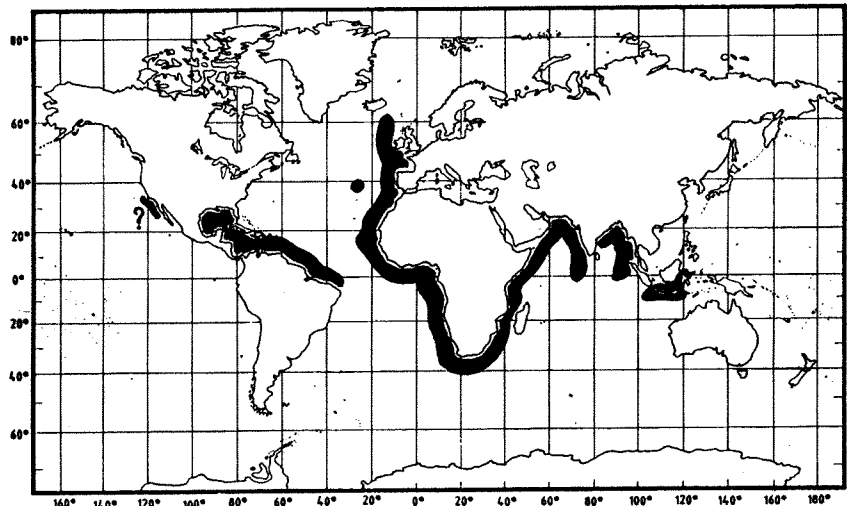


Fig. 546

Literature : Marshall (1973); Iwamoto (1970, 1979).

Remarks : The nominal Pacific species *M. hawaiiensis*, *M. luzonensis*, and *M. nipponensis* are closely related to *Malacocephalus laevis* and may eventually prove to represent populations of that species. Differences between these nominal species have not been adequately defined. A comprehensive comparison of material from the Atlantic, Indian Ocean, and throughout the Pacific is needed.

Malacocephalus occidentalis Goode & Bean, 1885

Fig. 547

MACROUR Mal 2

Scientific Name with Reference : *Malacocephalus occidentalis* Goode & Bean, 1885, *Proc. U.S. Natl. Mus.* 8:597.

Synonyms : *Lionuros (Nezumia) occidentalis* -- Gilbert & Hubbs, 1916: 145; *Chalinura occidentalis* -- Goode & Bean, 1896: 413; *Ventrifossa (Ventrifossa) occidentalis* -- Gilbert & Hubbs, 1920: 544; *Malacocephalus (Pawnurus) occidentalis* -- Parr, 1946; *Macruroplus violaceus* [non Zugmayer, 1911] -- Cadenat, 1953: 1066.

FAO Names : **En** - Western softhead grenadier; **Fr** - Grenadier scie; **Sp** - Abámbolo.

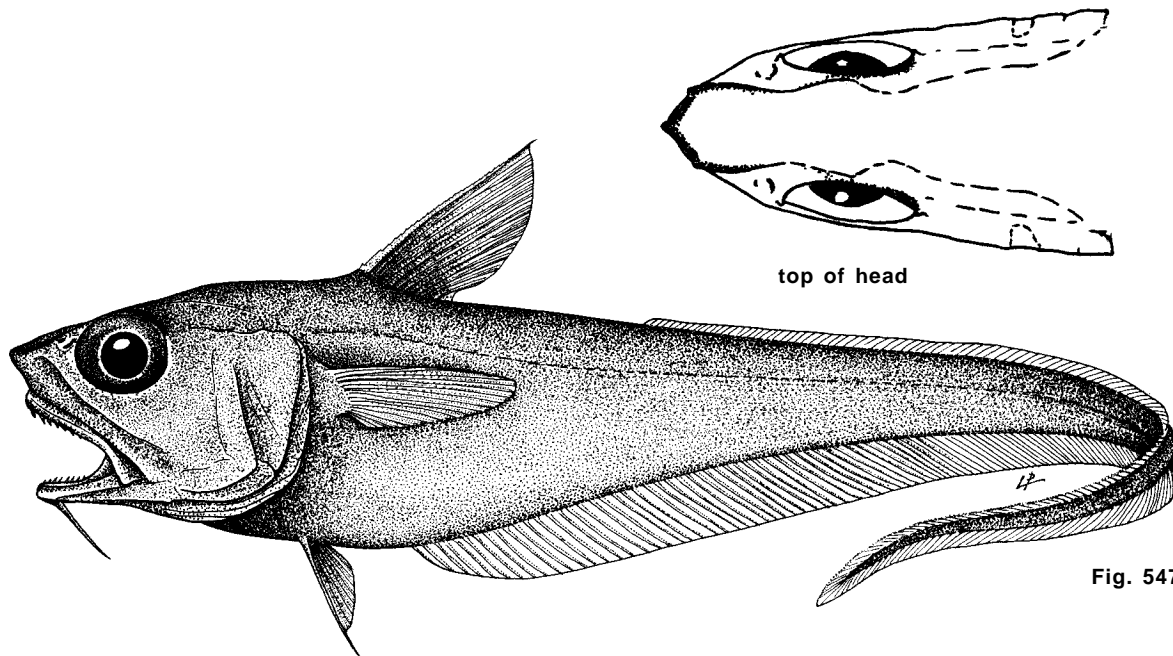


Fig. 547

Diagnostic Features : Snout narrow, weakly pointed, its length 26 to 31% of head length; orbit diameter usually 31 to 35% of head length; interorbital width usually 23 to 27% of head length; distance from orbit to preopercle 41 to 47% of head length; no scales on gular membrane; outer gill rakers on first arch usually 11 to 13 total. Premaxillary teeth in a broad band; one wide-spaced row of canines on mandible. First dorsal fin with 2 spines and 11 to 13 rays, the 2nd spine serrated; pectoral fin rays i20 to i25; pelvic fin rays 8 (7). **Colour**: upper lateral and leading edge of snout, orbital rims, lower margin of suborbital, lips, and gular membrane black.

Geographical Distribution : Tropical and warm-temperate waters of Atlantic (Fig. 548).

Habitat and Biology : Benthopelagic on continental slopes in depths of 200 to 600 m, but most common in about 300 to 500 m.

Size : To about 45 cm total length.

Interest to Fisheries : Taken as bycatch by offshore trawlers throughout its range. Mostly used for fish-meal and oil.

Local Names : CANADA: American strap-tail grenadier

Literature : Parr (1946); Poll (1953); Iwamoto (1970); Marshall (1973).

Remarks : Marshall (1973) has treated this species as a *Ventrifossa* because of its serrated dorsal spine and teeth in bands in premaxillary. The present author's treatment is based on features of the light organ,

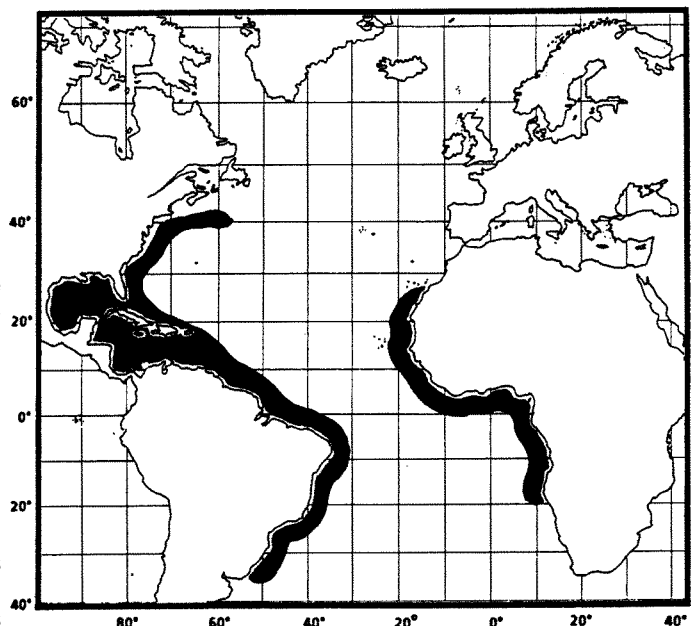


Fig. 548