

Size : Reaches a total length of at least 56 cm

Interest to Fisheries : Catch statistics for 1987 reported to FAO totalled 19 000 metric tons, mostly by USSR. Caught with trawls and longlines, marketed fresh. Only a small fishery exists and separate catch statistics are not recorded.

Local Names : AUSTRALIA: Deepsea cod, Ribaldo; FRANCE: Moro; ISRAEL: Gadela; ITALY: Moro; NEW ZEALAND: Deepsea cod, Googly-eyed cod, Ribaldo; PORTUGAL: Salmonete preto; TUNISIA: Ghrab; YUGOSLAVIA: Crnkinja.

Literature : Bini (1969); Paulin (1983).

Remarks : Separate names have been given to New Zealand (*M. pacifica*) and Australia (*M. dannevigii*) populations. Paulin (1983) believes that all populations belong to a single species; however, a thorough comparison of specimens from all regions is required.

***Physiculus* Kaup, 1858**

MOR Phys

Genus with Reference : *Physiculus* Kaup, 1858, *Arch.Naturgesch.*, 24:88.

Diagnostic Features : Chin barbel present in most species; a single band of brush-like teeth in jaws; teeth absent from vomer and palatines. Two dorsal fins, the first short-based, the second long based and a single, long-based anal fin. First dorsal fin with 5 or more rays. Anal fin originating on anterior half of body, not indented. Pelvic fin rays 4 to 7. Ventral light organ present as a dark, scale-less patch between ventral fin bases, its precise position may vary in different species (Fig. 798). Colour: in the various species varies from black or blue-black to pale pink or scarlet.

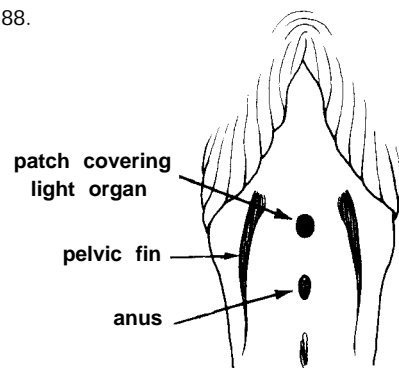
Habitat, Distribution and Biology : Benthopelagic; at least some species prefer a rough, rocky bottom. Various species occur at depths ranging from 2 or 3 m to over 1 500 m. Found throughout the world in tropical to temperate seas.

Interest to Fisheries : Minor, probably taken mostly by hook and line and in traps.

Remarks : There are 30 or more species of *Physiculus*. In a recent revision Paulin, 1989 presents a key

Tentative list of *Physiculus* species :

- Physiculus argyropastus* Alcock, 1893 - Indian Ocean
- Physiculus capensis* Gilchrist, 1922 -South Africa
- Physiculus chigodarana* Paulin, 1989 - Kagoshima, Japan
- Physiculus coheni* Paulin, 1989 - Central Pacific, Christmas Island
- Physiculus cynodon* Sazonov, 1987 - Central Pacific
- Physiculus dalwigkii* Kaup, 1858 -Western Mediterranean, Subtropical N-E. Atlantic
- Physiculus fulvus* Bean, 1885 - Tropical western North Atlantic
- Physiculus grinnelli* Jordan & Jordan, 1922 - Hawaii
- Physiculus helenensis* Paulin, 1989 - S. Atlantic, Saint Helena
- Physiculus huloti* Poll, 1953 -Tropical eastern Atlantic
- Physiculus japonica* Hilgendorf, 1879 - Japan, East China Sea
- Physiculus karrerae* Paulin, 1989 - Caribbean, Brazil, Saint Helena
- Physiculus kaupi* Poey, 1865 - Tropical western Atlantic
- Physiculus longicavis* Parin, 1984 -Southeast Pacific
- Physiculus longifilis* Weber, 1913 -Tropical Indo-Pacific
- Physiculus luminosa* Paulin, 1983 - New Zealand
- Physiculus marisrubri* Bruss, 1986 - Red Sea
- Physiculus natalensis* Gilchrist, 1922 -South Africa
- Physiculus nematopus* Gilbert, 1891 -Tropical eastern North Pacific
- Physiculus nigrescens* Smith & Radcliffe, 1912 -Tropical western Pacific



ventral view

Fig. 798

Physiculus nigripinnis Okamura, 1982 - Kyushu-Palau Ridge
Physiculus normani Bruss, 1986 -Western Indian Ocean
Physiculus peregrinus (Günther, 1871) -Tropical western Pacific
Physiculus rastrelliger Gilbert, 1891 - Tropical eastern North Pacific
Physiculus rhodopinnis Okamura, 1982 - Kyushu-Palau Ridge
Physiculus roseus Alcock, 1891 -Tropical Indo-Pacific
Physiculus sterops Paulin, 1989 - Hawaiian Islands
Physiculus sudanensis Paulin, 1989 -Western Indian Ocean
Physiculus talarae Hildebrand & Barton, 1949 - Eastern Pacific
Physiculus therosideros Paulin, 1987 - Southwest Pacific
Physiculus yoshidae Okamura, 1982 - Kyushu-Palau Ridge

***Physiculus dalwigkii* Kaup, 1858**

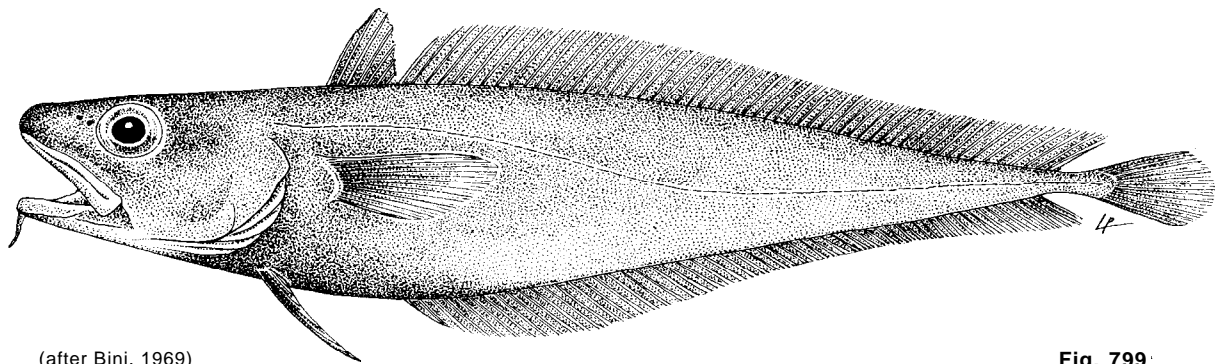
Fig. 799

MOR Phys 1

Scientific Name with Reference : *Physiculus dalwigkii* Kaup, 1858, Arch.Naturgesch., 24:88.

Synonyms : None

FAO Names : En - Black codling.



(after Bini, 1969)

Fig. 799

Diagnostic Features : Chin barbel present. No elongated rays in first dorsal fin; second dorsal fin rays 63 to 68; anal fin rays 66 to 75. Oblique scale rows between first dorsal fin and lateral line 11 to 13. Ventral light organ between bases of ventral fins. Colour: pinkish tan, oral cavity pale.

Geographical Distribution : Western Mediterranean, Madeira, Great Meteor Bank and south along the African coast to about 25°N(Fig. 800).

Habitat and Biology : Benthopelagic on the upper continental slope in about 100 to at least 300 m depth.

Size : Maximum total length about 30 cm.

Interest to Fisheries : Taken with bottom trawls and longlines, as bycatch of other fisheries. Occasionally seen in markets. Marketed mostly fresh.

Local Names : ITALY: Musdea nera; PORTUGAL: Abrotea de natura.

Literature : Bini (1969); Paulin (1989).

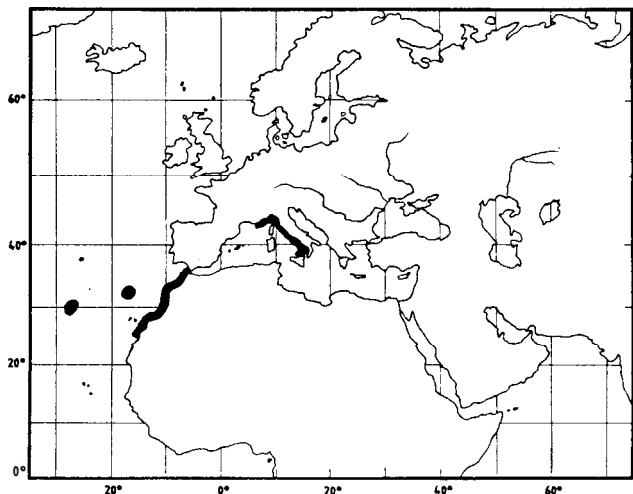
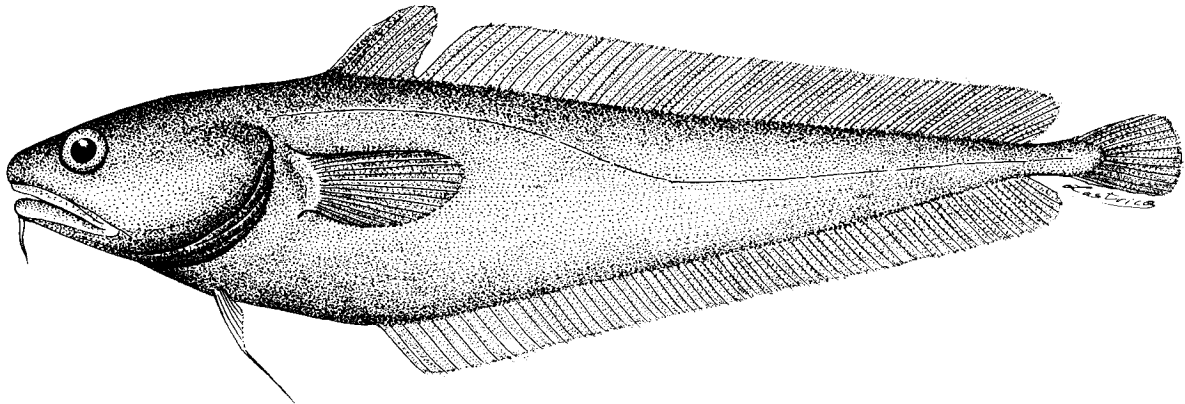


Fig. 800

Scientific Name with Reference : *Physiculus japonicus* Hilgendorf, 1879, Sitz.Naturf Freunde, 80.

Synonyms : None.

FAO Names : En- Japanese codling.



(after Okamura et al. 1982)

Fig. 801

Diagnostic Features : Chin barbel present. No elongated rays in first dorsal fin; second dorsal fin rays 63 to 71; anal fin rays 63 to 78; 12 to 14 scale rows between the first dorsal fin and the lateral line. Ventral light organ well behind a line between ventral fins. Vertebrae 52 to 56. Head and body light brown to pinkish tan, shading to blue-black on belly.

Geographical Distribution : Japan (Fig. 802).

Habitat and Biology : On rough, rocky bottom along the continental shelf and upper slope in 150 to 350 m depth.

Size : Maximum total length at least 35 cm.

Interest to Fisheries : Sometimes taken by trawlers. Marketed fresh. No separate catch statistics are recorded. Catches may contain more than one species.

Local Names : JAPAN: Chigodara.

Literature : Cohen (1979); Okamura et al. (1982); Masuda et al. (1984); Paulin (1989).

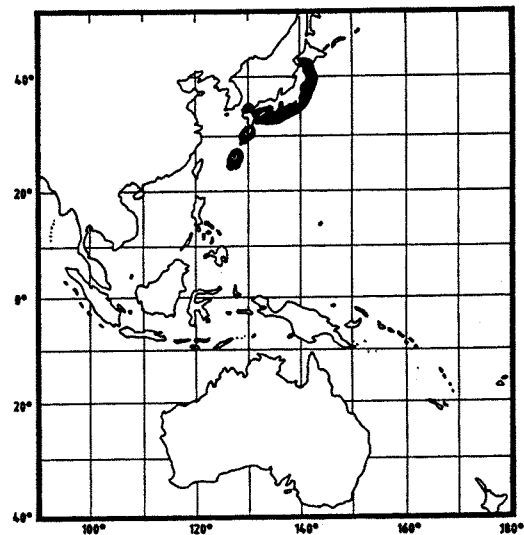


Fig. 802

***Pseudophycis* Günther, 1862**

MOR Pseud

Genus with Reference : *Pseudophycis* Günther, 1862, *Cat.Fish.Brit.Mus.*, 4:350.

Diagnostic Features : Eye diameter less than postorbital length of head. Chin barbel present. Jaw dentition a band of equal sized teeth. First dorsal fin with 8 to 14 rays, none greatly elongated; anal fin originating on anterior half of body, not greatly indented; pectoral fins reaching at least to origin of anal fin; pelvic fins with 5 or 6 rays, two somewhat elongated. Ventral light organ absent.

Habitat, Distribution and Biology : Benthopelagic on the continental shelf. Found around New Zealand and off Australia.

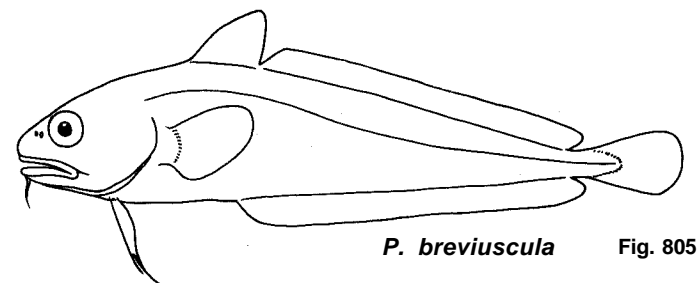
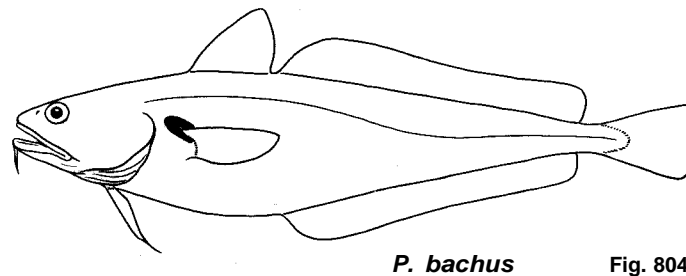
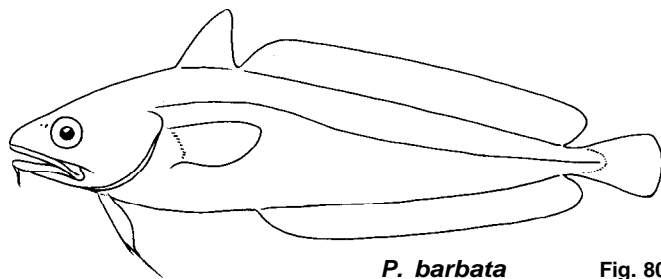
Size : From about 15 cm to over 1 m in total length.

Interest to Fisheries : Locally abundant and in some places a relatively important resource Taken with trawls, seines, gillnets, and hook and line.

Remarks : Three valid species according to Paulin (1983), from which the following key is adapted

Key to species:

- 1a. Scales between lateral line and first dorsal fin 13 to 16; pyloric caeca 16 to 20 (Fig. 803) ***P. barbata***
- 1b. Scales between lateral line and first dorsal fin 7 to 9; pyloric caeca 6 to 8
 - 2a. A dark blotch at base of pectoral fin; rear margin of caudal fin truncate (Fig. 804) ***P. bachus***
 - 2b. No dark blotch at base of pectoral fin; rear margin of caudal fin rounded (Fig. 805) ***P. breviuscula***



***Pseudophycis bachus* (Bloch & Schneider, 1801)**

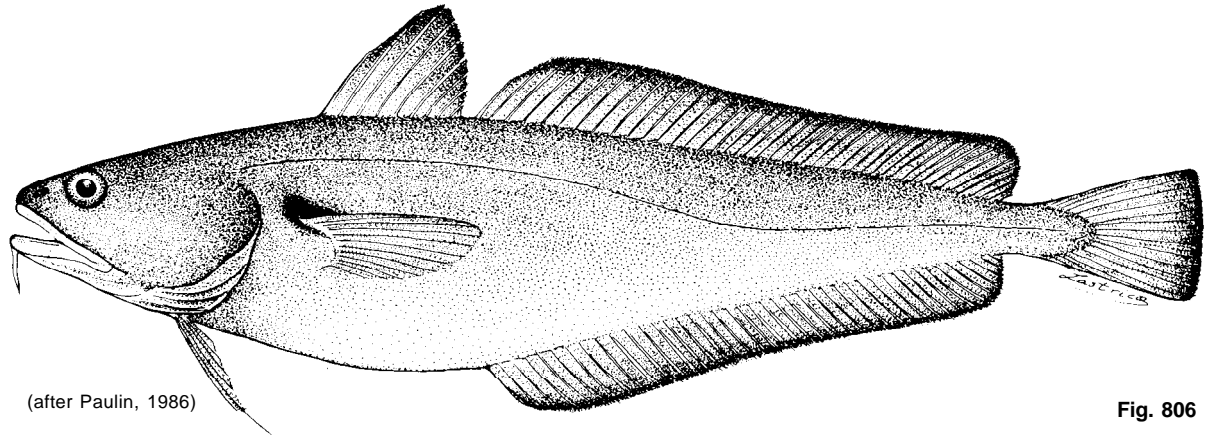
Fig. 806

MOR Pseud 1

Scientific Name with Reference : *Enchelyopus bachus* Bloch & Schneider, 1801, *Syst.Ichth.*:53.

Synonyms : *Lotella bachus*, Günther, 1862; *Pseudophycis bacchus*, Günther, 1880; *Physiculus bachus*, Waite, 1911; *Physiculus (Pseudophycis) bachus*, Graham, 1956.

FAO Names : En - Red codling



(after Paulin, 1986)

Fig. 806

Diagnostic Features : Nostrils anterior to eye by about one-third of snout length. Rear margin of caudal fin truncate; scales in a transverse row between first dorsal and lateral line 7 to 9. Pyloric caeca 6 to 8. **Colour**: chiefly reddish pink shading to paler ventrally, vertical fins with dark margins; a dark blotch at base of pectoral fin.

Geographical Distribution : New Zealand and around Australia, at least from Sydney to Adelaide, and around Tasmania (Fig. 807).

Habitat and Biology : In New Zealand, usually on soft muddy or sandy bottoms at depths of 50 to about 550 m, but most abundant in 200 to 300 m along the edge of the continental shelf. A shallow-water population inhabits crevices and caves in rocky areas at depths less than 50 m. Spawning occurs in late winter over the outer continental shelf, with large females producing as much as 30 million eggs. The young grow to 22 cm after year one, 30 to 35 cm after year two, and about 50 cm after year four, when they become sexually mature. Feeds primarily on fishes, cephalopods, crabs and other crustaceans (Ayling & Cox, 1982).

Size : Reaches about 90 cm total length, but mostly smaller.

Interest to Fisheries : Trawled in New Zealand (Canterbury Bight and off Westland). For 1983 7 809 t were reported to FAO, down considerably from the 12 500 t taken in 1977. These figures may include *P. barbata*, with which it has been confused for a long time in the fishery and in the literature.

Local Names : AUSTRALIA: Red cod; NEW ZEALAND: Hoka, Red cod.

Literature : Habib (1975); Ayling & Cox (1982); Paulin (1983, 1986).

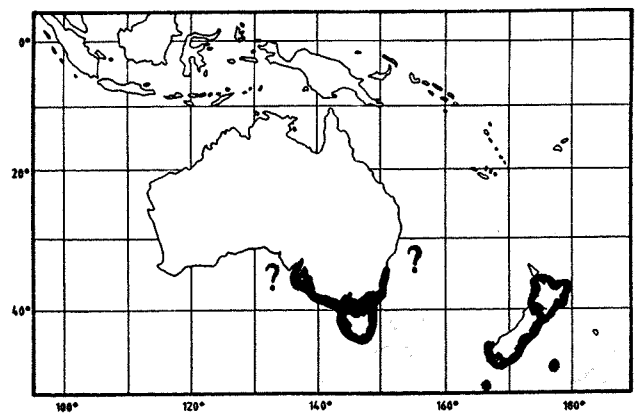


Fig. 807

***Pseudophycis barbata* Günther, 1863**

Fig. 808

MOR Pseud 2

Scientific Name with Reference : *Pseudophycis barbatus* Günther, 1863, *Ann.Mag.Nat.Hist.*, (3)11: 116.

Synonyms : *Lotella grandis* Ramsay, 1881; *Physiculus barbatus*, McCulloch, 1929

FAO Names : En Southern bastard codling.

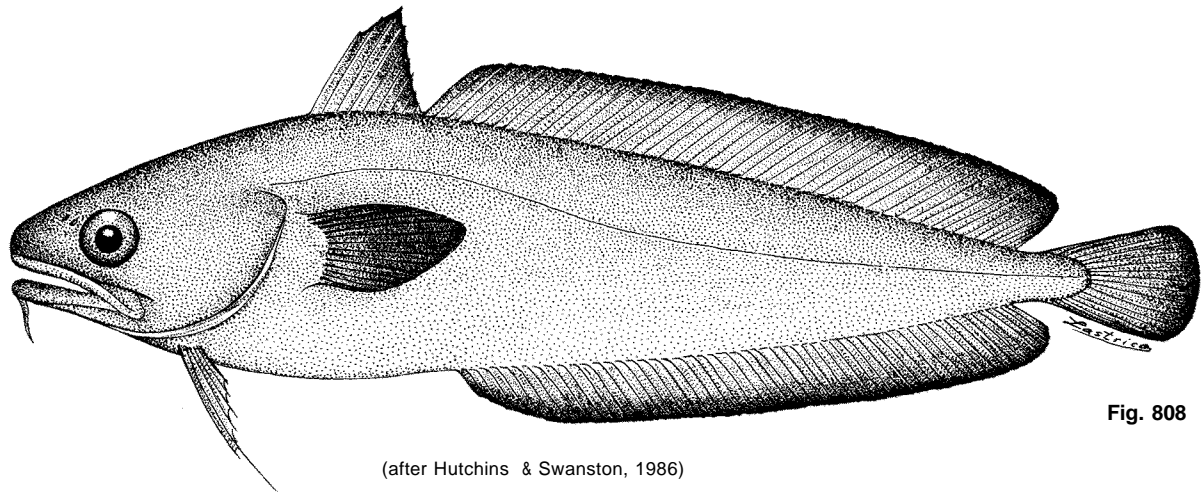


Fig. 808

(after Hutchins & Swanston, 1986)

Diagnostic Features : Nostrils immediately anterior to eye. Scales in a transverse row between first dorsal fin origin and lateral line 13 to 16. Pyloric caeca 16 to 20. **Colour**: reddish pink to pale brown dorsally, shading to lighter colour ventrally. Vertical fins with dark margins. No dark blotch at base of pectoral fin.

Geographical Distribution : Around New Zealand and Australia, from Sydney to Perth, although apparently rare in the west (Fig. 809).

Habitat and Biology : In New Zealand found on hard bottom at depths shallower than 300 m. Abundant in estuary mouths in New Zealand.

Size : Known to reach 63 cm total length.

Interest to Fisheries : Landed in New Zealand where potential for larger catches exists. Gillnetted in Tasmania. Occasionally appearing in the Melbourne market, taken from rock lobster pots. Separate catch statistics are not recorded, but the catch figures for *P. bachus*, which totalled 7 809 t in 1983, doubtless also includes this species.

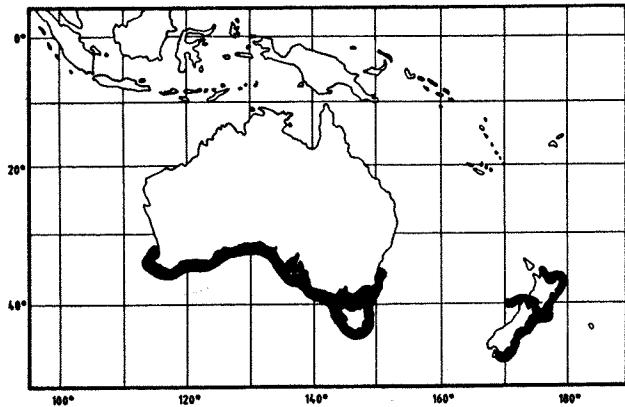


Fig. 809

Local Names : AUSTRALIA: Bearded rock cod, Beardie, Cod; NEW ZEALAND: Bastard cod, Bastard red cod

Literature : Graham (1956); Walker (1972); Paulin (1983).

Pseudophycis breviuscula (Richardson, 1846)

Fig. 810

MOR Pseud 3

Scientific Name with Reference : *Lota breviuscula* Richardson, 1846, Zool.Erebus and Terror, 2:61.

Synonyms : None.

FAO Names : En - Northern bastard codling.

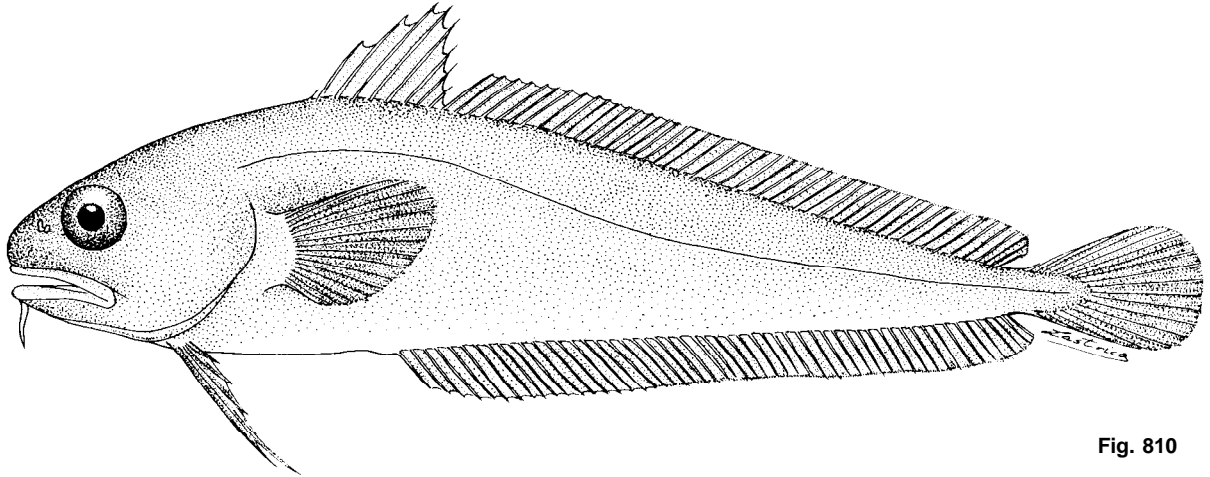


Fig. 810

Diagnostic Features : Caudal fin rounded. Scales in a transverse row between first dorsal fin origin and lateral line 6 to 8. Pyloric caeca 6 to 8. **Colour**: brown to pink-brown, paler ventrally; vertical fins with a dark margin. No dark blotch at base of pectoral fin.

Geographical Distribution : New Zealand, New South Wales to Southwest Australia, including Tasmania, less common to the west (Fig. 811).

Habitat and Biology : Benthopelagic over hard bottom. Caught at depths ranging from the shoreline to 220 m. Divers rarely see them during the day, but they are commonly observed at night swimming close to the bottom (Ayling & Cox, 1982).

Size : Maximum total length exceeding 25 m, but mostly smaller.

Interest to Fisheries : Although a common fish on the continental shelf, its relatively small size makes it of little interest to fisheries.

Local Names : NEW ZEALAND: Northern bastard red cod.

Literature : Paulin (1983).

Remarks : Although other references to the biology of this species exist, they should be used with care because of long-standing taxonomic confusion.

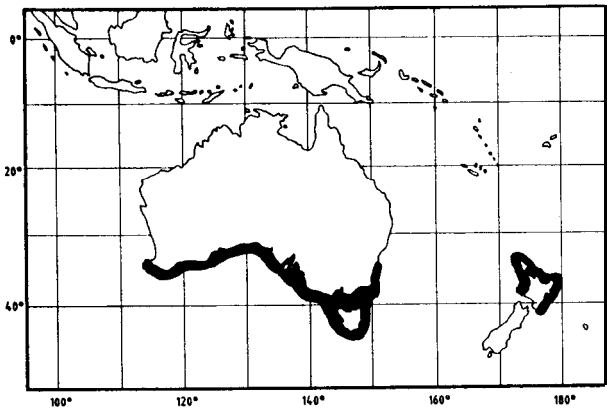


Fig. 811

***Salilota* Günther, 1887**

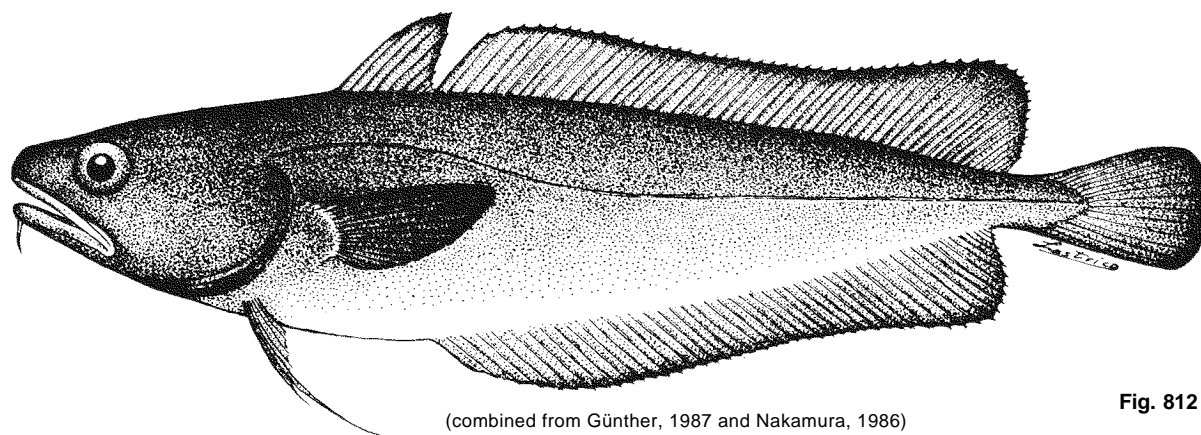
MOR Sal

Genus with Reference : *Salilota* Günther, 1887, Challenger Repts.Zool., 22:95

Salilota australis (Günther, 1878)

Fig. 812

MOR Sal 1

Scientific Name with Reference : *Haloporphyrus australis* Günther, 1878, *Ann.Mag.Nat.Hist.*, (5)2:19**Synonyms** : *Salilota bovei* Perugia, 1891.**FAO Names** : En - Tadpole codling.

(combined from Günther, 1987 and Nakamura, 1986)

Fig. 812

Diagnostic Features : Eyes equal to or larger than snout, shorter than postorbital; chin barbel present; a small, variably shaped patch of teeth on head of vomer. First dorsal fin with 9 to 12 rays, none greatly elongated; anal fin long-based, originating close to anterior third of body, not indented; pectoral fins reaching beyond anal fin origin. Ventral light organ present. Colour: body uniformly brown, fin margins darker.

Geographical Distribution : Patagonia-Falkland/ Malvinas region from 40°S to 55°S. Straits of Magellan and southern Chile to 45°S (Fig. 813).

Habitat and Biology : Benthopelagic at depths from 40 to more than 1 000 m with highest catches at 235 m. Females attain larger sizes than males. Larger individuals of both sexes move into deeper water.

Size : Reaching at least 50 cm total length.

Interest to Fisheries : Presently fished; marketed fresh in Patagonia, and also exported as frozen filets, and reduced to fishmeal.

Local Names : ARGENTINA: Bacalao austral, Bacalao criollo, Brotola brava; CHILE: Renacuajo de mar.

Literature : Bellisio, Lopez & Tomo (1979); Nakamura (1986)

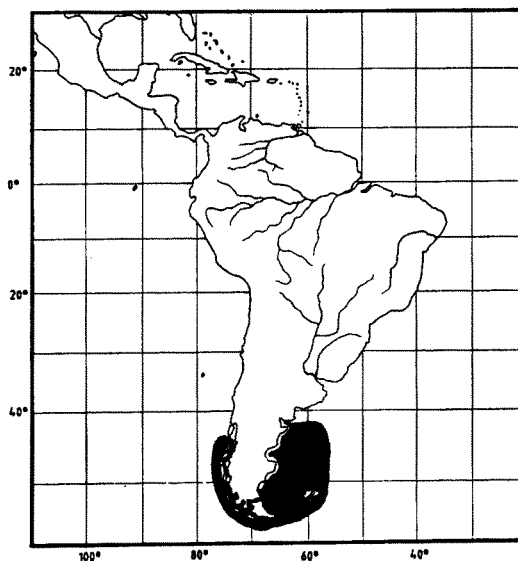


Fig. 813

Tripterophycis Boulenger, 1902

MOR Tript

Genus with Reference : *Tripterophycis* Boulenger, 1902, Ann.Mag.nat.Hist., 7,9:335

Diagnostic Features : Head small, 5 or more times in standard length, eye diameter equal to or smaller than postorbital length; chin barbel present; upper jaw falling short of rear margin of eye. First dorsal fin short-based, with 5 to 7 rays; second dorsal appearing as two distinct fins separated by a very low, scarcely visible median segment, the anterior section short-based and high, the posterior long-based and low; anal fin long-based, originating on anterior one-fourth of body, not indented; pectoral fins reaching beyond origin of anal fin base; pectoral fins with one or two moderately elongate rays. Ventral light organ present.

Size : Reaching about 33 cm total length.

Habitat, Distribution and Biology : Rare fishes, apparently benthopelagic at depths from 100 to more than 1 000 m in the subtropical to temperate South Pacific and southern Indian Oceans.

Interest to Fisheries : None.

Literature : Paulin (1983); Sazonov & Shcherbachev (1986).

List of Species :

Tripterophycis gilchristi Boulenger, 1902 - South Africa and Madagascar to New Zealand.

Tripterophycis svetovidovi Sazonov & Shcherbachev (1986) - Sala y Gomez Ridge in eastern Pacific, Madagascar, Australia

Key to Species:

- 1a. Jaw teeth compressed, incisor-like, close together..... ***T.gilchristi***
 1b. Jaw teeth conical, widely spaced..... ***T. svetovidovi***

Tripterophycis gilchristi Boulenger, 1902

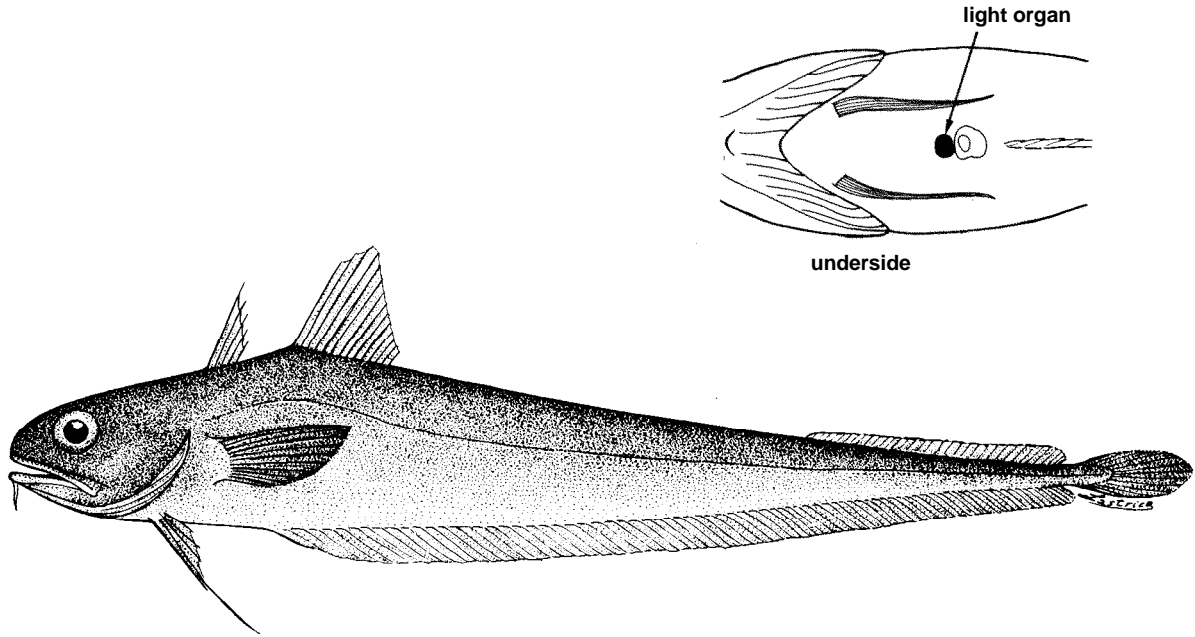
Fig. 814

MOR Tript 1

Scientific Name with Reference : *Tripterophycis gilchristi* Boulenger, 1902, Ann.Mag.nat.Hist., 7,9:335.

Synonyms : *Tripterophycis intermedius* Whitley, 1948.

FAO Names : En - Grenadier cod.



(after Paulin, 1986)

Fig. 814

Diagnostic Features : Jaw teeth compressed, incisor-like, set in a single row; vomer and palatines lacking teeth.
Colour: pale brown to pink.

Geographical Distribution : Known from New Zealand, Australia (New South Wales through the Great Australian Bight), Sumatra, south-western Indian Ocean, and mid-south Atlantic (Fig. 815).

Habitat and Biology : Benthopelagic at depths from 100 to more than 1 000 m.

Size : Reaching about 33 cm total length.

Interest to Fisheries : None.

Local Names : AUSTRALIA, NEW ZEALAND : Grenadier cod.

Literature : Paulin (1983).

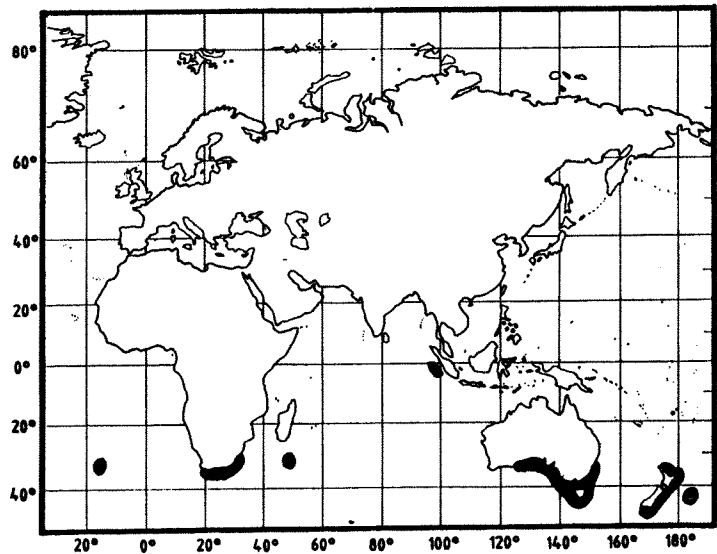


Fig. 815